

From Farming to International Business: The Social Auspices of Entrepreneurship in a Growing Economy *

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Abstract

Entrepreneurship has been traditionally concentrated in the hands of a few small communities in most developing economies. As these economies restructure, it is evident that these communities will be unable to satisfy the increased demand for new entrepreneurs. The analysis in this paper suggests that entrepreneurs without a family background in business will fill the gap, even in industries where connections matter a great deal, using their own community networks to support business activity. The theoretical framework indicates that these networks will actually grow most vigorously in communities with poor outside options once they do crystallize. Using new firm-level data on the Indian diamond industry, the empirical analysis verifies this prediction, documenting the important role played by an underlying community network in the expansion from agriculture to international business in one historically disadvantaged community over the course of a single generation.

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JEL. D85. J62. L14. L22.

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1 Introduction

Entrepreneurship – the successful establishment and management of new business – plays a critical role in the development process. Following Banerjee and Newman’s (1993) seminal contribution, the dominant view among development economists today is that inefficient credit markets can create substantial barriers to entry among potential entrepreneurs, with negative consequences for both growth and distribution. Although empirical tests of this hypothesis have provided mixed results (McKenzie and Woodruff 2002, Paulson, Townsend and Karaivanov 2006), it has nevertheless had a major impact on development policy, with numerous efforts initiated worldwide to provide micro-credit to fledgling entrepreneurs.

Most micro-credit initiatives focus on small business, such as managing a shop or engaging in petty trade, and the two studies listed above, for example, report a median investment of less than one thousand dollars among the enterprises that they sample. This paper is concerned, in contrast, with business activity at a larger scale that employs much greater amounts of both capital and labor. Within this class of potential entrepreneurs, a lack of business connections and commercial knowhow rather than liquidity might be the most significant barrier to entry. Business success in a developing economy requires a knowledge of the system; how to take advantage of legal loopholes and who to bribe. It also requires connections to buyers, sellers, bank loan officers, and other government officials. In such an economy, an individual who is born into a business *family* has a distinct advantage. The wealth that he inherits makes it easier to secure bank credit, while the experience and training that he receives from his father teaches him how to make connections and, more generally, how to exploit the opportunities that are available in the system. An entrepreneur who is born into a business *community* has an additional advantage, net of his family background, since community-based networks provide credit, insurance, and business connections to their members (Fafchamps 2001, Rauch and Trinidad 2002).

It is consequently not surprising that entrepreneurship has been historically concentrated in the hands of a few small communities in most developing economies. As these economies restructure and make the transition to a steeper growth path, however, it is evident that these communities will be unable to satisfy the increased demand for new entrepreneurs. The Indian economy, for example, has been growing rapidly since the early 1990s and is expected to continue to grow at this rate for many decades in the future. A critical question for India’s prospects and its ability to emerge as a global

economic power is whether and how it will be able to draw from a wider pool of entrepreneurial talent in the future.

Weber's (1958) pessimistic prognosis for India's economic future was not based on credit market imperfections, but on the rigid caste-based nature of Indian society, which he believed was inherently hostile to occupational mobility and, by extension, to business and entrepreneurship. This explained why Indian business was historically dominated by a single caste-group, the Vaishyas, and by non-Hindu communities such as Jains and Parsis. Modern historians such as Chandravarkar (1985) and Rudner (1994) have argued, in contrast, that occupational mobility has occurred on occasion, even in this caste-based society where connections are so important, when new entrepreneurial opportunities became available. In their view, mobility was historically facilitated through the endogenous formation of new networks in groups without a prior business background. The first-generation entrepreneurs in such groups would lack a family background in business. However, I will argue that business networks should strengthen particularly rapidly in those groups once they do form, compensating for the inherent disadvantage faced by first-generation entrepreneurs. This paper provides formal support for this hypothesis by documenting the role played by a new community-based business network in supporting the expansion from agriculture to international business in one community – the Kanbi Patels – in one important Indian industry – the diamond industry – over the course of a single generation.¹

India does not produce rough diamonds. The rough diamonds must first be imported, typically from Antwerp, and then cut and polished in factories and workshops, most of which are located in the city of Surat, north of Bombay. The polished diamonds are subsequently sold on the Bombay market to foreign buyers or shipped directly abroad. A combination of commercial acumen and cheap labor facilitated the rapid expansion of the diamond industry, which accounts for roughly 14% of India's total merchandise exports, and has competed with textiles, and more recently with computer software, as the country's top export industry over the course of the past three decades. It is estimated that approximately one thousand Indian diamond export firms employ over a million workers and that this industry accounts for as much as 85% of the rough diamonds cut and polished worldwide (60% by value) today (GJEPC 1998, Purani 2000).

¹Although networks may serve a useful purpose when markets function imperfectly, these collective arrangements can give rise to dynamic inefficiencies that constrain the individual's response to new opportunities (Greif 1994, Kranton 1996, Rauch 2001). Recent evidence from urban India indicates that *traditional* caste-based networks can indeed *restrict* mobility (Munshi and Rosenzweig 2006). The analysis in this paper suggests, in contrast, that *new* networks might at the same time be forming to *facilitate* mobility in growing economies.

Although much has been made of India's software industry and the growth of its economy more generally over the past decade, the diamond industry has also grown rapidly, at an average rate of 10% per year since the mid-1970s, for the most part outside the public eye. Diamond firms are notoriously secretive, partly due to the high value and hence the security concerns associated with their product. Diamonds, particularly rough diamonds, are also difficult to value objectively and can be easily swapped, and so diamond transactions rarely involve written contracts. Trust plays an important role in this industry, which is not surprisingly associated with a high degree of community networking, and with its low transparency, world-wide. Hasidic Jews historically controlled the Antwerp market, and in India two traditional business communities – Gujarati Jains from the town of Palanpur (known in the industry as *Palanpuris*) and *Marwaris* originally from the state of Rajasthan – have dominated the industry from its inception in the early 1960s. The commitment problems that arise naturally with diamond transactions would suggest that there are enormous barriers to entry for outsiders in this industry. Nevertheless, the Indian diamond industry has undergone a dramatic change in its sociological composition over the past two decades – with the entry of a new community into the business – which we will attempt to understand in this paper.

Historically, the Palanpuris and Marwaris handled the business end of the industry, leaving the cutting and the polishing to Kanbi Patels (known in the industry as *Kathiawaris*). The Kathiawaris are farmers from Saurashtra in the interior of Gujarat, many of whom migrated to Surat to work as laborers in the diamond industry when it started to grow in the early 1970s. Some of these migrants became manufacturing contractors, in charge of entire workshops or factories, and these contractors in turn brought more members of their caste to work in the Surat industry. Commitment problems arise at the manufacturing stage as well, with swapping of roughs being a common complaint, and so most Marwari and Palanpuri businessmen built long-term relationships with their Kathiawari contractors. In the mid-1970s, an exogenous increase in the world supply of rough diamonds, which could not be handled by the existing business networks, led some of these businessmen to open the door to the diamond trade to their trusted Kathiawari contractors. Bank credit has, until recently, been unavailable to diamond firms for good reason, due to the particular nature of this business. Thus, the critical step in the diamond trading process is accessing rough diamonds on credit from abroad. Palanpuri businessmen, who had established branches in Antwerp by that time, provided excess roughs to their contractors or served as guarantors for other suppliers. The early Kathiawari entrants took advantage of this opportunity to bring other members of their community into the business, providing

connections to rough suppliers in Antwerp and other forms of support, and the number of Kathiawari firms subsequently grew rapidly over time.

The theoretical framework developed in this paper shows that industry-specific networks will strengthen most rapidly in communities with poor outside options. Although the Palanpuris and particularly the Marwaris have many business opportunities outside the diamond industry, the next best option for Kathiawari entrepreneurs is farming or perhaps managing a diamond workshop in Surat, neither of which is particularly remunerative. We thus expect that once the Kathiawari network had crystallized, in response to the new business opportunities that became available, it should have strengthened more rapidly than the networks in the established business communities. Networks are by their nature difficult to observe and so I take an indirect approach to support this claim by studying changes in firm characteristics and performance, across communities and over time.

The empirical analysis in this paper is based for the most part on a survey of nearly 800 diamond export firms, with offices in the Bombay market, that I conducted in 2004-05. The survey collected information on the senior partner's personal and family background, the firm's history, and business relationships over time. Given the importance of a family background in business, particularly in an industry like the diamond industry where connections and commercial acumen are so useful, I measure entrepreneurial ability by the individual's father's occupation, specifically by whether his father was a businessman. Based on this measure of ability, as well as on other measures such as education, which also reflect the individual's intrinsic capability, we see that the ability of the Kathiawari entrants declines more steeply over time than their Marwari and Palanpuri rivals, consistent with the view that their rapidly strengthening network was compensating for the arrival of increasingly weak entrants at the margin. Although most of the early Kathiawari entrants had family backgrounds in business, by 1990 over 60% of the entrants were the sons of farmers, highlighting the role that their network played in supporting occupational mobility in an industry with substantial barriers to entry. An analysis of firm performance across communities and over time provides independent support for this conclusion, while inspection of intra-industry marriage patterns suggests a mechanism through which the Kathiawari network grew so strong.

Will the supply of entrepreneurial talent constrain growth in the future? We see in this paper that an exogenous increase in the demand for entrepreneurs in the Indian diamond industry gave rise to a new network that allowed entrants from a community without a background in business to enter. The network actually grew most vigorously in this community once it did crystallize. Based

on the theoretical framework and the empirical results, I will discuss conditions under which the experience of the diamond industry could be replicated in the concluding section of the paper. I will also argue in that section, based on recent developments in the diamond industry, that standard solutions to stimulate entrepreneurship, such as the infusion of bank credit, could have unexpected negative effects in industries where networks and markets co-exist.

2 The Institutional Setting

2.1 Entrepreneurship in India

“The history of the rise and growth of a modern business class in India is largely the history of the activities of members of certain groups” (Gadgil 1959: 16). One broad caste group, the Vaishyas, traditionally controlled money-lending and trade in India, with sub-castes or *jatis* drawn from this group active in different regions of the country. Mercantile opportunities expanded considerably with the arrival of the British in the eighteenth century and, not surprisingly, these opportunities were captured by the traditional business *jatis* and by a few non-Hindu communities such as the Jains and the Parsis.

Commercial activity under the British was concentrated around the ports of Calcutta and Bombay. Parsis and Gujarati Baniyas dominated Bombay’s textile manufacturing, finance, and foreign trade from the middle of the nineteenth century (Nafziger 1971). Commercial activity in Calcutta was already controlled by Marwari traders and bankers, originally from Rajasthan, by this time. Although the Marwaris made the transition to industry relatively late – around 1914 – they subsequently rapidly expanded their industrial and trading activities throughout the country (Lamb 1955).

The Marwaris, Parsis, and Gujarati trading *jatis* continue to dominate modern industry and banking, especially in major cities such as Bombay and Calcutta. For example, Timberg (1978) reports that 23 of the 37 largest North Indian owned industrial houses listed in the *Monopolies Inquiry Commission Report* of 1964 were Marwaris and Gujaratis. Timberg also cites a Time Magazine article (March 1, 1963, p. 77) in which it is estimated that the Marwaris controlled 60% of the assets in Indian industry at that time. More recently, a Times of India article (October 20, 2006) estimates that Gujarati promoted companies account for 17% of the market capitalization of the BSE-500 index, followed by Marwari promoted companies with 11% and Parsi promoted companies with 8%. Public sector units, including banks and oil companies, account for 25% and all other companies, including

multinationals, just 39% of the market capitalization.² A few communities such as the Sindhis and the Punjabi Khattris have gained prominence in Indian business after independence, but these communities were already engaged in commerce before they migrated to India from Pakistan in 1947.

The fact that traditional business communities continue to dominate mercantile activity in India does not imply that outsiders will not step forward in the future. There are some notable examples of non-mercantile communities making the transition to business when new opportunities became available, such as the entry of the Parsis into trade and industry under the British (Medhora 1965) and more recently the expansion of the Gounder community in Tamil Nadu from agriculture to textile manufacturing and exports in Tirupur (Cawthorne 1995). We know very little about the preconditions or the process through which such occupational mobility occurs and so it seems especially relevant to study the expansion from agriculture to business among the Kathiawaris.

2.2 A Brief History of the Indian Diamond Industry

The history of the modern Indian diamond industry begins in the 1880s when two diamond merchants from the town of Palanpur in Northern Gujarat, Surajmal Lalubhai and Amulakh Khubhchand Parikh, expanded their business to Bombay, Calcutta, and Rangoon.³ Over the next two decades, many Palanpuri Jains followed these pioneers into the diamond business, and later the pearl trade, and the Palanpuri network reached as far as Antwerp, where 20-25 families were settled by 1937. The overseas Palanpuris were forced to return to India during World War II and the industry suffered a further blow after independence in 1947 when the import of rough diamonds was banned to preserve scarce foreign exchange. The diamond business was restricted to domestic trade in polished stones, for the most part, until the early 1960s, when the Multi-Rate Import Replenishment Scheme allowed rough diamonds to be imported once again, against the export of rough diamonds.

Workshops were quickly set up in Surat, Navsari, and other inland centers to cut and polish diamonds and the industry grew extremely rapidly thereafter. Marwari businessmen also entered the diamond industry at this time. The Marwari network is more diversified, both spatially and by business activity, than any other community network in the country. Some of the new Marwari entrants had experience in the colored-stone business, which was traditionally centered around the city

²The market capitalization of the BSE-500 index is 92% of the total BSE (Bombay Stock Exchange) market capitalization.

³The discussion on the Palanpuris in this section is based on Chhotalal (1990) and an unpublished interview with the (former) Nawab of Palanpur conducted by Mark Boston and Sharada Dwivedi. The discussion on the Kathiawaris that follows is drawn from Engelshoven (2002).

of Jaipur in Rajasthan, but other merchants were attracted by the high rate of return on investment in the diamond industry.

In these early years, the Palanpuris and Marwaris handled the trading end of the diamond business, while Kathiawaris cut and polished the diamonds. The Kathiawaris are a caste of cultivators who worked historically as sharecroppers and laborers in Saurashtra, an arid region in Gujarat that is prone to drought and famine. The first Kathiawari migrants came to Surat in the 1960s, just as the diamond industry was starting to grow. Initially the Kathiawaris worked in factories owned by Palanpuris and local Surtis. However, many of the early migrants were able to set up their own workshops and factories by the early 1970s, doing contract work for Palanpuri and Marwari exporters. As discussed earlier, some of these contractors were encouraged to enter the import-export business in the mid-1970s by Palanpuris with whom they had established close personal ties, and we will see that the Kathiawari network grew at least as fast as the Palanpuri and Marwari networks in the decades that followed.⁴ What is most remarkable about this rapid growth is that the Kathiawari network had to draw from a pool of potential entrepreneurs with no family experience in business to expand, whereas the Palanpuris and the Marwaris belong to communities with many generations of business experience.

2.3 The Survey

Although aggregate diamond statistics are available over many years, detailed firm-level information could only be obtained by conducting a survey of the industry. Diamond firms are very secretive and so every effort was made to establish connections within the industry before the survey commenced. Assisted by a few close personal connections within the industry, I gradually built up a small network of influential diamond exporters over a two-year period, which in turn later helped the survey team penetrate each of the community networks. Despite this strong support, it was a challenge to gain access to the firms, and the implementation of the survey itself provides useful insights into the workings of this industry.

⁴Exporters maintain long-term relationships with their manufacturing contractors to avoid commitment problems at the cutting and polishing stage of the production process. This allows a high level of trust to be sustained across community lines between the exporters and their contractors. The fact that the early Kathiawari entrants were supported by Palanpuris is not disputed in the diamond industry, although individual firms are reluctant to admit that they were assisted in this way. Statements such as the following are often heard: “Kathiawadis are here because of the Palanpuris’ admits a Kathiawadi diamond merchant. The Palanpuris, who were the market leaders brought the Kathiawadis into the trade. Help came not only in the form of finance but as initiation into the import-export sector.” *Diamond World* (November-December 1999: p.52-53).

The population of firms is based on a computerized database maintained by the Gem and Jewelry Export Promotion Council (GJEPC) of all its members. This database includes the name of the firm, its address and telephone numbers, the name of a contact individual (typically the senior partner), and the firm's export figures, each year from 1995 onwards. Under the Multi-Rate Import Replenishment Scheme, a firm's foreign exchange quota, which allowed it to (legally) import roughs, was based on its previous exports. The GJEPC verified the export figures for its members and then forwarded them to the Government of India. Most exporters availed of this useful service, and so the GJEPC database provides us with a comprehensive list of firms that exported polished diamonds, each year, over the past decade. I was able to gain access to this database, covering the 1995-2003 period, at the beginning of 2004.

For security reasons, diamond markets tend to be spatially concentrated world-wide. In Bombay, the polished diamond market covers approximately 0.25 square miles in the Opera House area of the city. Hundreds of the larger firms have offices in two buildings – Panchratna and Prasad Chambers – and the smaller firms are crowded into buildings in the adjacent lanes and by-lanes. Somewhat surprisingly, however, a preliminary inspection of the GJEPC database revealed a significant fraction of firms with addresses outside the Opera House area. Diamond firms often operate under multiple names to exploit income tax loopholes and many of these “shell” firms are listed in residential areas where the diamond merchants live. In an economy where foreign exchange was until recently tightly regulated, the import-export nature of the diamond business also attracted firms, known in the industry as *choprawallas* (book-keepers), that were engaged in money laundering rather than legitimate diamond business. Many of these firms would also be listed outside the Opera House area. My industry contacts assured me that firms with legitimate activity in the diamond industry would have at least one office in the Opera House area and so the relevant population of firms for the survey was restricted to the 1,854 firms with addresses in that area, listed in the GJEPC database as exporting in any year over the 2001-03 period.

To test its ability to gain access to these firms, the survey team sent letters of introduction from the chairman of the GJEPC and the principal investigator to 40 firms drawn randomly from the list of 1,854 firms operating in the Opera House area. These firms were subsequently contacted by telephone to arrange an appointment, but only three agreed to be interviewed. It was clear from the outset that the only way to achieve a reasonable response rate in such a heavily networked industry was to use our own social connections. A computerized referral system was set up, and each firm in my personal

network provided a list of firms that it was tied closely with. These firms, in turn, provided additional referrals, and the process continued until all the names on our list had been covered. Progress was slow to begin with, and only 63 interviews were completed in December 2004, the first month of the survey. However, the pace increased thereafter, to six interviews per day, and the survey was ultimately completed in five months.

Of the 1,854 firms on our list, we were able to ascertain that 480 were multiple-name listings, 288 were *choprawallas*, 102 could not be contacted by phone, 53 had shut down, and 9 had no partners in town during the survey period, leaving us with 922 eligible firms. We ultimately interviewed 777 firms, giving us an overall response rate of 84.3%.⁵ Among the firms that we interviewed, 96.3% belonged to the three major communities and of these firms, 29% were Kathiawari, 17% were Marwari, and 54% were Palanpuri. When providing referrals, our contacts were simply asked to list firms that they were closely tied with, without any prompting from our side. It is worth noting that not a single referral led us to a firm without at least one office in the Opera House area, justifying the spatial restriction placed on the population of relevant firms. Moreover, only 5.7% of the sampled firms did not appear in the GJEPC database, supporting the assumption that this database effectively covers the entire population of active exporters.⁶

The sampled firms are all currently active. Much of the analysis in this paper is concerned with changes in the industry and so we would, in principle, need information on exit as well. Fortunately, exit rates in the diamond industry are extremely low, consistent with the theoretical framework in Section 3, which predicts that firms should not exit once they enter this industry. The GJEPC database lists all exporters, each year, over the 1995-2003 period. I assume that a firm exits in a given year if it was exporting in that year but fails to show up thereafter. It seems reasonable to assume that a firm which fails to show up continuously for three years or longer has permanently exited, allowing me to compute exit rates each year from 1995 to 2000. Restricting attention to firms in the Opera House area, exit rates are low each year – just around 1.5% – and there is no discernable time trend

⁵The firms that could not be contacted using the phone number provided by the GJEPC or traced through the directory enquiry system had either changed their name or shut down. Firms without a partner in town over a five month period are also unlikely to be active in the export market. The response rate across communities was 85.7% for the Kathiawaris, 89.3% for the Marwaris, and 81.9% for the Palanpuris.

⁶Towards the end of the survey, respondents were provided with a list of firms from our list that were still to be contacted. The survey team also made 36 appointments in the final month of the survey by telephoning exporters directly. While these few deviations from the usual procedure would naturally reduce the number of referrals made outside the list, they are unlikely to undermine the basic claim that the GJEPC database effectively covers all active exporters and that it is appropriate to restrict attention to firms located in the Opera House area.

in these statistics. Moreover, exit rates do not vary by community.⁷

The computerized system that we had set up to schedule interviews included data fields to record the identity of up to five individuals who had provided referrals for each firm. We would speak on behalf of these individuals when arranging interviews with the firms; in many cases this was sufficient for the firm to agree to be interviewed, but in other cases the firms did contact the individual who had provided the referral to verify its authenticity. Although it is well known that community networks play an important role in this industry, the survey respondents were generally reluctant to report the support that they received from members of their community or from other close connections in the diamond industry. The pattern of referrals that was received evidently had research value since it could be used to provide direct evidence on the importance of community ties and so the survey team was instructed to continue to fill those data fields even after a firm had been interviewed.

Table 1 lists the major sources of referrals, the number of referrals that they provided, and the community-wise breakdown of firms that received these referrals. We started with the largest firms in the industry and gradually moved down the firm-size distribution as we received referrals to smaller and smaller firms. Because of this non-random sequence of interviews and because the number of referrals is restricted to five per firm, we clearly do not have a representative sample of referrals. The statistics in Table 1 should be treated with caution, but the cross-community referral patterns reported below are nevertheless indicative of the important role that social ties play in this industry. A total of 295 individuals provided referrals; 72% were exporters belonging to the three main communities, 16% were brokers, and the remaining 12% were exporters from other communities and individuals outside the industry who had social connections with particular exporters. A total of 1,473 referrals were provided by these sources; 76% from the exporters, 16% from the brokers, and 8% from other sources. Although the three communities are represented roughly in proportion to their share in the population of export firms in Column 1, Marwaris are over-represented, while Kathiawaris are under-represented in terms of their share of the total referrals provided in Column 2.

Looking across Columns 3-5 it is apparent that exporters from each community disproportionately provide referrals to members of their own group. Given that Kathiawaris make up just 29% of all

⁷The contact names included in the GJEPC database, together with a detailed knowledge of firms in the industry, allowed my contacts and their employees to assign a community affiliation to each firm in the database that was located in the Opera House area. Names are a good indicator of community affiliation, and comparing this assignment to the actual affiliation, obtained from the survey, just 6.3% of the sampled firms were miscoded. Based on the assigned community affiliation, annual exit rates over the 1995-2000 period are 1.8% for the Kathiawaris, 1.1% for the Marwaris, and 1.5% for the Palanpuris.

firms, it is quite striking that 74% of the referrals from Kathiawari exporters are to members of their community. Marwaris and Palanpuris also favor members of their own community, but the Marwaris in particular make a substantial number of cross-community referrals. We will see that the Marwaris concentrate on the polished side of the market where community affiliation is less important, which explains why the Marwari exporters appear to maintain connections across all communities. In contrast with the pattern of referrals made by the exporters, the distribution of referrals made by brokers – who belong to different communities and must interact with firms of all communities – generally matches the composition of firms, by community, in the industry.

3 The Diamond Industry Today

3.1 Characteristics of Entrepreneurs

The history of the industry described earlier would suggest that exporters from the three communities should come from very different backgrounds. The descriptive statistics in Table 2, based now on the survey data collected from the senior partner in each firm, indicate that this is indeed the case.

The entrepreneur's age is (mechanically) negatively correlated with the year that the firm was established. Not surprisingly, the Kathiawari respondents are younger than the Marwari respondents, who in turn are younger than the Palanpuri respondents in our sample. The Kathiawaris also have significantly lower educational attainment, measured by years of schooling, than the entrepreneurs from the more established business communities. One important schooling decision that parents must make in India is whether to send the children to secondary school in English or the local language (university education is almost always in English, at least in the major metropolitan areas). Munshi and Rosenzweig (2006) describe how this choice has important implications for the children's future; in the diamond industry, fluency in English and the westernization that goes with English schooling allow entrepreneurs to make contact and establish personal relationships more easily with foreign buyers and suppliers. The Kathiawaris are less likely to have been schooled in English than the Marwaris and Palanpuris, and they are further disadvantaged by being less likely to have grown up in Bombay (as compared with the Palanpuris). This lack of urban experience is potentially a liability when it comes to establishing branches abroad and interacting with foreign buyers and suppliers. Notice that a relatively low proportion of Marwaris also report having grown up in Bombay, but this simply reflects the wide scope of their business activities; although not reported, many of them grew up in urban

centers elsewhere in the country and this will become apparent in a moment when we describe the occupations of their fathers.

Table 2, Panel B describes the entrepreneur's father's occupation, which is aggregated into seven categories: farming, white-collar professional, other business, other jewelry business, diamond cutting and polishing, diamond broker or trader, and diamond exporting. The most striking observation from these statistics is that 53% of the Kathiawaris, but just over 2% of the Marwaris and Palanpuris, report that their fathers were farmers. Looking down the other occupational categories, the Kathiawaris are significantly less likely to belong to a business family than the other two communities: 35% of the Kathiawaris versus 82% of the Marwaris and 76% of the Palanpuris report that their father was engaged in any type of business.

How do entrepreneurs with such different business backgrounds co-exist in the diamond industry? The Kathiawari entrepreneurs could, in principle, have compensated for their limited family backgrounds by improving their individual capabilities prior to establishing their firms. The survey collected information on the entrepreneur's employment activity prior to entering the diamond industry, where the relevant choices included: did nothing, farming, white-collar professional job, jewelry business, colored stone or pearl business, and other business. Most of the entrepreneurs – 82% of the Kathiawaris, 72% of the Marwaris, and 84% of the Palanpuris – did nothing (were students) prior to entering the industry. Combining the last three categories listed above, 6% of the Kathiawaris versus 19% of the Marwaris and 9% of the Palanpuris reported that they were engaged in any type of business activity prior to entering the industry.

The survey also collected information on the entrepreneur's activities within the diamond industry prior to entering the current firm. The list of available categories in this question included: did nothing, cut and polished diamonds, worked as a manufacturing contractor, served as an employee/apprentice, worked as a broker, was involved in rough or polished trading, and was a partner in another firm. Approximately 25% of the entrepreneurs reported that they did nothing, while 30% reported that they were employees/apprentices in another firm, with little variation in these statistics across communities. Combining the last four categories in the preceding list, however, 52% of the Kathiawaris versus 71% of the Marwaris and 65% of the Palanpuris reported prior activity that would have prepared them directly for the diamond export business. The Kathiawaris are disproportionately likely to report that they cut and polished diamonds or were manufacturing contractors, and in general there is no evidence that they are preparing themselves prior to entry to compensate for their weak business backgrounds.

Although we have focussed on family background in business and access to a community network as the principal determinants of business success, the entrepreneur’s intrinsic capability could also contribute to his success. The Kathiawaris do not appear to compensate for their weaker family backgrounds by preparing themselves prior to entry, but it is possible that they compensate on another dimension, with only the most intrinsically able entrepreneurs from that community entering the industry. Because the Kathiawaris have worse options outside the industry, they might not mind faring worse than their Marwari and Palanpuri competitors inside the industry, providing yet another explanation for the observed difference in business backgrounds across communities.

The explanation for the co-existence of diverse entrepreneurs put forward in this paper is based on the idea that the relatively strong Kathiawari community network would have compensated for the weak family background of its members. The theoretical framework will provide a simple explanation for why the Kathiawari network should have strengthened in this fashion and will also generate predictions that allow us to distinguish between the network-based explanation for the cross-community statistics in Table 2 and the alternative explanations proposed above. Before proceeding to the theoretical model, however, we must first understand what role the network actually plays in this industry and this is what we turn to next.

3.2 Organization of the Diamond Business

“Much of the diamond industry revolves around the issue of getting a regular supply of good quality [rough] diamonds” (Engelshoven 1999: 371). Rough suppliers in Antwerp and the largest exporters receive parcels directly from the Diamond Trading Corporation (DTC), the trading arm of DeBeers, or from other primary suppliers of rough diamonds. These parcels will typically comprise stones of various grades and sizes. Individual exporters, however, will tend to specialize in stones of a particular size, which implies that they must approach different suppliers in Antwerp from one trip to the next.⁸ The exporters receive these roughs on credit, without providing security or signing a written contract. Without the ability to establish a long-term relationship with a single supplier, the commitment problems that could consequently arise are substantial. The suppliers would also like to do business

⁸Diamonds are classified by size and shape. In the questionnaire we defined eight categories – seven sizes and a separate category for “fancy shapes” – and asked the entrepreneurs to report the proportion of their output (by value) in each category. Despite this fine classification of stones, a substantial fraction of the firm’s output is devoted to a single – most popular – category: 52% for the Kathiawaris, 42% for the Marwaris, and 48% for the Palanpuris. The Marwaris are significantly less specialized, in large part because their business is centered on the polished side of the market, where flexibility is less costly.

with capable exporters, who can have the roughs cut and polished quickly and then sold at a good price, allowing them to repay their loans within the stipulated period with relative certainty. This is where the community network comes in: Firms that have established close ties with a particular supplier provide referrals for other members of their community. The firms providing the referrals have supplier-specific reputations, and presumably the rents that go with them, at stake and so they have the right incentive to refer only the most able firms and to ensure that those firms do not renege on their obligations. Firms will typically draw upon different members of their community to provide referrals from one trip to the next, and so a multilateral punishment strategy of the sort described by Greif (1993), in which no firm provides referrals to an entrepreneur who has deviated in the past in equilibrium, must be in place to maintain cooperative behavior.⁹

Table 3, Panel A describes transactions on the rough side of the market, while Panel B describes transactions on the polished side. We see in Panel A that firms have 10-12 suppliers per year and that 70% of the firms have a dominant supplier who provides more than 30% of their roughs. Different firms will have different dominant suppliers, allowing for cross-referrals across firms as described above. Much of the rough supply (around 70%) comes from Antwerp. The other major alternative source of roughs is the Bombay secondary market, where the price is substantially higher but the commitment problems less severe since the firms have a permanent presence in the city. Notice that the Kathiawaris receive a significantly greater fraction of their roughs from Antwerp than the other two communities, consistent with the view that they have access to a stronger network.¹⁰ Despite the high value of the rough diamonds and the potential for default, much of the rough supply is obtained on credit and rarely involves a written contract, across all three communities, consistent with the organization of the business described above.

In contrast with rough diamond transactions, where referrals are critical and firms tend to do business with a limited number of suppliers, the polished side of the industry operates very much like

⁹Suppose that a limited number of exporters are in a position to provide a fixed number of referrals in each period. If one of those exporters deviates from the equilibrium and provides a referral to someone who has reneged on his obligations in the past, the previous cheater's only incentive to be honest is to maintain ties with his benefactor. In contrast, someone who has been honest in the past has an additional incentive to be honest; to receive referrals from other exporters in the future. As long as there is some probability that the deviating exporter will be unable to provide a referral in the next period, irrespective of current-period behavior, previously honest individuals will have a strictly greater incentive to honor their commitments and so will be preferred, ruling out such deviations from the cooperative equilibrium.

¹⁰The very largest firms, known as *sightholders*, receive roughs directly from the DTC. A relatively small number of firms also buy roughs from Israel. Allowing for all of these possibilities, the Kathiawaris continue to receive a greater share of their roughs from outside the Bombay market than the other communities.

a spot-market. Firms have as many as 30-50 buyers per year in Panel B and relatively few (around 60%) of the firms have a single dominant buyer, despite the fact that a dominant buyer is now defined to account for just 20% of the firm's product. A substantial fraction of the polished diamonds are also sold on the Bombay market, typically through brokers, either to merchant exporters or visiting foreign buyers. Notice that the Marwaris perform particularly well on the polished side of the market; they have more buyers per year, yet are more likely to report a dominant buyer (indicative of a balanced client portfolio) and to sell their polished directly abroad. This observation is consistent with the subsequent analysis, which indicates that the Marwari rough-diamond network is relatively weak and that diamond firms from this community tend to concentrate on the polished side of the market.

Polished diamonds are largely sold on credit and these transactions rarely involve a written contract, so commitment problems could potentially arise on this side of the market as well, with buyers renegeing on their obligations. Although referrals play an important role on the rough side of the market, firms do not share polished buyers with each other according to my industry informants. Because firms tend to specialize in particular stone sizes, they can build long-term relationships with a few foreign buyers instead, channelling the rest of their output abroad through numerous *merchant exporters*. Merchant exporters restrict their activity to buying polished diamonds on the Bombay market and selling these diamonds to established foreign clients. All export firms, including the merchant exporters, have a permanent presence in Bombay and so commitment problems between local firms naturally tend to be less severe on the polished side of the market. Along the same lines, we do not expect community networks to play an active role at the cutting and polishing stage of the production process either. Entrepreneurs can always establish long-term bilateral relationships with their manufacturing contractors to avoid the commitment problems, associated with the swapping of roughs, that arise at this stage. Consistent with this view, the respondents in the survey reported an average relationship of 16 years with their manufacturing contractors.

Information on the firm's transactions was also collected when it first started exporting. Although not reported, the patterns in Table 3 are by and large the same when the transactions statistics are computed at this earlier point in time. The number of suppliers and buyers is smaller, less than half of what we see in Table 3, but most other aspects of these transactions do not change with the firm's age or over time. The only exceptions are the proportion of roughs bought directly from Antwerp, which has declined for the Marwaris and Palanpuris relative to the Kathiawaris, and the repayment period on the polished side of the market, which was about 90 days when the firms first started

exporting and has now increased to about 110 days. These two observations are consistent with a strengthening of the Kathiawari rough-network and a decline in profit margins with the entry of new firms over time. Many Marwari and Palanpuri firms have chosen to exit the rough side of the business in this increasingly competitive environment, restricting their activity to merchant exporting. These firms are not included when computing the rough statistics in Table 3, Panel A and these changes in the organization of the firm, across communities, will also show up in subsequent sections where we theoretically and empirically explore changes in the industry over time.

4 Networks and Entrepreneurship: Theoretical Framework

The simple model presented in this section formalizes the negative relationship between a community's outside options and the growth of its network, once it has crystallized. This result is associated with testable predictions, which are successfully verified in Section 5, supporting the hypothesis that the rapidly strengthening Kathiawari network was able to compensate for the increasingly weak business backgrounds of its entering members over time. It is these predictions, across communities *and over time*, that distinguish the network-based explanation for the patterns in Table 2 from the alternative explanations that were proposed. I make a number of simplifying assumptions when deriving the main theoretical result and its accompanying predictions. The implications of relaxing these assumptions will be discussed over the course of this section and the next.

4.1 Production and Network Technology

Each firm in this industry consists of a single entrepreneur who buys rough diamonds from Antwerp on credit at the beginning of each period, has the rough diamonds cut and polished in Surat, and then sells the polished diamonds on the competitive Bombay market. His profits at the end of the period are determined by his sales net of the loan that he must repay to the rough supplier. The unit price of rough and polished diamonds is constant over time. Diamond cutting and polishing is a labor intensive activity that does not require great skill. Firms in the industry employ the same production technology, with a single worker assigned to a single machine, and so must increase their production by hiring new workers. With constant returns to scale in production, the firm's profit is a linear function of the amount of rough diamonds that it can procure, which varies across firms and over time. Each entrepreneur is characterized by an ability endowment that reflects both family background as well as intrinsic capability. More able entrepreneurs are better positioned to independently establish

connections with suppliers in Antwerp and so the amount of roughs procured is increasing in ability.

The entrepreneur will also receive referrals from members of his network to rough suppliers. As discussed above, a limited number of entrepreneurs are positioned to provide referrals in each period. This set of entrepreneurs varies from one period to the next depending on the mix of stones received by the suppliers in Antwerp. If a fixed proportion of entrepreneurs in the network provide referrals in each period and each entrepreneur provides a fixed number of referrals then it is evident that the probability of receiving a referral is independent of network size. However, the amount of roughs received on credit with each referral will be positively correlated with network size if larger networks can sustain higher levels of cooperation. We assumed above that the only cost that an entrepreneur incurred by defaulting on his loan was exclusion from the network and the referrals it provided. In practice a deviator could also lose access to the suppliers that his network is connected with and this loss would be increasing in network size under the reasonable assumption that larger networks interact with more suppliers. A larger network might also be better positioned to punish the deviator by adversely affecting his reputation outside the industry; for example, by reducing his marriage prospects in the wider community. With larger sanctions, inside and outside the industry, higher levels of credit can be sustained without default, increasing the level of production and hence the profits of firms in larger networks.

4.2 Selection into the Industry

4.2.1 The Entry Condition

Profits inside the diamond industry are increasing in the entrepreneur's ability and the size of the network, as described above. Assume that individuals do not provide referrals in the first period that they enter. Subsequently they contribute to the network but do not internalize the value of the service they provide. The first assumption reflects the idea that entrepreneurs must be established before they can provide referrals. The second assumption is consistent with the observation that social sanctions must often be imposed to encourage participation in collective institutions.

Each community consists of a continuum of individuals, with an ability distribution characterized by the function $F(\omega)$. We will see below that there exists a threshold ability level in any community at each point in time above which all individuals enter the diamond industry. Based on the assumptions above, the effective size of community j 's network for entrants in period t is $1 - F(\omega_{t-1}^j)$, the measure of the community already in the network in the previous period, where ω_{t-1}^j is the threshold ability

in that period. The payoff inside the diamond industry for individual i belonging to community j in period t is then $G(1 - F(\omega_{t-1}^j)) + r_I \omega_i^j$, where the function G , with $G' > 0$, characterizes the network technology, mapping network size into individual payoffs in that period, ω_i^j is the individual's ability, and r_I measures the returns to ability inside the industry.

Individuals belong to two communities, the H -community and the L -community, which are distinguished only by the quality of the options available to their members outside the diamond industry. In practice, the L -community refers to the Kathiawaris while the H -community includes the more established Marwaris and Palanpuris. The payoff outside the diamond industry for individual i from community j in any period is described by the expression $u^j + r_O \omega_i^j$, where u^j is a community-specific term, $u^L < u^H$, and r_O measures the returns to ability outside the industry. The diamond industry is an industry in which an individual with initiative and resourcefulness can do exceptionally well and so it seems reasonable to assume that $r_I > r_O$.

With free entry and exit, the present value from remaining outside and inside the industry for individual i in period t is given by the expressions

$$\begin{aligned} V_{it}^{jO} &= u^j + r_O \omega_i^j + \delta \max(V_{it+1}^{jO}, V_{it+1}^{jI}) \\ V_{it}^{jI} &= G(1 - F(\omega_{t-1}^j)) + r_I \omega_i^j + \delta \max(V_{it+1}^{jO}, V_{it+1}^{jI}), \end{aligned}$$

where V_i^{jO} , V_i^{jI} are the respective value functions outside and inside the industry and $\delta \in [0, 1)$ is a discount factor. Without experience effects, the infinitely lived individual's period- t decision has no effect on the continuation value of his subsequent payoffs and it is apparent from the expressions above that his entry decision will depend on current payoffs alone. In general, there exists a threshold ability ω_t^j in each period t satisfying the condition:

$$u^j + r_O \omega_t^j = G(1 - F(\omega_{t-1}^j)) + r_I \omega_t^j. \quad (1)$$

Entrepreneurs with $\omega_i \in [\omega_t^j, \omega_{t-1}^j)$ will enter the industry and entrepreneurs with $\omega_i < \omega_t^j$ will stay outside. We will see below that each community's network grows steadily in size over time. Although we allow for free entry and exit, this implies that no entrepreneur who has chosen to enter the industry will subsequently exit, because the payoff inside the industry will be strictly greater than the payoff outside the industry for him in all future periods.

4.2.2 Growth of the Network

Our first objective in this section is to establish that the L -community network strengthens more rapidly than the H -community network. Network strength is measured by the $G(1 - F(\omega_{t-1}^j))$ term in equation (1) above. Moving the $r_O\omega_t^j$ term to the right hand side of that equation, and noting that $r_I - r_O > 0$, it follows that the threshold ability ω_t^j will decline more steeply in the L -community than in the H -community if the network is strengthening more rapidly in the L -community over time. The analysis that follows derives reasonable conditions under which this result will be obtained.

To initiate the network dynamics, assume that all individuals with ability above ω_0 are exogenously moved into the industry, in both communities, in period 0. From equation (1), the change in the ability threshold from period 0 to period 1 within any community j is given by,

$$\omega_0 - \omega_1^j = \omega_0 - \frac{u^j - G(1 - F(\omega_0))}{r_I - r_O}. \quad (2)$$

Because individuals are moved exogenously into the industry in period 0, the first condition that needs to be satisfied for the network to proceed on a positive trajectory is that the endogenously determined ability threshold in period 1, ω_1^j must be less than ω_0 . This requires that the right hand side of equation (2) must be positive. If this condition is satisfied, it is easy to verify from the expressions that follow that the network will continue to grow steadily thereafter. In that case, it follows immediately from the expression above that $\omega_0 - \omega_1^L > \omega_0 - \omega_1^H$, since $u_L < u_H$; the marginal entrant's ability declines more steeply in the L -community in the first period.

Using equation (1) once again, the change in marginal ability from period 1 to period 2 is given by

$$\omega_1^j - \omega_2^j = \frac{G(1 - F(\omega_1^j)) - G(1 - F(\omega_0))}{r_I - r_O}. \quad (3)$$

Since $\omega_1^L < \omega_1^H < \omega_0$, it follows that $\omega_1^L - \omega_2^L > \omega_1^H - \omega_2^H > 0$; the marginal entrant's ability declines more steeply in the L -community in the second period as well. However, the comparison of the ability-decline across communities is not as straightforward from the next period onwards. From equation (1),

$$\omega_2^j - \omega_3^j = \frac{G(1 - F(\omega_2^j)) - G(1 - F(\omega_1^j))}{r_I - r_O}.$$

We have already shown that $\omega_1^L - \omega_2^L > \omega_1^H - \omega_2^H$, but the effect of this larger ability-gap in the L -community on $\omega_2^j - \omega_3^j$ will depend, in general, on the ability distribution (F) and the network technology (G) since we have moved further down the ability distribution in that community. To characterize conditions under which $\omega_2^L - \omega_3^L > \omega_2^H - \omega_3^H$, take a first-order Taylor expansion around $\omega_1^j = \omega_2^j$ to obtain

$$\omega_2^j - \omega_3^j \approx \frac{G'(1 - F(\omega_1^j))F'(\omega_1^j)(\omega_1^j - \omega_2^j)}{r_I - r_O}.$$

Because $\omega_1^L - \omega_2^L > \omega_1^H - \omega_2^H > 0$, $F'(\omega_1^L) > F'(\omega_1^H)$ and $G'(1 - F(\omega_1^L)) > G'(1 - F(\omega_1^H))$ are sufficient to ensure that $\omega_2^L - \omega_3^L > \omega_2^H - \omega_3^H > 0$. We have already shown that $\omega_1^L < \omega_1^H$ and so the first condition will be satisfied if the density $F'(\omega)$ is non-decreasing as we move down the ability distribution. Since we are starting from the very top of the distribution and moving down, this would seem to be a reasonable assumption and we will later verify empirically that the marginal entrant's ability indeed declines as the network matures. While larger networks may provide a greater payoff to their members, network effects could potentially be declining at the margin. As long as the network technology is not too concave, however, the preceding expression tells us that marginal ability will decline more steeply in the L -community than in the H -community in the third period. Solving recursively, the same conditions on the ability distribution and the network technology imply that $\omega_{t-1}^L - \omega_t^L > \omega_{t-1}^H - \omega_t^H$, $\forall t$; the marginal entrant's ability will decline more steeply in the L -community with worse outside options at each point in time. This implies, from the discussion above, that the network will strengthen more rapidly in the L -community under the same conditions.

4.2.3 Firm Characteristics and Performance

With constant returns to scale in production, the firm's profit is a linear function of its sales or exports. In our framework, the firm's performance, measured by its exports, can then be described by the expression: $\theta[G(1 - F(\omega_{t-1}^j)) + r_I\omega_t^j]$, where θ is a positive constant mapping profits into exports. Firm-level export data over the 1994-2004 period were made available by the GJEPC. Controlling for compositional change in the industry with firm fixed effects, which capture the ω_t^j term above, changes in exports across communities and over time will reflect variation in the $G(1 - F(\omega_{t-1}^j))$ term. We saw above that the network strengthens relatively rapidly in the L -community and so the prediction from the model is that exports should grow relatively rapidly in that community as well, once firm fixed effects are included.

The model also generates predictions for changes in the marginal entrant's ability across communities and over time when networks are active. For the empirical analysis that follows, however, it will be convenient to derive predictions for changes in the *average* entrant's ability. This is most easily accomplished for the special case with a linear network technology and ability uniformly distributed over the unit interval; recall that these conditions are sufficient to ensure that the L -community network grows more rapidly than the H -community network at each point in time. Under these conditions, equation (1) can be rewritten as

$$\omega_t^j = \frac{u^j - g(1 - \omega_{t-1}^j)}{r_I - r_O} \equiv \alpha^j + \beta\omega_{t-1}^j,$$

where the g parameter maps network size into payoffs. Starting with the first period and moving forward in time we solve recursively to obtain

$$\omega_t^j = \frac{\alpha^j}{1 - \beta} + \left(\omega_0 - \frac{\alpha^j}{1 - \beta} \right) \beta^t. \quad (4)$$

Treating time as a continuous variable and placing the following restrictions on the parameter values, $\beta \in (0, 1)$ and $\omega_0 - \frac{\alpha^j}{1 - \beta} > 0$, we replicate the results derived more generally above, noting that α^j is increasing in u^j .¹¹

$$\begin{aligned} \frac{d\omega_t^j}{dt} &= \left(\omega_0 - \frac{\alpha^j}{1 - \beta} \right) \beta^t \ln \beta < 0 \\ \frac{d^2\omega_t^j}{d\alpha^j dt} &= \frac{-\beta^t}{1 - \beta} \ln \beta > 0. \end{aligned}$$

The marginal entrant's ability is declining over time in both communities, with a steeper decline in the L -community. To obtain the corresponding results for the average entrant with ability W_t^j we take advantage of the assumption that the ability distribution is uniform: $W_t^j = \frac{\omega_{t-1}^j + \omega_t^j}{2}$.

Placing the same restrictions on the parameters as above, the selection patterns that we derived for the marginal entrant follow through for the average entrant as well:

$$\begin{aligned} \frac{dW_t^j}{dt} &= \left(\omega_0 - \frac{\alpha^j}{1 - \beta} \right) \beta^t \ln \beta \left(\frac{1 + \beta}{2\beta} \right) < 0 \\ \frac{d^2W_t^j}{d\alpha^j dt} &= \frac{-\beta^t}{1 - \beta} \ln \beta \left(\frac{1 + \beta}{2\beta} \right) > 0. \end{aligned}$$

¹¹These restrictions on the parameters are analogous to the condition that the right hand side of equation (1) should be positive, which ensures that $\omega_1^j < \omega_0$. With ability distributed on the unit interval it is also apparent that our results only apply to periods prior to the time that the individual with zero ability in the L -community enters the diamond industry.

Earlier, we showed that $\omega_t^j, \omega_{t-1}^j$, which cover the range of abilities for entrants in period t , should shift down faster in the L -community than in the H -community, without placing strong parametric restrictions on the network technology or the ability distribution. The assumption that the ability distribution is uniform allows us to derive the same result for the average entrant, with ability $(\omega_{t-1}^j + \omega_t^j)/2$. For the more general case with a non-decreasing density as we move down the ability distribution, the average entrant would lie increasingly closer to ω_t^j than to ω_{t-1}^j in the L -community with greater entry, reinforcing the result obtained with the uniform distribution.

4.2.4 Alternative Distributional Assumptions

1. Multiple cohorts: Up to this point we have assumed that individuals belong to a single cohort. In practice, multiple cohorts would have entered the diamond industry over the past four decades. To derive patterns of entry with the multiple-cohort case that can be compared with the single-cohort case it will be convenient to assume: (i) the ability distribution does not vary across cohorts and continues to be characterized by $F(\omega)$ in each community, (ii) individuals enter the industry at a fixed age, and (iii) they receive referrals from the cohort that preceded them. With these assumptions, it is straightforward to verify that the marginal entrant's ability in each period is the same as it was with a single cohort. The difference is that entrants in period t are now drawn from $\omega_i \in [\omega_t, 1]$ rather than $\omega_i \in [\omega_t, \omega_{t-1}]$. Although this does not affect the predictions for performance, across communities and over time, the average entrant's ability is now described by the expression $\tilde{W}_t^j = \frac{1+\omega_t^j}{2}$. Assuming that the ability distribution is uniform and that the network technology is linear, and placing the same restrictions on the parameters as before, it can be shown that $\frac{d\tilde{W}_t^j}{dt} < 0$, $\frac{d^2\tilde{W}_t^j}{d\alpha^j dt} > 0$.

Although the main predictions of the model continue to hold with multiple cohorts, it is straightforward to verify that the decline in ability over time is shallower than it was with a single cohort. The intuition is that the average entrant's ability can continue to decline relatively slowly over many periods when the pool of potential entrants is continually refreshed by younger cohorts. It is more difficult to compare the single-cohort and multiple-cohort cases when we allow all previous cohorts to provide referrals, but the basic argument outlined above should still hold and we will later see that the average entrant's ability declines steadily over a forty-year period in our data.

2. The ability distribution varies across communities: The model generates predictions for changes in firm characteristics and performance, across communities and over time, based on differences in outside options alone. Suppose, instead, that the ability distribution varies across

communities but the outside options are the same. Would we still expect the L -community to show a steeper decline in the marginal entrant's ability over time?

Since the H -community has greater business experience, we might expect that the ability distribution in that community will lie to the right of the distribution in the L -community. Equivalently, we might expect the H -community to be characterized by a thicker tail at the top of the ability distribution. Assuming as before that all individuals with ability above ω_0 are moved into the network in period 0, the size of the network will be larger in the H -community in the initial period. Setting $u^L = u^H$, it follows from equation (1) that $\omega_1^L > \omega_1^H$ and, solving recursively, that $\omega_t^L > \omega_t^H, \forall t$. Using the argument outlined above, it follows that $\omega_{t-1}^L - \omega_t^L < \omega_{t-1}^H - \omega_t^H, \forall t$, as long as the density is non-decreasing as we move down the ability distribution in each community and the G function is not too concave. Holding outside options the same across communities, the marginal entrant's ability would actually decline more steeply over time or across cohorts in the more established H -community, contradicting the empirical patterns that we will later observe. It must be that differences in outside options $u^L < u^H$ are large enough to compensate for any opposing effect due to differences in ability across communities.¹²

4.3 Selection into the Network

We have assumed that all individuals that enter the industry benefit from the network and contribute to it once they are established. The implicit condition underlying this assumption is that the threat of punishment by members of the network is sufficient to deter deviations from cooperative behavior. In practice, we might expect individuals to make investments in the network that make it more costly for them to deviate in the future, increasing the level of cooperation that can be sustained in equilibrium. One example of such an investment is marriage within the industry; an entrepreneur who has married in this fashion risks his own reputation as well as the reputation of his wife's family when he reneges on his business obligations. Although individuals can choose the level of participation in the network that is optimal for them in practice, we assume for simplicity that they can either invest in the network or not, once they enter the industry, in the discussion that follows. Only those individuals who have invested contribute to the network and benefit from it.

If we think of investment in the network as marriage within the industry, then this is a choice

¹²Note that differences in the ability distribution across communities will have no impact on the ability of the marginal entrant at each point in time, although the rate of entry of firms might differ, when networks are absent.

that the individual can make once only. It will thus be convenient to consider the case with multiple cohorts, which is equivalent to the single-cohort case when the individual receives referrals from the cohort that preceded him. We will see that there exists an ability threshold above which individuals enter the diamond industry, as before. In addition, there will exist an ability threshold above which individuals inside the industry select out of the network. Payoffs inside the diamond industry are described by the expression:

$$X_i^j \cdot g [\bar{\omega}_{t-1}^j - \underline{\omega}_{t-1}^j] + r_I \omega_i^j - X_i^j p \omega_i^j,$$

where X_i^j equals one if individual i from community j who has chosen to enter the industry also invests in the network, X_i^j equals zero if he does not. $\underline{\omega}_{t-1}^j$ is the ability threshold above which individuals entered the industry in the preceding cohort and $\bar{\omega}_{t-1}^j$ is the threshold above which they selected out of the network. Assuming that ability is uniformly distributed on the unit interval, the measure of the network in period t is $\Delta \omega_{t-1}^j \equiv \bar{\omega}_{t-1}^j - \underline{\omega}_{t-1}^j$. The mapping from network size to individual payoffs is linear, measured by the g term as usual. The cost of investing in the network, p , is assumed to be increasing in the individual's ability. The motivation for this assumption is that capable individuals are more likely to have opportunities outside the diamond industry and so industry-specific investments are more costly for them. It is this assumption that drives the selection by ability out of the network.

Using the preceding expression for payoffs inside the diamond industry, individual i in community j will invest in the network (conditional on having entered the industry) if:

$$g \Delta \omega_{t-1}^j - p \omega_i^j \geq 0.$$

Using the same expression for payoffs outside the industry as in equation (1) and noting that the marginal individual who enters the industry also invests in the network, individual i in community j will enter the industry (and invest in the network) if:

$$g \Delta \omega_{t-1}^j + (r_I - p) \omega_i^j \geq u^j + r_O \omega_i^j.$$

Based on the entry conditions derived above, the thresholds for selection out of the network and selection into the industry can be expressed as:

$$\bar{\omega}_t^j = \frac{g \Delta \omega_{t-1}^j}{p} \tag{5}$$

$$\underline{\omega}_t^j = \frac{u^j - g\Delta\omega_{t-1}^j}{r_I - r_O - p}. \quad (6)$$

Entrepreneurs with $\omega_i \in [0, \underline{\omega}_t^j)$ stay out of the industry, entrepreneurs with $\omega_i \in [\underline{\omega}_t^j, \bar{\omega}_t^j]$ enter the industry and select into the network, and entrepreneurs with $\omega_i \in (\bar{\omega}_t^j, 1]$ enter the industry but select out of the network. Subtracting the expression for $\underline{\omega}_t^j$ in equation (6) from the expression for $\bar{\omega}_t^j$ in equation (5),

$$\Delta\omega_t^j = \frac{-pu^j + (r_I - r_O)g\Delta\omega_{t-1}^j}{p(r_I - r_O - p)} \equiv -\tilde{\alpha}^j + \tilde{\beta}\Delta\omega_{t-1}^j.$$

Assume that a measure $\Delta\omega_0$ of firms is exogenously entered into the network in both communities in period 0. Moving forward in time and solving recursively, we obtain an expression analogous to equation (4),

$$\Delta\omega_t^j = \frac{\tilde{\alpha}^j}{\tilde{\beta} - 1} + \left(\Delta\omega_0 - \frac{\tilde{\alpha}^j}{\tilde{\beta} - 1} \right) \tilde{\beta}^t. \quad (7)$$

Once again we need to place restrictions on the parameters, $\Delta\omega_0 - \frac{\tilde{\alpha}^j}{\tilde{\beta} - 1} > 0$ with $\tilde{\beta} > 1$, to set the network on a positive trajectory from period 1 onwards. The change in network size across communities and over time can then be described by the following expressions:

$$\begin{aligned} \frac{d\Delta\omega_t^j}{dt} &= \left(\Delta\omega_0 - \frac{\tilde{\alpha}^j}{\tilde{\beta} - 1} \right) \tilde{\beta}^t \ln \tilde{\beta} > 0 \\ \frac{d^2\Delta\omega_t^j}{d\tilde{\alpha}^j dt} &= \frac{-\tilde{\beta}^t}{\tilde{\beta} - 1} \ln \tilde{\beta} < 0. \end{aligned}$$

The measure of network firms grows over time (across cohorts) at an increasing rate. The marginal increase is steeper in the L -community, which implies that the gap in network size across communities should widen over time:¹³ Using marriage within the industry to measure investment in the network, this result implies that intra-industry marriage should be increasing over time in both communities, with a steeper increase in the L -community.

By allowing firms to select into the network we can also characterize the relationship between networks and the organization of production in the industry. Most firms periodically make short trips to Antwerp and so must rely on their networks for much of their rough supply. Other firms have vertically integrated by establishing branches in Antwerp. This permanent presence in the Antwerp market allows them to source roughs directly, without relying on their networks. The ability of the

¹³ $\tilde{\beta} > 1$ implies that $r_I - r_O - p > 0$. It then follows that u^j and $\tilde{\alpha}^j$ have the same sign.

network to punish these firms is consequently limited and they would have restricted access to the network in any case. Finally, merchant exporters restrict their activity to buying and selling polished diamonds and so would have little use for the network's services. Placing vertically integrated firms and merchant exporters outside the network, we can derive changes in the organization of firms across communities and over time by studying changes in $\bar{\omega}_t^j$. Substituting from equation (7) in equation (5), it is straightforward to verify that $d\bar{\omega}_t^j/dt > 0$, $d^2\bar{\omega}_t^j/d\tilde{\alpha}^j dt < 0$ if $\tilde{\beta} > 1$. The measure of non-network firms entering in each cohort is $(1 - \bar{\omega}_t^j)$. With infinitely-lived entrepreneurs, $d\bar{\omega}_t^j/dt > 0$ implies that the measure of non-network firms is increasing, but at a declining rate over time. The marginal decline is smaller in the H -community since $d^2\bar{\omega}_t^j/d\tilde{\alpha}^j dt < 0$. These results indicate that non-network firms are more likely to be drawn from the H -community and that the community-gap should be widening over time.¹⁴ In our framework, firms belonging to the H -community are more likely to select out of the network for two reasons: First, they have higher ability on average than firms from the L -community and this ability gap is widening over time. Second, their network is weakening relative to the L -community network over time and so they have less to lose by selecting out of it.

Although the augmented model that allows for selection within the industry generates additional network-specific predictions, measured by marriage within the industry and changes in the organization of firms, note that the predictions for firms characteristics and performance derived earlier continue to hold. The ability of the average entrant into the industry is $(\underline{\omega}_t^j + 1)/2$. Substituting from equation (7) in equation (6), it is straightforward to verify that average ability is declining over time, but less rapidly in the H -community. The same result is obtained when we restrict attention to network firms, with average ability $(\underline{\omega}_t^j + \bar{\omega}_t^j)/2$, under the additional assumption that $r_I - r_O - 2p < 0$. The payoff for firms inside the network is described by the expression: $g\Delta\omega_{t-1}^j + (r_I - p)\omega_t^j$. Controlling for compositional changes in the network over time with firm fixed effects, the results that we derived earlier $d\Delta\omega_t^j/dt > 0$, $d^2\Delta\omega_t^j/d\tilde{\alpha}^j dt < 0$ imply that firm performance will continue to grow relatively rapidly over time in the L -community.

¹⁴Substituting from equation (7) in equation (6), we could go through a similar exercise for ω_t^j to demonstrate that $d\underline{\omega}_t^j/dt < 0$, $d^2\underline{\omega}_t^j/d\tilde{\alpha}^j dt > 0$. The measure of new firms entering the industry in each cohort is given by $(1 - \underline{\omega}_t^j)$ and so these results imply that the total number of new firms entering the industry will be increasing at the margin. The number of firms continues to grow relatively rapidly in the L -community, as shown earlier, since $d^2\underline{\omega}_t^j/d\tilde{\alpha}^j dt > 0$. However, the community-gap will be wider if attention is restricted to the network firms on account of the differential selection out of the network documented above.

5 Networks and Entrepreneurship: Empirical Results

5.1 Change in Firm Characteristics

The theoretical model predicts that the network should grow relatively strong over time in the L -community, resulting in a relatively rapid decline in average ability among entering entrepreneurs in that community. To test this prediction I will estimate the following regression:

$$\omega_i^j = \alpha EY_i + \beta EY_i \cdot L^j + \delta_j + \epsilon_i^j \quad (8)$$

where ω_i^j measures the ability of entrepreneur i belonging to community j , EY_i is the year in which his firm was established, L^j equals one if he belongs to the L -community and zero if he belongs to the H -community, δ_j is a community dummy, and ϵ_i^j is a mean-zero disturbance term. Under the assumptions of the model, $\alpha < 0$ and $\beta < 0$.

The L -community consists of the Kathiawaris, while the H -community includes both the Palanpuris and the Marwaris. All three communities will be included in the regression, with the Palanpuris treated as the reference category. The predictions described above thus apply to the Kathiawaris. Once we relax the assumption that rough and polished prices are constant over time, the model no longer has unambiguous predictions about the sign of the α coefficient. Changes in prices within the industry are equivalent to changes in outside options in terms of their effect on entry behavior and it is evident that the sign of dW_t^j/dt is ambiguous once we allow w^j to vary over time. More generally, the establishment year coefficient cannot be interpreted as reflecting the changing strength of the Palanpuri network alone once we allow for secular changes in payoffs within or outside the diamond industry over time. However, the prediction $d^2W_t^j/d\alpha^j dt > 0$ continues to hold and so we continue to expect that the establishment year-Kathiawari coefficient will be negative and significant.

Ability in the model subsumes the entrepreneur's intrinsic capability as well as his family background in business. Intrinsic capability could, in principle, be negatively correlated with business background if only relatively capable entrepreneurs with weak inherited backgrounds enter the industry. Even with such substitution at the margin, we still expect to see a decline along both dimensions of ability over time, with a particularly steep decline in the L -community, when networks are active. The dependent variable takes the value one if the entrepreneur's father was not a farmer, zero if he was in Table 4, Column 1. Non-business activities are expanded to include white-collar professional occupations and diamond cutting and polishing in Column 2. Finally, we measure ability by the

entrepreneur's years of schooling in Column 3. The coefficient on the establishment year variable is negative in all three columns but only significant in Column 3. More importantly, the coefficient on the interaction of this variable with the Kathiawari dummy is negative and significant (except with schooling as the dependent variable), precisely as predicted by the model and consistent with the view that the rapidly strengthening network in that community was increasingly able to support entrants with weaker business backgrounds over time.¹⁵ The Marwari-establishment year coefficient, in contrast, is small in magnitude and imprecisely estimated.

When deriving predictions with multiple cohorts in the previous section we assumed that the ability distribution did not vary across communities or cohorts. In practice, schooling levels have increased substantially across cohorts in our sample, particularly among the Kathiawaris. Secular changes in schooling, or ability, would have no effect on the Kathiawari-establishment year coefficient that we are most interested in but differential changes in ability across communities would affect the coefficient on the interaction term as well. By not accounting for the convergence in ability across cohorts we underestimate the relative growth in the Kathiawari network's strength over time.

If entrepreneurs establish their firms at a fixed age, as assumed in the model, then it would not be possible to control for differential changes in ability across cohorts. However, the age at establishment varies across firms in practice, and so the specifications in Columns 4-6, and all the regressions that follow in the table, include the entrepreneur's age and the age-community interaction terms as additional regressors. The Kathiawari-establishment year coefficient becomes more negative with each measure of ability, as expected, and is now significant even with schooling as the dependent variable.¹⁶ We showed previously that the differential pattern of entry across communities applies to all firms in the industry as well as to network firms. Excluding vertically integrated firms and merchant exporters in Table 4, Columns 7-9, we verify that the estimates remain stable with a substantially reduced sample of network firms as well.

To demonstrate the economic importance of the cross-community effects reported in Table 4, I present nonparametric estimates of the relationship between entrepreneurial ability and the firm's

¹⁵For firms that were formed following a separation by partners, the establishment year is measured by the year of separation. The results in Table 4 are unaffected when the establishment year is measured instead by the year in which the original firm was established or the year in which the firm started exporting.

¹⁶Although the age coefficients are not reported in Table 4, it is worth mentioning that the coefficient on the Kathiawari-age interaction term is negative and significant in all columns. Some of the entrepreneurs in the oldest firms inherited the business from their fathers and it follows that the age-establishment year correlation will be naturally weaker in such firms. Dropping those firms has no effect on the establishment year coefficients.

establishment year (net age effects) in Figure 1.¹⁷ Almost all entrants, regardless of their community, came from non-farming backgrounds in 1975. While this pattern remains constant over time for the Marwaris and the Palanpuris, the Kathiawari entrants are increasingly likely to have fathers who were farmers. By 1990, over 60% of the Kathiawari entrants have farming backgrounds, emphasizing the important role that their community network has played in supporting entrepreneurship.¹⁸ One concern with our comparison across communities is that their networks were established at different points in time. If the decline in ability were weakening at the margin, then the steeper decline for the Kathiawaris could be simply a consequence of their later arrival. Notice from the figure, however, that the decline in ability is roughly linear over the entire thirty-year period starting from 1975, ruling out this alternative explanation for our results.

5.2 Change in Firm Performance

If outside options are declining over time and, in particular, if they are declining more steeply among the Kathiawaris, then the change in firm characteristics in Table 4 and Figure 1 could be obtained even when networks are absent. To rule out this alternative explanation we proceed to demonstrate that the performance of Kathiawari firms improves relative to other firms in the industry, once we have controlled for compositional change with firm fixed effects, reflecting the increasing relative strength of their network.

Citing confidentiality concerns, the GJEPC did not release firm-level export figures when it provided its database to be used to design the survey in 2004. However, it reversed its decision in 2005 once the survey had been completed and I had established more credibility in the industry. I was provided with export data over the 1995-2004 period, which can be matched to the 95% of firms in the sample that appear in the database. To mask firm-specific figures, the firms in the database were sorted by export level and then divided into 100 groups in each year by the GJEPC. The average

¹⁷The nonparametric kernel estimates are constructed in two steps: Estimate the regression corresponding to Table 4, Column 2, separately by community, with *EY*-squared as an additional regressor. This allows for additional flexibility in the relationship between father's occupation and the firm's establishment year. Compute mean age by community and subtract this from each entrepreneur's age. Subtract this differenced variable, multiplied by the estimated age coefficient from the regression just described, from the dependent variable. This generates a measure of father's occupation net age effects. Then nonparametrically regress this measure on the firm's establishment year, separately by community, using the Epanechnikov kernel function.

¹⁸With the less inclusive business classification, among the entrepreneurs that established their firms in 1975, 90% of the Marwaris, 80% of the Palanpuris, and 70% of the Kathiawaris had fathers in business. In 1990, 70% of the Marwari and Palanpuri entrants continued to be drawn from business families versus 30% of the Kathiawaris. Schooling levels roughly match these trends in occupational background: The Marwari entrepreneurs maintain roughly 14 years of schooling, and the Palanpuris roughly 13 years of schooling, over the 1975-1990 period. The Kathiawaris start with 13 years of schooling in 1975 and fall below 11 years by 1990.

export level in a group was then assigned to all firms in that group. While this procedure generates some noise in the export data, it does not bias the estimated community coefficients in the export regressions that I describe below. Table 5, Column 1 regresses exports on a time trend, the interaction of the time trend with Kathiawari and Marwari dummies, and a full set of community dummies.¹⁹ We see that the coefficient on the Kathiawari-year interaction term is positive but insignificant; Kathiawari exports do not lag behind Palanpuri exports despite the fact that entrepreneurs from this community with relatively weak backgrounds were entering the industry over time. The community-year effects in Column 1 reflect changes in the strength of the network as well as changes in the composition of firms over time. Controlling for compositional change with firm fixed effects in Column 2, the Kathiawari-year interaction coefficient increases in size and is now significant at the 5 percent level, as predicted by the model.

The model and the empirical analysis have, up to this point, ignored individual experience effects. It is well known that experience effects, time effects, and cohort effects cannot be separately identified with panel data. Secular experience effects are thus subsumed in the firm fixed effects and the uninteracted time trend in the export regressions. This is not a problem since we do not attempt to associate the uninteracted time trend with underlying changes in the Palanpuri network in any case. However, if firms with weaker family backgrounds start with a disadvantage but subsequently grow relatively fast, then the positive and significant Kathiawari-year coefficient in Column 2 could reflect a stronger experience effect among firms in that community. Columns 3-4 consequently include the entrepreneur's family background, measured by whether his father was a businessman, interacted with the firm's experience (years since establishment), as an additional regressor. The family background variable and the firm's experience are also included as regressors in Column 3 without fixed effects. The family background and experience coefficients are large and positive as expected, although the family background coefficient is not significant at conventional levels. The coefficient on the interaction term, in contrast, is small in magnitude and insignificant, with and without fixed effects. Not surprisingly, the Kathiawari-year coefficient remains stable across the alternative specifications.

The predictions for changes in firm performance apply to network firms and so Table 5, Columns 5-6 verify the robustness of these results by excluding vertically integrated firms and merchant exporters

¹⁹For firms with multiple names, we took care to discard the "shell firm," which typically reports negligible exports in each year. An additional complication when computing the export figures is that polished diamonds sold to merchant exporters will not appear under the supplying firm's name. This would, if anything, underestimate export levels for the Kathiawaris and so provide a conservative estimate of the role of their network in supporting entrepreneurship.

from the sample. When a firm is involved in all stages of the production process, typically three partners, who are invariably close relatives, are required; one to buy roughs, the second to supervise the cutting and polishing, and the third to market the polished. In contrast, a merchant exporter could get by with no additional partners. Many Marwari and Palanpuri firms have restricted their activities to merchant exporting in recent years, often leading to the termination of existing partnerships. This explains, in part, why over 17% of Marwari and Palanpuri firms were formed following a separation by partners, as opposed to only 8% of the Kathiawari firms.²⁰ When two relatives who were partners separate, one individual will keep the original name while the other starts a new firm under a different name. Since suppliers and clients will be divided among the partners, both firms will be smaller than the original firm, at least to begin with. To rule out the possibility that the positive Kathiawari-year coefficient is a consequence of greater separation among Marwari and Palanpuri firms, Table 5, Columns 7-8 exclude firms that have separated or were formed following a separation from the sample. The Kathiawari-year coefficient remains stable and continues to be precisely estimated with this reduced sample of firms.

The fixed effects regressions in Table 5 rule out differential changes in outside options across communities as an explanation for the selective entry into the industry observed in Table 4. However, an alternative explanation for this selective entry, which is also consistent with changes in performance across communities and over time, is based on changing profits within the industry. Kathiawari firms tend to specialize in small stones; these stones account for 57% of their output by value, versus 44% and 49% for the Marwaris and the Palanpuris, respectively.²¹ If the supply of small stones grew relatively rapidly over time, then these favorable circumstances would explain the relatively steep decline in ability among the entering Kathiawaris as well as their superior performance over time (net fixed effects), without requiring networks to be active. Small stones make up the most dynamic and competitive segment of the market and, if anything, we would expect the availability of these stones to have declined over time, relative to other sizes. Table 5, Columns 9-10 include the proportion of rough stones in the firm's output interacted with time as an additional regressor (the uninteracted variable is also included in Column 9 without fixed effects). The coefficient on this interaction term is

²⁰The Kathiawari firms have significantly more partners than firms from the other communities: The average number of partners, with standard errors in parentheses, is 2.81(0.12), 2.07(0.12), 2.22(0.07) for the Kathiawaris, Marwaris, and Palanpuris, respectively. Moreover, around 40% of the Marwari and Palanpuri firms are proprietary concerns versus 25% of the Kathiawari firms.

²¹We classified stones into seven sizes in the survey: -2, stars, mele, +11, pointers, stones, and larger stones. Small stones are defined to include -2, stars, and mele.

negative and significant (in Column 10), indicating that the small-stone segment has become relatively less profitable over time, while the Kathiawari-year coefficient continues to be positive and significant once fixed effects are included.

Notice, in contrast with the positive Kathiawari-year coefficient, that the coefficient on the Marwari-year term is negative across all specifications in Table 5, consistent with the view that superior outside options in that community are associated with a weakening industry-specific network. The estimated coefficients in the fixed effects regressions indicate that the Kathiawari network increased average sales for its members by approximately 240 thousand dollars per year over and above the Palanpuri benchmark, which reflects growth in that network as well as secular changes in the industry, effectively compensating for their increasingly weak business backgrounds. To get a sense of the importance of this differential network effect, average annual sales for Kathiawari firms were roughly 4.7 million dollars per year over the 1994-2004 period.²²

5.3 Change in the Number of Firms

Once we allow for selection into the network, conditional on having entered the industry, the theoretical framework predicts that the number of non-network firms should be increasing relatively rapidly in the *H*-community. Table 6 studies changes in the number of firms across communities over the 1965-2004 period. A time trend, community dummies, and the time trend separately interacted with the Kathiawari and Marwari dummies are included in each regression. Columns 1-2 report trends in the number of merchant exporters and vertically integrated firms, respectively. Figures 2-3 show these trajectories graphically.

Merchant exporters emerged in the mid-1970's, allowing the Kathiawaris, without contacts on the polished side of the market, to enter the export business. As predicted, the merchant exporters are drawn predominantly from the Marwari and Palanpuri communities and it is apparent from Figure 2 and Table 6, Column 1 that the gap between the number of merchant exporters belonging to these established business communities and the Kathiawari community has grown over time. I define a merchant exporter to be a firm that has only been active on the polished side of the market, both when it started exporting and currently. A number of Palanpuris who were previously involved in all stages of the import-export process have recently reduced their activities to merchant exporting. If

²²Exports are measured in millions of 1994 Rupees in Table 5 and the exchange rate was 31 Rupees to the dollar in that year.

we accounted for the shift of such firms into merchant exporting in Figure 2, then the gap between the Kathiawaris and the other communities would widen even further over time.

A firm is defined to be vertically integrated when it establishes a branch in Antwerp and we see in Figure 3 that the number of vertically integrated Palanpuri firms increases dramatically from the late 1970s onwards. There is a fixed cost to setting up a branch abroad – apart from the monetary expense, a close relative must also typically reside there – and so the firm will weigh the returns from procuring roughs through the community network with the returns from this substantial investment when choosing between these options. The returns to vertical integration will depend to a large extent on how easy it is for the firm to access roughs on its own, once it is established in Antwerp. The world supply of rough diamonds increased substantially in the late 1970s and the early 1980s with the opening up of Australia’s Argyle mines and the release of DeBeers stockpiles in response to these competitive pressures. This exogenous increase in the rough diamond supply presumably provided the impetus for Palanpuri firms to set up branches in Antwerp. And, as discussed earlier, these firms played an important role in the subsequent growth of the Kathiawari network.

While the gap in the number of vertically integrated Kathiawari and Palanpuri firms widens over time, as predicted, notice from Figure 3 and Table 6, Column 2 that very few Marwari firms vertically integrate. Marwari business activities are well diversified across space and industries and although we assumed that the cost of investing in the network did not vary across communities, to highlight the role of outside options, in practice this cost will be especially high for the Marwaris. By the same argument, fixed investments in the industry, such as setting up a branch in Antwerp, are particularly costly for the Marwaris and this might explain why they concentrate on the polished side of the market.²³

We considered two mechanisms through which the network could strengthen in Section 4: An increase in the number of firms and an increase in network-specific investments, measured by intra-industry marriage. Table 6, Column 3 studies changes in the number of firms and Table 6, Column 4 studies changes in the number of network firms (excluding merchant exporters and vertically integrated firms). The Palanpuris grow most rapidly with both of these measures, followed in turn by the

²³Although the theoretical framework provides one explanation, based on outside options, for why the Kathiawaris may be less likely to vertically integrate, an alternative explanation is that their rural, less Westernized background makes it difficult for them to live abroad. However, the Kathiawaris are nearly as likely as the Marwaris and Palanpuris to set up branches in the United States, Asia and Europe to market polished diamonds, and the increase in the number of these branches among the Kathiawaris matches the corresponding increase for the Palanpuris during the 1990s. Recall that networks are less important and that firms effectively operate independently on the polished side of the market.

Kathiawaris and the Marwaris.

Columns 3-4 summarize changes in the number of firms over a 40 year period. Dividing this period into two equal halves, the total number of Palanpuri firms increases by about nine firms per year in both the pre-1985 and post-1985 periods. The growth in the number Kathiawari and Marwari firms is substantially lower in the pre-1985 period; around two firms per year. While the Marwaris continue to grow at this slow rate in the post-1985 period, the Kathiawaris grow significantly *faster* than the Palanpuris in this latter period. Excluding merchant exporters and vertically integrated firms, the Palanpuri network actually grows more slowly in the post-1985 than in the pre-1985 period. In contrast, the Kathiawari network increases by about 1.5 firms per year in the pre-1985 period and by as much as 7 firms per year in the post-1985 period, which is significantly faster than the growth in the Palanpuri network.

Although the number of Kathiawari firms, particularly the network firms, does grow faster than the number of Palanpuri firms from the mid-1980s onwards, the relatively small difference in trajectories does not seem sufficient to explain the rapidly expanding gap in the ability of entering firms across communities over time. The discussion that follows considers the role that investments in the network, measured by intra-industry marriage, might have played in supporting this differential entry across communities.

5.4 Change in Marriage Patterns

The basic marriage rule in Hindu society is that no individual can match outside the sub-caste or *jati*. The dense web of marriage ties that consequently forms over the course of many generations improves information flows and reduces enforcement problems, and not surprisingly networks serving different functions have historically been organized at the level of the *jati*. Marriage outside the *jati* is rare in India, in large part due to the continuing role that caste networks play in facilitating economic activity. Consistent with this general trend, over 90% of the entrepreneurs in the sample married within their *jati*.

“For the business family more may be required of marriage than just *jati* endogamy ... Access to credit and avenues for mobility are dependent upon the complex network of relationships arising from marriage” (Hazlehurst 1966: 45, 109). Marriage within the industry reduces the entrepreneur’s incentive to renege on his obligations, thereby increasing his access to the network. The theoretical framework predicts that such investments in the network should be increasing at the margin over time

(across cohorts). Once we allow for secular changes in the industry, which are equivalent to changes in outside options u^j in our framework, it is evident that the sign of $d\Delta\omega_t^j/dt$ is ambiguous. However, $d^2\Delta\omega_t^j/d\tilde{\alpha}dt$ continues to be negative, implying that investments in the Kathiawari network should continue to grow faster *relative* to investments in the other communities over time.

Table 7, Column 1 studies marriage choices of firm owners using the same specification as in equation (8). The dependent variable takes the value one if the spouse's family was in the diamond industry prior to their marriage, zero otherwise. The regressors include the firm's establishment year, a full set of community dummies, and the interaction of the establishment year with the community dummies. The establishment year coefficient is negative but insignificant; we have already noted that this coefficient cannot be interpreted once we allow for secular changes within the industry. More importantly, the Kathiawari - establishment year coefficient is positive and significant, precisely as predicted by the model.

Conditional on entry into the industry, entrepreneurs select by ability into the network in our model. We saw in Table 4 that the entrepreneur's age provided information about his ability and so Table 7, Column 2 includes age and age interacted with the community dummies as additional regressors. The Kathiawari- establishment year coefficient continues to be positive, but is smaller in magnitude and no longer significant at conventional levels. Although the model assumes for simplicity that entrepreneurs enter the industry and select into the network (marry) at the same point in time, this is not necessarily the case in practice. Marriages occur within a narrow age-window in this society. An entrepreneur who enters the industry at a late age is consequently likely to be married already and so the option of marrying within the industry will not be available to him. Conditional on age, a later establishment year mechanically lowers the probability of intra-industry marriage, biasing the estimated establishment year coefficient downward.

To correct this bias we would need to include the individual's age at establishment AEY_i as an additional regressor. $AEY_i = AGE_i - (2004 - EY_i)$, where AGE_i is the entrepreneur's age in the survey year (2004) and EY_i is the firm's establishment year. AEY_i is a linear function of AGE_i and EY_i and so all three variables cannot be included as regressors simultaneously. AGE_i is consequently replaced by AEY_i , together with the accompanying interaction terms, in Table 7, Column 3. AGE_i is now omitted as a regressor but we have already seen in Table 4 that its omission provides us with conservative estimates of the community gap. The Kathiawari-establishment year coefficient is positive and significant in Column 3 and close in magnitude to what we obtained in Column 1.

Our explanation for the cross-community patterns in Columns 1-3 is that intra-industry marriage is associated with investments in an underlying network, which consequently strengthens relatively rapidly in the Kathiawari community.²⁴ However, other explanations for these results are also available. For example, the number of Kathiawari firms increased relatively rapidly over time in the post-1985 period, which would have expanded the pool of prospective partners from within the industry for that community. We consequently include the number of firms belonging to the entrepreneur's community that were already in the industry when his firm was established as an additional regressor in Table 7, Column 4. An increase in the number of firms actually lowers intra-industry marriage, which may simply be a consequence of the increased heterogeneity in family backgrounds that accompanies the growth of any network. While the establishment year coefficient is now positive and significant, the Kathiawari-establishment year coefficient is unchanged, indicating that intra-industry marriage continues to increase relatively rapidly in that community over time. As a final robustness check, vertically integrated firms and merchant exporters are omitted from the sample in Column 5. The Kathiawari-establishment year coefficient with the reduced sample of network firms is similar to what we obtained previously and continues to be precisely estimated.

Apart from his own marriage decision, the entrepreneur could also invest in the network through the marriage choices he makes for his children. Although the Kathiawari children continue to lag behind the established communities in educational attainment and the likelihood of being schooled in English, the community-gap has narrowed substantially across the generations (not reported). The sons of the respondents who have completed school are almost without exception absorbed into the diamond industry, whereas almost none of the daughters work outside the home. The corresponding statistics for the spouses of the (married) children broadly match these occupational patterns, except that a significant proportion of the daughters marry white-collar professionals or businessmen in other industries. One-third of the Marwari daughters are married to businessmen operating outside the diamond industry, consistent with the idea that many outside opportunities are available for members of that community. Along the same lines, just 16% of the daughter-in-laws and 37% of the son-in-laws of the Marwari respondents come from families that were already in the diamond business prior to

²⁴Munshi and Rosenzweig (2005) show that an exogenous decline in the quality of caste-based insurance arrangements leads individuals to exit their networks by marrying outside the sub-caste. By the same argument, an exogenous improvement in the quality of the Kathiawari network would have generated an increase in intra-industry marriage since diamond families would find it difficult to match with comparable families outside the industry. Although such a marriage *response* remains a possibility, I am aware of no other plausible explanation, other than the marriage mechanism, through which the Kathiawari network strengthened over time.

marriage. These numbers are significantly lower than the corresponding statistics for the Kathiawaris and Palanpuris. However, children from all three communities continue to marry within their *jatis*, highlighting their continued ties to the broader community networks.

Table 7, Columns 6-10 repeat the regressions that we ran for the entrepreneur, with children's marriage choice as the dependent variable. The child's gender is now included as an additional regressor but the specifications from Columns 1-5 are otherwise unchanged. Children's marriage choices are less likely to be mechanically determined by the entrepreneur's age when the firm was established. As expected, the Kathiawari-establishment year coefficient is positive and significant without exception in Columns 6-10, even with the age terms as regressors.

To provide a sense of the economic importance of these cross-community differences in marriage patterns, Figure 4 presents nonparametric estimates of the relationship between the entrepreneur's marriage choice and the firm's establishment year, corresponding to the specification in Column 3.²⁵ As is sometimes the case with kernel regressions, the marriage estimates are unstable in the tails, with predicted marriage prevalence decreasing sharply for Marwaris and Palanpuris in the pre-1975 period and increasing sharply for both communities in the post-2000 period. Figure 4 consequently restricts attention to the 1975-2000 period. The estimates in this period match the statistics with the full sample, which indicate that 16% of the Marwaris and 45% of the Palanpuris married within the industry. Moreover, there is no discernable time trend in marriage prevalence among the Marwaris or Palanpuris, matching the parametric estimates in Table 7. In contrast, intra-industry marriage increases rapidly among the Kathiawaris, starting at zero in 1975 and reaching 45% by 2000, matching the estimates in Table 7 once again.²⁶ Munshi and Rosenzweig (2005, 2006) describe how individuals at the top of the ability or wealth distribution in their sub-caste start to exit, with an accompanying increase in out-marriage, as their networks start to decay. In this paper we observe the opposite pattern, with a decline in the marginal entrant's ability and an increase in intra-industry marriage as the Kathiawari network matures over time.

To provide additional support for the link between networks and marriage, I complete the empirical analysis by comparing marriage choices for network and non-network firms within each community. The model predicts that entrepreneurs with relatively low ability in each community-cohort will remain

²⁵The age at establishment terms are netted out using the same two-step procedure as in Figure 1.

²⁶The cross-community differences corresponding to Figure 5 for the children are even more dramatic, matching the substantially larger Kathiawari-establishment year coefficient in Table 7. While the proportion of Palanpuris marrying within the industry stays roughly constant at 0.65 and the corresponding proportion for the Marwaris increases slightly over time, almost all Kathiawari children marry within the industry by 2000.

within the network and marry within the industry. Including the firm's establishment year, a full set of community dummies, and the interaction of the establishment year with these dummies, as controls we see in Table 8, Columns 1-3 that network firms have lower observed ability as predicted, although the network coefficient is only significant at the 10 percent level. Further, entrepreneurs and their children from network firms are significantly more likely to marry within the industry in Columns 4-5, consistent with the equilibrium correlation between network membership and marriage assumed in the model.

6 Conclusion

Entrepreneurship has been traditionally concentrated in the hands of a few small communities in most developing economies. As these economies restructure and make the transition to a steeper growth path, it is evident that these communities will be unable to satisfy the increased demand for new entrepreneurs. The analysis in this paper suggests that entrepreneurs without a family background in business will fill the gap, even in industries where connections matter a great deal, using their own community networks to support business activity. Indeed, the theoretical framework developed in this paper indicates that these networks will strengthen most rapidly in communities with poor outside options once they do crystallize.

The analysis in this paper is based on a single community in a single industry. Would we expect this experience to be repeated elsewhere when new entrepreneurial opportunities become available? Although barriers to entry would appear to be exceptionally high in the diamond industry, due to the trust-based nature of the business and the importance of connections, our analysis indicates that entry would, in fact, be more of a challenge in industries where networks are absent. This is because networks would be unavailable to support entrants with weak family backgrounds in such industries. Apart from their poor outside options, there is nothing notable about the Kathiawaris as a group. Prior to entering the diamond business, the Kathiawaris had an undistinguished history, working as agricultural laborers for centuries and more recently as industrial workers. They had the good fortune to be employed in a dynamic industry in which a confluence of favorable circumstances generated a demand for new entrepreneurs, and based on the analysis in this paper there is no reason why the same outcome would not have been obtained in any other industry where networks were active when new business opportunities became available.

While this paper focusses on community networks as the mechanism through which new entrepreneurship can be supported, could subsidized bank credit play a similar role? In the diamond industry, bank credit would have allowed newcomers to buy roughs on cash in Antwerp, lowering barriers to entry. Diamond firms have few fixed assets and banks must use their rough inventory as security when providing them with credit. The value of rough diamonds is uncertain and easily manipulated, and so it is no surprise that banks have historically kept away from this industry. However, this position has changed dramatically with financial liberalization in India. Ten years ago, three banks provided credit to the industry. Today, 59 banks provide credit and the current outstandings, based on Reserve Bank of India statistics, are estimated to be close to four billion dollars.

This surge in bank credit allowed firms to compete vigorously for roughs in Antwerp, pushing up the price and encouraging DeBeers and other primary suppliers to unload their rough stocks on the market. The increase in the polished diamond supply that followed quickly outstripped the demand and we noted in Section 3 that the delay in payment on the polished side of the market had lengthened substantially by 2004-05. This delay made it difficult for firms to repay their rough suppliers in a timely fashion and starting from October 2005, the rough suppliers in Antwerp cut back drastically on their credit to diamond firms. Without supplier credit, which continues to be the main source of capital in the industry, the rough diamonds cannot move and the industry is now in a downturn.²⁷ The past few months have witnessed the unprecedented phenomenon of sightholders refusing to accept their boxes of roughs, which were once a prized commodity, from the DTC and industry observers predict that the downturn in the industry is unlikely to be rectified in the immediate future (IDEXmagazine, Issue no. 198, October 10, 2006).

There are two reasons why the rough suppliers cut back on credit. First, the availability of bank credit without sufficient monitoring allowed firms to buy roughs recklessly, pushing up the price and increasing delays in payment and default rates. Second, firms that now had access to bank credit had less to lose by renegeing on their obligations to the network, providing another channel through which defaults would have increased. Networks that took many decades to mature have now been undermined and it is not clear that they will be in a position to provide their former levels of support when the industry corrects itself and recovers from the current downturn. The banks could, in principle, have

²⁷Although widespread defaults on bank loans have not occurred, Reserve Bank of India statistics on credit outstandings suggest that banks may have avoided this by rolling over their debts. The ratio of outstandings to diamond imports was just over 0.25 from 1997 to 2004, then increased to 0.42 in 2005 just when the firms were finding it difficult to repay their loans, and then increased even further to 0.50 in 2006. It is consequently unlikely that the supply of fresh bank credit will increase substantially in the future.

exploited the monitoring and enforcement capability of the networks to judiciously increase the supply of capital and stimulate entry, as well as growth in the industry. Instead, the indiscriminate provision of bank credit may have undermined an institution based on trust that took many decades to develop, leaving the industry less stable in the future.

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Table 1: Referral Pattern

Source of referrals:	number of individuals that provided referrals (1)	total number of referrals provided (2)	percent of referrals for Kathiawaris (3)	percent of referrals for Marwaris (4)	percent of referrals for Palanpuris (5)
Kathiawari exporters	60	212	74.06	2.83	20.28
Marwari exporters	24	206	12.62	42.72	37.86
Palanpuri exporters	128	707	9.19	9.05	78.64
Brokers	47	239	31.38	14.23	51.05
Other	36	109	18.35	21.10	49.54

Note: Other sources of referrals include personal connections of the survey team and firms belonging to other communities.

A total of 295 individuals provided referrals in Column 1.

These individuals provided a total of 1,473 referrals in Column 2.

Columns 3-5 sum to approximately 95% because some referrals are also made to exporters from other communities.

Table 2: Characteristics of the Entrepreneurs

Community:	Kathiawari	Marwari	Palanpuri
	(1)	(2)	(3)
Panel A: Individual characteristics			
Age	42.46 (0.77)	46.13 (0.92)	49.05 (0.52)
Years of schooling	10.84 (0.26)	14.41 (0.19)	12.87 (0.12)
Percent schooled in English	11.47 (2.16)	47.20 (4.48)	37.28 (2.41)
Percent that grew up in Mumbai	22.02 (2.81)	26.40 (3.96)	49.38 (2.49)
Panel B: Family background			
<u>Father's occupation (%)</u>			
Farming	53.02	2.46	2.54
White-collar professional	5.58	13.93	15.52
Other business/store-owner/sales	11.16	27.05	27.23
Other jewelry business	5.12	29.51	11.96
Diamond cutting & polishing	7.44	1.64	6.62
Diamond broker/trader	2.79	3.28	9.92
Diamond exporter	14.88	22.13	26.21
Any business	34.56 (3.24)	82.40 (3.42)	75.81 (2.14)
Number of firms	218	125	405

Note: standard errors in parentheses.

Any business includes other business/store-owner/sales, other jewelry business, diamond broker/trader, and diamond exporter.

Table 3: Organization of the Diamond Business

Community:	Kathiawari	Marwari	Palanpuri
	(1)	(2)	(3)
Panel A: Rough transactions			
Number of suppliers per year	9.98 (1.17)	11.68 (2.71)	10.76 (1.13)
Percent of firms with a single dominant supplier	70.78 (3.68)	70.83 (6.63)	71.48 (2.83)
Percent of roughs sourced directly from Antwerp	76.31 (2.37)	63.18 (4.99)	67.98 (2.15)
Percent of roughs received on credit	80.78 (2.27)	73.48 (4.99)	75.39 (2.03)
Average repayment period (days)	102.39 (1.88)	98.29 (4.78)	101.44 (1.79)
Percent of transactions involving a written agreement	3.95 (1.58)	9.76 (4.69)	6.28 (1.57)
Panel B: Polished transactions			
Number of buyers per year	33.23 (4.39)	49.57 (14.11)	30.11 (2.40)
Percent of firms with a single dominant buyer	52.91 (3.49)	69.03 (4.37)	58.65 (2.56)
Percent of polished sold directly to buyers abroad	59.10 (2.71)	69.42 (3.42)	63.35 (1.89)
Percent of polished sold on credit	77.20 (1.95)	82.95 (2.38)	84.37 (1.25)
Average repayment period (days)	102.11 (2.55)	114.24 (3.89)	113.49 (1.83)
Percent of transactions involving a written agreement	2.99 (1.20)	5.98 (2.20)	5.57 (1.18)

Note: standard errors in parentheses.

Dominant supplier is defined as a supplier who provides more than 30% of the firm's roughs.

Dominant buyer is defined as a buyer who accounts for more than 20% of the firm's polished.

Merchant exporters, who restrict their activity to the polished side of the market, are excluded from Panel A.

Table 4: Selection into the Industry

Sample: Dependent variable:	all firms			all firms			network firms		
	father not farmer	father business	schooling	father not farmer	father business	schooling	father not farmer	father business	schooling
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Establishment year	-0.001 (0.001)	-0.002 (0.002)	-0.022 (0.007)	-0.001 (0.001)	-0.002 (0.002)	-0.030 (0.007)	-0.001 (0.001)	-0.00004 (0.002)	-0.037 (0.009)
Establishment year - Kathiawari	-0.008 (0.004)	-0.011 (0.004)	-0.017 (0.024)	-0.016 (0.004)	-0.016 (0.004)	-0.065 (0.025)	-0.020 (0.005)	-0.020 (0.005)	-0.059 (0.026)
Establishment year - Marwari	-0.00004 (0.001)	-0.003 (0.002)	0.025 (0.017)	0.0001 (0.001)	-0.003 (0.003)	0.031 (0.018)	-0.001 (0.002)	-0.006 (0.003)	0.011 (0.023)
Age terms	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	737	737	737	737	737	737	486	486	486

Note: Standard errors in parentheses clustered by establishment year.

All regressions include community dummies.

Entrepreneur's age is included, uninteracted and interacted with Kathiawari and Marwari dummies, in Columns 4-9.

Business occupations include other business/store-owner/sales, other jewelry business, diamond broker/trader, and diamond exporter.

Schooling is measured as years of educational attainment.

Network firms exclude merchant exporters and vertically integrated firms.

Table 5: Change in Exports

Dependent variable: Sample:	exports									
	all firms				network firms		excluding separated firms		all firms	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Year	12.940 (2.093)	14.272 (1.906)	9.953 (1.904)	14.066 (1.354)	10.491 (1.733)	10.056 (1.082)	14.114 (2.241)	15.293 (1.954)	17.593 (4.440)	20.585 (3.287)
Year-Kathiawari	1.874 (3.938)	7.419 (2.223)	2.491 (3.490)	7.494 (2.685)	2.472 (3.723)	7.778 (2.243)	3.453 (4.054)	8.892 (2.411)	2.744 (3.803)	8.266 (2.362)
Year-Marwari	-7.514 (2.332)	-6.626 (2.153)	-7.152 (2.243)	-6.641 (2.278)	-7.412 (1.935)	-3.068 (1.416)	-7.113 (2.553)	-6.504 (2.298)	-8.214 (2.520)	-7.583 (2.408)
Father business-experience	--	--	0.518 (1.383)	0.369 (1.595)	--	--	--	--	--	--
Year-proportion small stones	--	--	--	--	--	--	--	--	-0.100 (0.056)	-0.123 (0.031)
Firm fixed effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	6,114	6,114	6,051	6,051	4,112	4,112	5,233	5,233	5,965	5,965

Note: Standard errors in parentheses clustered by year.

Exports are measured in millions of 1994 Rupees.

Network firms exclude merchant exporters and vertically integrated firms.

Separated firms are formed following a split among original partners.

Father business is a binary variable defined in Table 4 and experience measures the number of years after the firm was established.

Proportion small stones measures the proportion of the firm's output that is accounted for by -2, stars, and mele.

All regressions without firm fixed effects include community dummies.

Table 6: Change in the Number of Firms

Dependent variable:	number of firms			
	merchant	vertically		
Sample:	exporters	integrated firms	all firms	network firms
	(1)	(2)	(3)	(4)
Year	2.334 (0.064)	1.383 (0.034)	9.916 (0.195)	6.199 (0.208)
Year-Kathiawari	-1.388 (0.090)	-1.128 (0.049)	-3.954 (0.276)	-1.407 (0.294)
Year-Marwari	-0.620 (0.090)	-1.120 (0.049)	-6.685 (0.276)	-4.945 (0.294)
Number of observations	120	120	120	120

Note: Standard errors in parentheses.

Merchant exporters buy polished stones in the Mumbai market and sell to foreign buyers.

Vertically integrated firms have branches in Antwerp.

Network firms exclude merchant exporters and vertically integrated firms.

All regressions include community dummies.

Table 7: Change in Marriage Patterns

Dependent variable: Generation: Sample:	married within the industry									
	firm owners					children				
	all firms		network firms			all firms		network firms		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Establishment year	-0.001 (0.002)	-0.001 (0.002)	0.001 (0.003)	0.009 (0.004)	0.001 (0.003)	0.001 (0.002)	0.002 (0.002)	-0.003 (0.005)	-0.006 (0.006)	-0.001 (0.006)
Establishment year - Kathiawari	0.009 (0.004)	0.004 (0.004)	0.011 (0.005)	0.009 (0.004)	0.011 (0.006)	0.014 (0.004)	0.010 (0.005)	0.025 (0.006)	0.027 (0.006)	0.029 (0.008)
Establishment year - Marwari	0.003 (0.003)	0.004 (0.003)	-0.003 (0.005)	-0.008 (0.005)	-0.007 (0.008)	0.008 (0.008)	0.007 (0.007)	0.006 (0.010)	0.008 (0.010)	-0.006 (0.018)
Number of firms	--	--	--	-0.001 (0.0005)	--	--	--	--	0.0004 (0.0005)	--
Age terms	No	Yes	No	No	No	No	Yes	No	No	No
Age at establishment terms	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Number of observations	742	742	742	742	489	588	588	588	588	416

Note: Standard errors in parentheses clustered by establishment year.

All regressions include community dummies. Columns 6-10 also include a gender dummy.

Number of firms measures the number of firms in the community that were active in the industry when the firm was established.

Age terms include entrepreneur's age, uninteracted and interacted with Kathiawari and Marwari dummies.

Age at establishment terms include entrepreneur's age in the establishment year, uninteracted and interacted with Kathiawari and Marwari dummies.

Network firms exclude merchant exporters and vertically integrated firms.

Table 8: Selection into the Network

Dependent variable:	entrepreneur's characteristics			married within the industry	
	father not farmer	father business	schooling	entrepreneur	children
	(1)	(2)	(3)	(4)	(5)
Network firm	-0.031 (0.024)	-0.062 (0.037)	-0.396 (0.234)	0.079 (0.032)	0.081 (0.045)
Number of observations	737	737	737	742	588

Note: Standard errors in parentheses clustered by establishment year.

All regressions include community dummies and establishment year, uninteracted and interacted with Kathiawari and Marwari dummies.

Column 5 also includes a gender dummy.

Network firms exclude merchant exporters and vertically integrated firms.

Figure 1: Change in Entrepreneurial Background

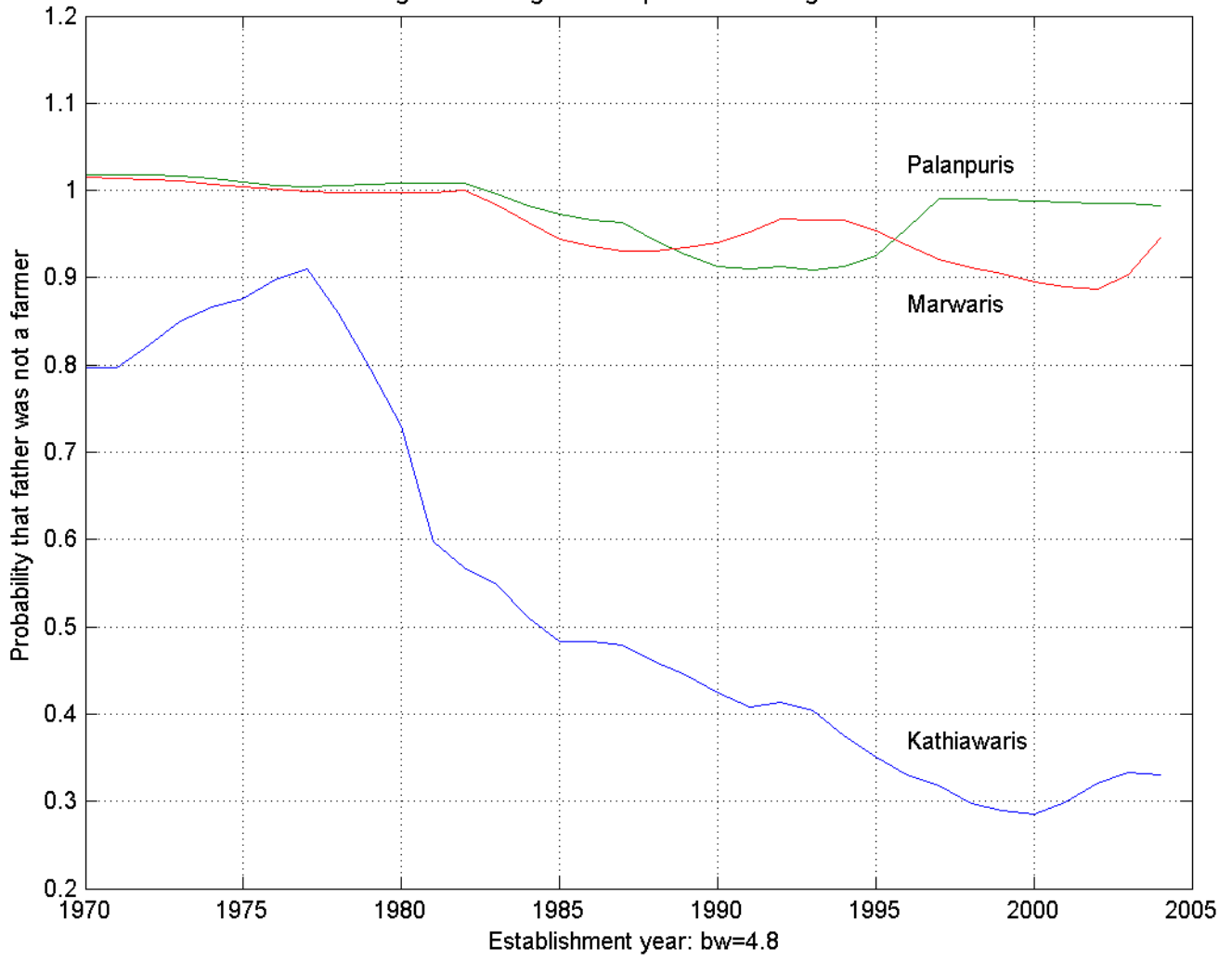


Figure 2: Change in the Number of Merchant Exporters

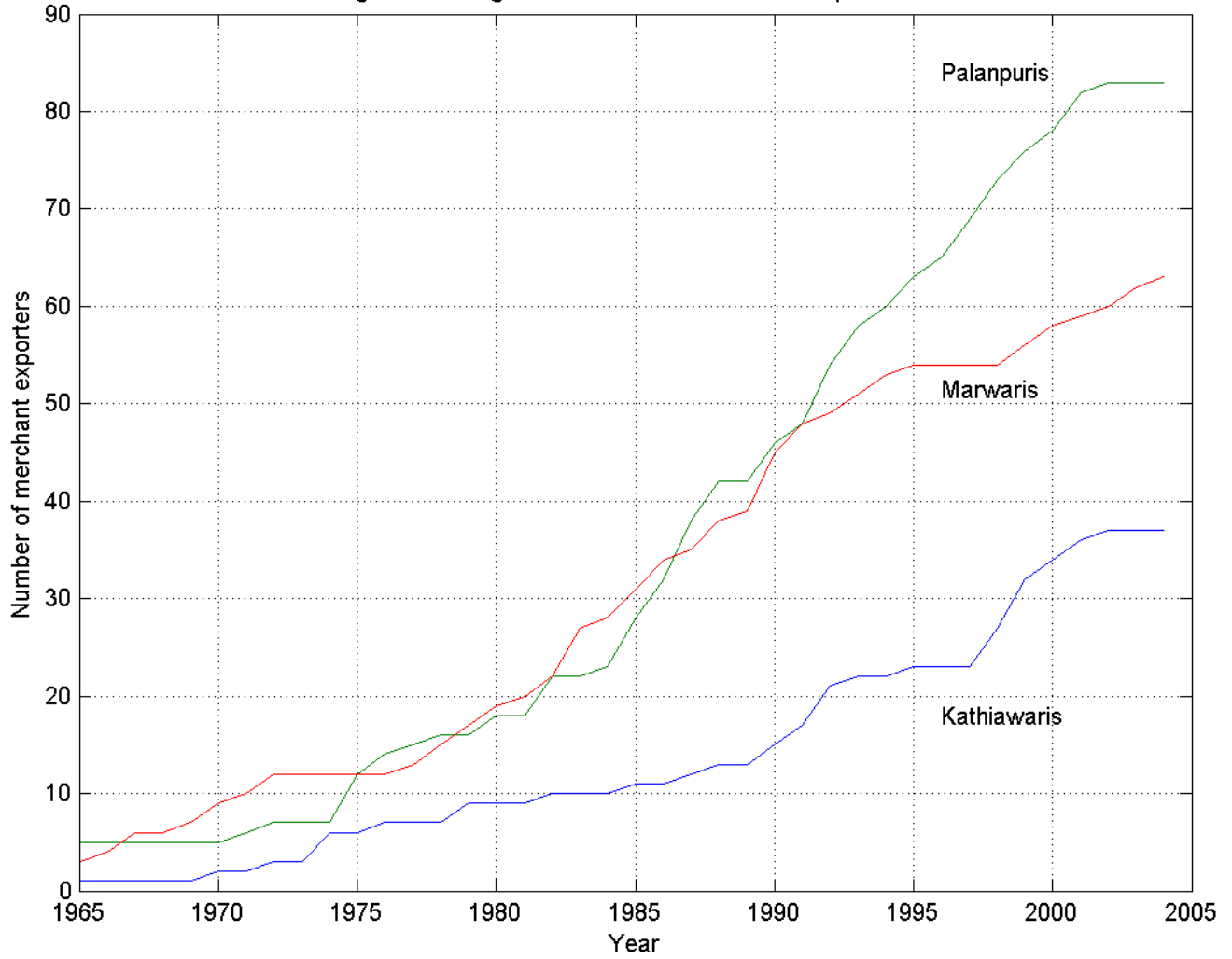


Figure 3: Change in the Number of Vertically Integrated Firms

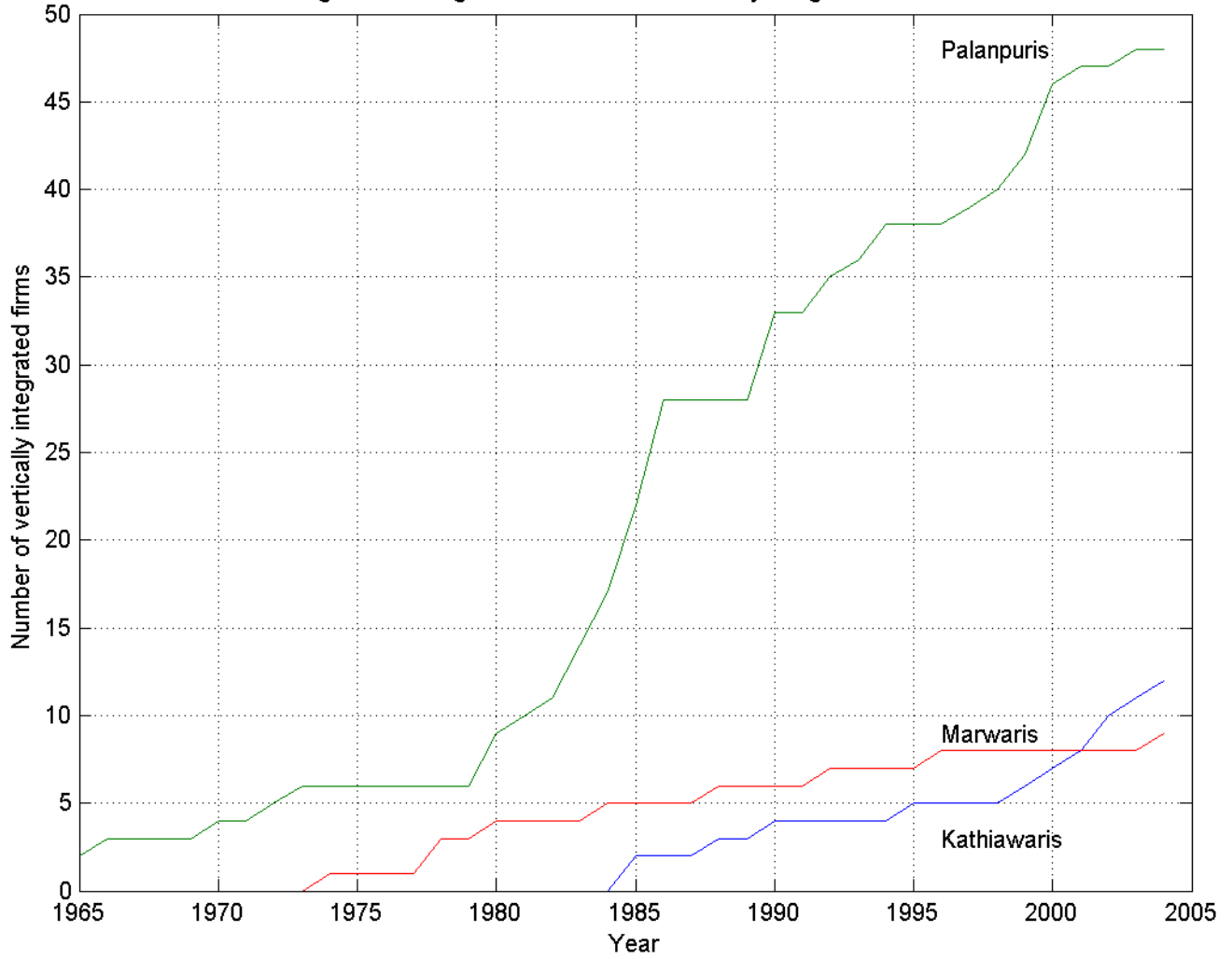


Figure 4: Marriage within the Industry

