

Discrimination or Social Networks? Industrial Investment
in Colonial India

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Abstract

Industrial investment in Colonial India was segregated by the export oriented industries, such as tea and jute that relied on British firms and the import substituting cotton textile industry that was dominated by Indian firms. The literature emphasizes discrimination against Indian capital. Instead informational factors played an important role. British entrepreneurs knew the export markets and the Indian entrepreneurs were familiar with the local markets. The divergent flows of entrepreneurship can be explained by the comparative advantage enjoyed by social groups in information and the role of social networks in determining entry and creating separate spheres of industrial investment.

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Introduction

Bombay and Calcutta, two metropolitan port cities, experienced very different patterns of industrial investment in colonial India. One was the hub of Indian mercantile activity and the other the seat of British business. The industries that relied on the export market attracted investment from British business groups in the city of Calcutta. Bombay, on the other hand, became the centre of the import substituting textile industry. Indian cotton traders from different communities moved from trade to production of cotton textiles. Few British entrepreneurs were present. British industrial interests exercised monopoly control over various industrial activities in Calcutta and the hinterland. British firms were set up in tea, jute and coal and here the presence of Indians was minimal.

Although geographical factors determined the location of these industries, who invested and why remain questions of interest. Cotton was grown in the hinterland was Bombay and tea and jute in the hinterland of Calcutta. History could matter too. Indian merchants in Bombay had a more dominant presence in Bombay. These merchants had a strong presence in internal as well in the Indian Ocean trade. In the cotton textiles industry around Bombay, most of the investment was by Indians, who had links with the trade in raw cotton. The trade in raw jute around Calcutta was also in the hands of Indian traders, but they were not involved in the investment in jute manufacturing until the First World War. Investment in tea, jute and coal in and around Calcutta came from the British. A puzzle is why did British entrepreneurs not take advantage of these profitable opportunities open to Indian merchants. Why did British and Indian investment stay separated? Why did British capital flow into some sectors and not to others?

The literature on early industrial development in India has emphasized the role British investment and entrepreneurship. Some scholars see it as a crucial factor in the development of an economy scarce in capital, technology and entrepreneurial skills.² Max Weber claimed that the negative effect of Hinduism on entrepreneurial spirit was a reason for India's economic backwardness.³ Morris criticized Weber, arguing that Indians did become industrial entrepreneurs when conditions were attractive.⁴ Others have emphasized the negative impact British rule in circumscribing the sphere of operation for domestic capital.⁵ This literature emphasizes the discrimination faced by Indian business and the favor received by British entrepreneurs from the colonial state. These favours included subsidized land transfers to tea planters and legislations in support of contracts with indentured workers in these plantations. While this may explain the absence of Indian business interests in Calcutta, it does not explain their dominant presence in Bombay. More importantly it does not explain the small presence of British capital in the cotton textile industry.

This paper offers an explanation for the segmented world of industrial investment by British and Indian capital. By matching the volumes of investment to the ethnicity of the investors, I argue that informational asymmetry can explain why capital did not necessarily flow to activities of high return. The role of social networks in long distance trade in history is well researched. Less is known about its role in investment. This paper explores the role of social networks in decisions to invest in industry. Investors faced significant risks and problems of moral hazard and asymmetric information. Consequently, investment

² Buchanan, *The Development of Capitalist Enterprise in India*, Anstey, *Economic Development of India*.

³ Weber, *The Religion of India*

⁴ Morris, "Values as an Obstacle to Economic Growth"

⁵ Bagchi, *Private Investment in India*, Gadgil, *Industrial Evolution of India*.

flows were influenced by the extent of knowledge that investors had of particular markets. The information was transmitted through community networks creating separate spheres of investment. I argue that access to information about markets differed across social groups and gave an advantage to specific groups in specific markets. Conditional on the initial advantage, information flows within a network further accentuated the segregation of economic activity by social group and showed up in the different investment patterns in the cities of Calcutta and Bombay.

The paper is organized as follows: I start with a summary of the theoretical literature on long distance capital flows and informational constraints and presents a simple model to analyze the determinants of industrial investment in colonial India. This is followed by a discussion of the type and magnitude of industrial investment. The empirical section tests for discrimination in industrial investment and the role of social networks in entry into industrial activity. The final section concludes.

Informational Constraints and Capital Flows: A Simple Model of Informational Advantage

The recent literature on international capital flows provides a backdrop to my analysis of the Indian economy in colonial times.⁶ Only a quarter of British capital went to the Empire of which only 30 percent went to the colonies under British rule with India receiving two thirds.⁷ Lucas, in his well-known paper, argued that British capital flows to India were low even during the colonial period when the threat of expropriation was low and returns

⁶ Lucas “Why doesn’t capital flow”

⁷Davis and Huttenback “The export of British finance”

were high.⁸ The low volumes of capital flows could be explained if the imperial power had exploited its monopoly position and restricted capital flows to keep returns on capital high. This does not seem to have been the case in British India. On the contrary, large inflows of capital into the railways were encouraged by guaranteeing favorable rates of return.

Bovenberg and Gordon set out a model of asymmetric information to explain why capital flows do not equalize returns across countries. They consider a situation where domestic investors are better informed about the quality of the investment project than foreign investors. Foreigners fear being overcharged and hesitate to buy equity. Thus asymmetric information between foreign and domestic investors prevents capital from flowing to high return economies.⁹ Empirical evidence from recent cross-country equity flows support the view that information asymmetries reduce the involvement of foreign investors.¹⁰ Portes et al. estimate a gravity model for capital flows and find the distance and speed of information flows, measured by telephone connections, have significant effects. The results suggest that local producers have better information about local markets and foreign firms are not willing to undertake long distance investment even when political risks are minimal. These informational barriers may be reinforced by the absence of institutions that are effective in enforcing commercial contracts.¹¹

In my framework, informational asymmetries are defined by social groups. Information flows were easier within social groups and restricted across groups. Therefore if one member of a social group invested in a particular industry, others could be persuaded to invest in it too. Members of a community made similar decisions to diversify from trade

⁸ Lucas, Why doesn't capital flow from rich to poor countries.

⁹ Bovenberg & Gordon, Why is Capital so Immobile Internationally.

¹⁰ Portes & Rey, The Determinants of Cross-Border Equity Flows.

¹¹ Bordo et. Al, Is Globalization Today really different from Globalization a Hundred Years Ago.

to industry in response to changing economic conditions of the 19th century. The shift from cotton trade to production of cotton textiles is a case in point. Community members also made similar decisions to migrate. There are many examples of this. Bhatia and Parsi merchants moved as groups from Surat to Bombay as the city began to grow in the 18th century.¹² Marwari traders moved as a group from North –Western India towards the East in search of new business opportunities.¹³

We can think of two channels of information flow through social networks. The informational constraints faced by investors were different from those faced by entrepreneurs. Potential entrepreneurs had information about investment opportunities. Potential investors were guided by the risk associated with buying shares in a foreign company. Familiarity with products could overcome this type informational constraint. Reputational value of the entrepreneur could also be an advantage. Entrepreneurs decided which is a profitable enterprise and the investors chose whether to invest in the enterprise. Investors' choice depended on who the entrepreneurs were and the type of industry.

An example of the first is that British savers invested in companies started by British entrepreneurs. An example for the second type of information is tea, where the product was present in the consumption basket of the average British consumer giving them an incentive to invest in this industry. I will return to this point in the next section. For now, I focus on the informational constraints facing entrepreneurs. Potential entrepreneurs have different quality of information about investment opportunities. This information is shared with members of the community so that it influences their decisions to enter a particular industry. I put forward a simple model to illustrate the way in which

¹² Tripathi and Mehta, *Business Houses in Western India*.

¹³ Timberg., *The Marwaris*, pp92-93

informational flows within a community give rise to a herding effect so that different communities specialize in different industries.

Consider two sectors and two communities. First, any initial entrant is a pioneer, who observes only imperfectly which niche is profitable. The pioneer has the option to enter either industry and select a niche. However, in compensation, such an entrant earns monopoly profits initially. Second, entrants from the same community become informed about the profitability of a niche once successful entry takes place. By entering the same industry, they face reduced risk, and this offsets the congestion arising from additional entry. On the other hand, entrants from a different community suffer from competition and the congestion and have no informational benefits. This produces a tendency towards segregation, with different communities specializing in distinct industries.

Assume for simplicity that there are two industries, A and B

In each industry, there are several niches , indexed by $i \in \{1,2,\dots,n\}$

Only one of these niches is profitable, and each of them has equal prior probability.

Let L be the loss suffered by entering an unprofitable niche. Let G_i be the gain from entering a profitable niche in industry i , $i \in \{A,B\}$.

We assume that G_i is a random variable that is independently and identically distributed according to density f on $[\underline{G}, \hat{G}]$.

At each date t , individual has an investment opportunity, and can invest either in industry A or B, and must also choose a niche to enter in either industry.

He observes G_A and G_B , and also observes signals S_A and S_B , where $S_i \in \{1,2,\dots,n\}$ is a signal of which niche is profitable. S_i equals the profitable niche with probability $p > (1/n)$, and with probability $((1-p)/(n-1))$ it equals one of the other niches.

Thus the posterior probability of success of a niche for which a favorable signal is obtained is p , and the expected profit from entry (without any additional information), is

$pG_i + (1-p)L - c$, where c is the cost of capital.¹⁴

Let \hat{G} denote the break-even level of profit where the above expression equals zero.

Assume that there are no sunk costs. Thus an individual without any additional information will enter if and only if $G_i \geq \hat{G}$

Once he enters, he finds out whether the niche is actually profitable or not. If it is profitable, he continues in the industry, and if it is unprofitable, he exits at the end of the period.

Now consider any individual who follows the first entry. We assume that such an individual either belongs to the same community, C , as the first entrant, or to a different community, \hat{C} . If he belongs to the same community, he observes the niche that the first entrant chose. He also observes an exit decision and learns if the first entrant's choice was the right one. Thus, he now believes that the probability that this niche is profitable is 1 rather than p . As in the models of herd behavior,¹⁵ the follower will ignore his own information and the signal he observes and follow the first entrant. However, he has to share profits with the current incumbent, and his payoff is $G_i(2) < G_i$.

More generally, let $G_i(m)$ denote the profits when m firms are already in the market, which is assumed to be decreasing in m . Thus for any value of $t G_i$, there exists $m^* G_i$ such that at most m^* firms can profitably enter. Note that this value of m^* assumes that firms perfectly know which niche is profitable.

Notice that a following entrant of the same community also learns that the niche is not profitable if the first entrant exits after one period. If the follower observes a positive signal for a different niche, he assigns a higher probability $p_1 > p$.¹⁶

Consider now an individual who is from, \hat{C} , a different community from that of the first entrant into industry i , and all previous entrants into the industry i .

Suppose that there are m entrants into this industry. Since he cannot observe the niche, his expected profit is

$$p G_i(m) + (1-p)L - c,$$

¹⁴ Since the posterior probability of success in a niche, where no signal is observed is $(1-p)/(n-1)$, which is strictly less than $1/n < p$, it is strictly worse to enter a niche where no signal is observed.

¹⁵ Banerjee, "A simple model" and Bikchandani et al, "Learning from behavior of others. The model here differs from the models of herd behaviour and the informational cascades as the follower observes whether the first entrant was successful or not, whereas in the herd behaviour literature outcomes are not observed.

¹⁶ Bayesian updating implies $p_1 = (n-1)p / (n-1)p + (n-2)(1-p) > p$

which is strictly less than the payoff of the first entrant. On the other hand, if no firm has entered industry j , his payoff from entering industry j is given by

$$pG_j + (1-p)L - c.$$

Thus if $G_j > G_i(m)$ and $G_j \geq \hat{G}$, he will prefer to enter industry j rather than i . In other words, an entrant from a different community \hat{C} will prefer to enter a new industry as there is less competition from the existing firms and he does not have the same informational advantage as the members of the community C .

Let us consider industry dynamics under the assumption that $G_A \approx G_B$, that is profitability levels are close to each other in the two industries.

Let us assume that at each date, there are two possible entrants, one from each community. Thus at date 1, in a pure strategy equilibrium, the two entrants will choose different industries. If one chooses industry A , the other will prefer industry B since monopoly profits in B will be greater than duopoly profits in A .

Now suppose that both entrants are successful. Then at date 2, each entrant has a choice between $G_i(2)$ with probability p (if he chooses the industry of a different community) or $G_j(2)$ with probability 1

Thus if he enters, he will choose the industry chosen by his community predecessor. This argument iterates -- at any date that an entrant enters, he will choose the industry chosen by the predecessors in his community.

Of course, it is possible that one of the initial entrants, say from community \hat{C} in industry B , chooses a wrong niche as he gets the wrong signal while the entrant from community C chooses the right niche. In this case, he will choose to exit, and the succeeding entrants from community \hat{C} will not have full information on the profitability of the niche, whereas following entrants from community C will be fully informed about the profitable niche in industry A .

It is an equilibrium for the informed individual to choose industry A , earning $G_A(2)-c$, while the uninformed individual chooses a niche in industry B , earning

$$pG^B + (1-p)L - c.$$

Thus, even in this case, the pattern of industry specialization by different communities is sustained.

To summarize, the model incorporates the advantage of information flow through the community network in reducing risk for a member of the same social group and offsetting the congestion arising from additional entry. A member of the other social group face adverse effects competition and congestion without the benefit of better information. This produces a tendency towards segregation with different social groups specializing in different industries. Even unsuccessful entry by a member of the same community is informative as it narrows down the set of profitable niches and the entrants face reduced risk.

This model is ex ante symmetric so that each social group is equally likely to enter either industry. In reality, the British had better information about the export markets in tea and jute, while the Indians had better knowledge of the domestic market in cotton textiles. This implies that the quality of signal, that is the value of p in the model would depend on the identity of the entrant. It is larger for the British in the export industries and larger for the Indian in the import substituting industries. Therefore ex ante the British were more likely to be the pioneer in the export industry and Indians in cotton textiles. The model implies that the herding effect would lead to persistence even if profitability was different in the two industries. To the extent the quality of the signal depended on prior knowledge of markets, there may be examples which run contrary to the simple model outlined, such as the presence of a few British firms in cotton textiles. Note that these entrepreneurs were also involved in the domestic cotton trade and therefore would have a higher p than a British firm not involved in cotton trade.

The model also assumes that the profitability of the industries is stationary over time and varies only with the number of entrants. This is a simplification and the model can

be extended to allow for the profit opportunities to change over time across industries. It can be modeled by assuming that $G_i(m)$ is determined by a Markov process, where at any date, profits could increase or decrease stochastically so that it may become unprofitable for a new follower to invest in the industry chosen by a member of his social group even if perfectly informed. He may prefer to invest in the other industry even if he is less informed. Similarly rising profitability of an industry may induce members of the other community to enter even in the absence of full information. High dividends could encourage “outsiders” to buy shares even if they were not socially connected to the entrepreneur. The size of the group of “outsiders” can increase through information flow within the social network. Once the share ownership reaches a critical minimum, it can encourage entry into the industry. The jute industry is a case in point. Jute traders belonging to the Marwari community began to acquire shares in the British firms during the First World War and entered as entrepreneurs in the 1920s. The Marwaris did not take over British firms, but set up new firms. With this framework in mind, I turn to the dynamics of industrial investment in colonial India,

Capital and Entrepreneurship: The Industrial Divide

The port cities of Bombay and Calcutta also became the railway hub in the course of the 19th century, when not only raw materials, but industrial goods began to be exported out of these cities. However, there had been a difference in the interaction between British business and Indian commercial interests in the two cities. Both had seen the rise of British agency houses as the trading monopoly of the East India Company ended. While some of them ventured into new activities such as coal mining or shipping, their primary

involvement was in trade and the China trade in cotton and opium was an important component.¹⁷ The presence of Indian merchants in the East was small. Indian partnerships with British business in joint stock companies such as Carr, Tagore and Company were short lived.¹⁸ In contrast in Western India, the Indian merchants had a long history in the trading world, including overseas trade based on social networks. Their role in the illicit opium trade to China out of the ports in the West shaped their economic importance in the region.¹⁹ With the decline of the opium trade and shipbuilding in the middle of the 19th century, the communities involved in these activities, such as the Parsis, began to look for alternative profitable opportunities.²⁰ The Indian traders in the West were guaranteed brokers for the importers of cotton goods and distributed them in the local markets. But in the internal trade in jute cloth, Indian traders were not the principal brokers and had a relatively small presence until the First World War.²¹ It could well be the case that Indian merchants had a special position in Bombay and were able to exploit opportunities of industrial investment, which they could not in Calcutta. However, it is the case that the industries that developed in the two regions targeted separate markets. In the East, tea and jute were export commodities mainly and the British had an informational advantage in these markets mattered. In the West, cotton textiles, was an import substituting activity and the knowledge of the local markets was important. Traders involved in the cotton trade and distribution of British imports of cotton textiles had an advantage here. The long standing economic role of Indian merchants in the West gave them this advantage.

¹⁷ Tripathi, Oxford Dictionary, pp46-48

¹⁸ Tripathi, Oxford Dictionary, pp67-70

¹⁹ Tripathi, Oxford Dictionary, pp74-76

²⁰ Bagchi, *Evolution of the State Bank*, p100

²¹ Timberg, *The Marwaris*, p150

From the mid-19th century, changes in company law led to the formation of limited liability joint stock companies.²² Companies were set up by British entrepreneurs who could raise capital from markets in Britain as well in India. Firms were floated on the London Stock Exchange as sterling companies or in India as rupee companies. The sterling companies raised capital in Britain and traded shares in the London stock market. Some sold block shares to British expatriates in India. The rupee companies raised capital from Indians as well as British expatriates, for whom this was ideal investment opportunity. The capital for the rupee companies came from British civil servants, army personnel and traders.²³ These firms were run by managing agents or specialist management firms that owned shares, but were not required to have a majority shareholding. The managing agents managed companies across industries through long term agency contracts. They could be either British or Indian firms, the latter typically the Indian counterpart of the British agent.

In the context of India's industrial sector, firms are classified as British or India in relation to the managing agent. We can adopt a simple criterion to classify all sterling companies as British owned and managed. The picture is less clear for rupee companies. Capital was raised in India and did not show up as direct inflow of foreign capital. However, the managing agents were the Indian counterpart of the British agency firms and acted as an indicator of ownership. This is a reasonable assumption as all decisions were undertaken by these agents and the new issue of shares also relied on their reputation and social connections. The reputational value of the managing agency houses in raising capital in the British and Indian markets was important. If a new firm was unknown to the British

²² Rungta, *The Rise of Business Corporations*, pp 43-45, 61

investor, the managing agent associated with it had a reputation.²⁴ The managing agency system may be seen as an institutional innovation, which addressed the problem of informational constraints in long distance investment by providing a trustworthy name to the British investor. This system was universally adopted by British business in Asia. Table1 shows the involvement of several leading managing agents in different industries.

British investors could invest in sterling or rupee companies. They could choose to invest in tea, cotton or jute or utilities such as railways. There were two types of British investors: those resident in Britain and those resident in India. The first group invested mainly in sterling companies in railways and public utilities and in tea, while the second invested in rupee companies in tea, jute and coal. Britain was the main market for tea, and consumers were familiar with the product. In India, it was still a consumption good largely unknown. Tea attracted large volumes of sterling investment in London. When the tea companies were floated in the 1860s and 1870s, it turned into a mania. On the other hand, jute was relatively unknown to the average British consumer and jute companies in Scotland might have been less risky. Only a handful of jute companies were registered in London. It was a product widely used in India for centuries and most of the capital was raised locally from British residents in India looking for profitable investment. These Rupee companies in Calcutta were the ideal investment opportunity for the british residents in India.²⁵

In the tea industry, which was the largest sector, most companies were sterling companies, while in jute and coal, the typical firm was a rupee company managed by the Indian counterpart of the British agent. Indian investors could also buy shares in the Rupee

²⁴ Chapman, *The Merchant Enterprise*, p 123

²⁵ Bagchi, *Evolution of the State Bank*, p66

companies. While systematic quantitative evidence is difficult to come by, case study based evidence from individual managing agency houses indicate that British investors accounted for bulk of the investment. For the agency house Bird and Company, nearly 90% of the investment in rupee companies in tea and jute came from British investors.²⁶ The Indian Industrial Commission of 1918 reported by Indian shareholders held just over 15 per cent of the shares of jute companies²⁷

The second largest industrial sector was cotton textiles. Here the Indian firms were dominant. Investors in this sector were their friend and family. The Parsis in Bombay had the financial resources to subscribe as paid up capital a large part of the authorized capital of a new company and well as the reputation to attract interest from the public.²⁸ When Davar, a Parsi, floated the first cotton mill in 1854, fifty leading traders of Bombay paid up the initial capital of Rupees 500,000. Majority of the shareholders, were Parsis, the same community as the entrepreneur, but there were others from other Indian caste groups as well as two Englishmen.²⁹ Davar retained a large chunk of the shares, Parsis and Gujaratis subscribed one-third.³⁰ In other towns raising capital by Indians proved difficult except when backed by community support. When Ranchhodlal set up the first cotton mill in Ahmedabad in 1858, most of the shares were bought by his friends and family after he failed to raise capital from the local traders.³¹ Examples of raising capital through the network of friends and family can be found in the case of other textile entrepreneurs in Bombay, such as Tatas and the Bhatia merchants. When Tata offered shares to a member of

²⁶ Chapman, *Merchant Enterprise*, p126

²⁷ Bagchi, *Private Investment*, p193.

²⁸²⁹ Rungta, *The Rise of Business Corporations*, pp59-60

²⁹ Morris, *Growth of large scale industries*, p574.

³⁰ Tripathi, *The Oxford History of Indian Business*, p97

³¹ Tripathi and Mehta, *Business Houses*, p44-5, Rungta *The Rise of Business Corporations*, pp60-61

another trading community, a Marwari trader, it was met with skepticism.³² Members of the Bhatia community were the main shareholders in companies floated by Thackersey, Morarjee and Khatau, all Bhatia merchant.³³ In Buckingham Mill, one of the few British cotton textile firms, Indian shareholders held only one-tenth of the shares.³⁴

The demand for coal came from the British owned railway companies and this sector was dominated by British firms. The majority of coal firms were set up and managed by British managing agents in India and the investors were British expatriates living in India. Jardine Matheson, the managing agent, argued that it was better to issue shares in India where there was local knowledge.³⁵

The export trade in jute and tea was in the hands of British companies and this gave British entrepreneurs an informational advantage. Jute was sold both in local and foreign markets. About 25% of jute output was sold in the domestic market. This market was well known to the Indian traders buying and selling raw jute and jute products³⁶, but the local traders were reluctant to become entrepreneurs. Demand for coal came from sectors that were dominated by British capital. Railways accounted for over 30% of total demand for coal.³⁷ The cost of transporting coal from Bengal to other region remained high in comparison to the price of imports and Indian industry used substantial amounts of imported coal. After 1900, the price of imported coal increased making Bengal coal competitive in the home market as well as in the nearby export markets.³⁸ Indian owned

³² Tripathi, *The Oxford History*, p121

³³ Tripathi, *The Oxford History*, p 124

³⁴ Bagchi, *Private Investment*, p193.

³⁵ Chapman *Merchant Enterprise*, p124.

³⁶ Morris, Indian industry and business, p136.

³⁷ Buchanan, *The Development of Capitalist Enterprise*, p264.

³⁸ Rungta, *The Rise of Business Corporation*, pp174-75.

firms that were in the industry were small and produced poorer quality coal that was sold in the local market.

It was the market for cotton textiles was relatively unknown to the average British investor. Cotton textile firms in Lancashire exported to the Indian market, where the distribution was in the hands of Indian traders. These traders had knowledge of local market in cotton textiles and became entrepreneurs when the opportunity arose. The trade in raw cotton had been in the hands of these local merchants in Western India. They made large profits in the cotton famine, ready to be invested. The cotton traders came from specific communities, such as the Parsis and Bhatias, who had a long history in intra-regional as well as Indian Ocean trade. One of main British firms that entered this industry had also been involved in the cotton trade and the other was set up by a British technician working in the industry.³⁹

Table 2 presents a summary of investment in industries in colonial India. Table 3, shows the community divide across the two cities Calcutta and Bombay in the first quarter of the 20th century in commercial activity including its industrial sub-sector. The racial and regional divide is striking suggesting a chasm between the commercial worlds of the two cities.

Estimates of Investment

Chapman's estimates show that total British investment in Sterling and Rupee companies increased from £349 million in 1905-06 to £528 million in 1914-15.⁴⁰ Railways accounted for nearly half the capital and tea plantations one-fifth. The value of paid up capital of 373 sterling companies operating in India was £78 million in 1911, with

³⁹ Tripathi, *The Oxford History*, p117

⁴⁰ Chapman, *Merchant Enterprise*, p 121

debentures issued for £45 million. In comparison, the paid up capital of the 2463 companies registered in India was only £46 million with £6 million debentures.⁴¹ Table 4 shows the breakdown of investment in sterling and rupee companies. Tea accounted for the largest of sterling investment in 1915. In jute and coal, investment was primarily in rupees and the magnitudes of investment were much smaller, not only in relation to sterling investment in tea, but also in comparison with rupee investment in cotton textiles. The two largest sectors of investment in 1915 were tea in Eastern India dominated by British companies and cotton textiles in Western India dominated by Indian companies.

Data on paid up capital allows us to track the changes in investment in rupee companies from 1880. Paid-up capital is likely to underestimate the total volume of investment as enterprises raised loans from banks, particularly British owned firms. Loans were obtained from machinery producers as well.⁴² The British agents found it relatively easy to borrow from the banks in India.⁴³ This creates a distortion if some sectors have better access to loans. A more serious problem is that paid up capital in older firms will have a lower nominal value. Information is not detailed enough to correct for this. Therefore investment in sectors with older firms will be underestimated further.

Figure 1 presents the relative position of different sectors in rupee investment. In 1880 tea had the largest share. However, by 1900 investment in cotton textiles was higher than that in tea and banking and by 1914 cotton textiles was by far the largest sector of Rupee investment. In this paper, the focus will be on cotton vs. jute as examples of manufacturing investment. Figure 2 shows Bagchi's estimates of industrial investment after 1900. Bagchi uses import of machinery as an indicator of investment. This gets rid of the

⁴¹ Foreman-Peck, Foreign investment and imperial exploitation , p366.

⁴² Morris, The growth of large scale industry , p579

⁴³ Ibid

biases introduced in the use of paid up capital. Industrial investment increased up to the First World War, particularly in jute. The period also saw reinvestment of profits by British firms in India and investment in industrial firms by British residents encouraged by the stable Rupee- Sterling exchange rate.⁴⁴ After the war investment in cotton textiles measured by the import of industrial machinery grew relatively faster than investment in jute and reflected the change in the balance of investment between Calcutta and Bombay.⁴⁵

labor

The return on investment in the Empire has been estimated to be higher than investment in domestic securities.⁴⁶ While the average British investor in England would have been happy with a rate of return that compared well with the return on investment in Britain, Indians sought higher rates of return that was comparable to those obtained in alternative activities in India.⁴⁷ Efforts to raise capital for the railways in India had not succeeded. But the guaranteed return of 5 per cent was attractive for British middle class investors.⁴⁸ Morris suggests that there were differential rates of profit in different activities and Indians were drawn to those sectors that yielded a higher rate of return. Traditional activities in trade and commerce had high returns. The average rate of return in money lending, internal trade and real estate transactions was 9-10%.⁴⁹ Indian entry into the

⁴⁴Bagchi, Private Investment in India, p76

⁴⁵ Bagchi, Private Investment in India, p 83-84

⁴⁶ Davis & Huntenback, The political economy of British imperialism, p125.

⁴⁷ Morris, Growth of large scale enterprise p572. Rajat Ray has criticized Morris – he cites the view of the American consul in India that there were two separate markets in India- the demand for high quality goods by the middle classes where the profit margin was high, but volume of sales was low and the much larger mass market where the profit margin was lower. If the American consul was right, this would suggest higher profits for the industries the British invested in.

⁴⁸ Macpherson, Investment in Indian Railways, p186.

⁴⁹ Tripathi, *The Oxford History of Indian Business*, p80

jute industry began only after the jute cartel pushed up profits and suggests that the required rate of profit was higher for the Indian entrepreneurs.⁵⁰

Morris's argument, if correct might explain why Indians did not invest in the industries dominated by the British. They had no incentive to do so, given the higher returns to be obtained in cotton textiles. However, this view still does explain why the British failed to be attracted to cotton textiles. For an explanation based on social discrimination to hold there should have been barriers to entry for Indian entrepreneurs in the high echelons of British business in Calcutta. There is support for this. Less than 4 percent of company directors in tea were Indians and there were none in jute in 1911.⁵¹ The race bar disallowed entry of Indians into the London Jute Association and therefore acted as a barrier to entry in the export market.⁵² Such barriers operated in one direction against Indian capital and do not explain why British capital stayed out of a major industry, despite all the advantages it enjoyed under the colonial state.⁵³

However informational disadvantage could discourage entry despite other advantages enjoyed by British business groups. Informational asymmetries could also explain differences in rates of return. Social groups facing capital shortage would have higher rates of return. Morris was the first to recognize that familiarity with markets can explain why the spheres of investment were different for British and Indian capital.⁵⁴ Informational differences gave each social group a different assessment of profitability of a sector. Morris argued that Europeans tended to get involved in markets which were

⁵⁰ Morris, Indian industry and Business in the Age of Laissez- faire, pp136-137.

⁵¹ Chapman, *Merchant Enterprise*, p122

⁵² Ray, *Entrepreneurship and Industry*, p38

⁵³ The success of British business in lobbying the government for laws aiding labour recruitment in tea plantations and cartelization of industries is well known

⁵⁴ Morris, The South Asian Entrepreneurship and the Rashomon Effect.

export oriented or closely supported by the state.⁵⁵ Most of state support was directed towards the tea industry and the jute industry did not enjoy similar political clout. Therefore it is difficult to argue that government support played an important role in the choice of investment.

A different view of discrimination is that British capital entered those sectors which were complementary to their domestic industrial interests.⁵⁶ Jute was an aberration as this industry did not rely on the Indian market as cotton textiles did and Dundee did not have the same political clout as Lancashire. This argument is flawed. Indian jute products competed in the world market with the industry in Dundee and gained market share. British industrial interests were not a homogeneous group. The interest of Lancashire textile producers differed from those of the textile machinery producers. In 1843 the British Parliament repealed the act prohibiting the sale of machinery abroad. This opened new possibilities for exporters of textile producing equipment in Britain, which they did not hesitate to seize. There is much evidence to suggest a close cooperation between Indian textile entrepreneurs and the British textile machinery manufacturers. Davar who set up the first textile firm in Bombay was advised by Platt Bros from Oldham on the type of machinery needed.⁵⁷ In general machinery makers had close contact with the textile entrepreneurs. They offered large commissions to promoters of the order of 5% and accepted deferred payment.

The discrimination view is important in the literature, but has not been tested empirically. In the next section, I put forward simple statistical tests to see if there were

⁵⁵Morris, Growth of large scale industry, p580

⁵⁶ Sen, " Pattern of British enterprise"

⁵⁷ Rutnagur, *Bombay Industries: The Cotton Mills*, p9.

systematic differences in availability of capital and returns of return, which can explain the segregation of British and Indian business.

Measuring constraints

The empirical strategy adopted in this paper is to rule out explanations that suggest barriers to entry. If discrimination against Indian capital or the privileges enjoyed by British capital explain the different spheres investment, then we should be able to measure economic attributes that differ across industries

Did the minimum efficient scale differ across sectors? If the Indian entrepreneurs had a disadvantage in raising capital through the stock market or had limited access to credit from the formal British owned banking sector, they would be more likely to enter industries where the initial capital outlay was lower. If scale economies did not matter then, in any given industry, firms started by Indians would tend to be smaller. I can test both propositions using firm- level data.

Table 5 presents comparative start-up capital outlays required in different industries using both aggregate data from Rungta and firm-level information from various sources.⁵⁸ It shows that the average paid up capital in cotton mills was lower compared to the paid up capital of an average jute mill right from the 1880s to 1910. However, this is not the case for the average coal or tea firm. The absence of Indians in these sectors indicates a relatively minor role of a capital constraint. Table 6 focuses on the two comparable industries cotton and jute and provides measures of machinery used and employment.

⁵⁸Morris suggests that initial investment in jute was about the same if not lower than the setting up cost in an average cotton mill and could not have deterred entry. Morris uses Rungta's estimates paid- up capital of Rs 933,000 in 1881 and Rs 1.5 million in 1901 in an average jute mill. However Rungta's data on cotton textiles show that the average paid- up capital in cotton mills was less than Rs 900,000 in both years.

Although the machinery employed is not directly comparable across the two sectors, the loom is the main equipment for weaving. Many cotton firms produced a large quantity of yarn as the finished product. Therefore cotton firms list the number of spindles and looms. I construct a measure of loom equivalent by aggregating spindles and looms in the cotton industry. (See table 6 for the details) Although the loom equivalent is higher for cotton mills, jute firms employed significantly more labor. This seeming anomaly is due to the aggregation problem. About two hundred spindles could be operated by one worker whereas one worker attended to one loom. Both capital outlay and number of workers were higher in the jute firm. The firm size and the minimum efficient scale could have given Indian entrants a disadvantage if they were capital constrained. However, it has already been noted that such an argument cannot be used to explain the absence of Indian entrepreneurs in tea and coal.

The second test for the presence of a capital constraint is to see if there is difference in size between British and Indian firms, in industries where they co-exist. If capital constraint was systematically greater for the Indians, we might expect Indian firms to be smaller than British firms. I compare firms *within* the industries: cotton and jute. Note that Indians were the majority group in cotton, but a minority in jute the opposite holds for the jute industry. This procedure has the advantage that we can use a physical measure of capital, the loom equivalent, rather than a value measure, since we only make intra industry comparisons. On the basis of the measure of loom equivalent and looms, we can make comparisons across firms according to ownership for the year 1924.⁵⁹ Table 7 shows that in each industry, the majority group has the larger firm, although this difference is not

⁵⁹I have chosen the year 1924 as there was a significant group of Indian firms in the jute industry by this period.

statistically significant. In the cotton textile industry in Bombay, the Indian firms on average were larger than British firms, while in the jute industry, British firms were larger. Thus the initial hypothesis, that Indians were uniformly more capital constrained, is not borne out. Instead it appears that the minority group may face more difficulty in raising capital. If capital had been a constraint for Indian firms, then British firms would tend to be larger in all sectors.

I compute the capital- labor ratio intensities in mills run by different communities in the cotton textiles in Bombay to test for systematic differences. The only group which had a higher capital- labor ratio is the Sassoon group, reputed to be most efficient in the industry. The ratio was similar across all other groups and the British firms were not more capital intensive. (See table 8)

Although Indian entrepreneurs might have been rationed out of the formal banking sector, they could raise capital through the indigenous networks. The initial start- up capital came from profits made in trade. Entrepreneurs in cotton textiles typically had made money in trade as did Indian entrepreneurs in jute. The rupee companies formed by the Indians raised finance through local networks. The profits made by the cotton traders during the cotton famine of the 1860s created an advantage. The capital to set up the first cotton mills was raised by the Parsi entrepreneurs from their own resources and contribution from family and friends. The Bhatia merchants, who were the first Hindu entrepreneurs, also raised their own finances⁶⁰ 70-80% of the authorized capital was paid up soon after the firm was set up. Small firms tended to sell a small number of high value shares and large firms tended to float shares of low face- value that could be taken up by a larger number of investors.⁶¹ Although Davar had failed

⁶⁰ Rutnagar, *Bombay Industries*, p46

⁶¹ Rungta, *The Rise of Business Corporations*, pp59-60.

to find the financial support in three years earlier, by 1854 raising capital for a cotton mill in Bombay did not prove difficult. Oriental mills sold 500 high value shares of Rupees 2500 each, but had to limit subscription to four share per person due to the high demand.⁶² On the other hand British firms found it more difficult to raise capital in the Bombay region. Greaves, Cotton & Company, the largest European managing agent controlling seven spinning mills was unable to raise capital to diversify into weaving.⁶³ European capital was no more than 10-20% of total capital invested in cotton. In Calcutta, the average jute or tea firm did not have problems in mobilizing capital.

Another constraint that could have deterred entry of Indian entrepreneurs is the rate of profit. Did profit rate differ across industries? If the Indians were guided by higher returns and were capital constrained, then the profit rates should have been higher in cotton textiles although there are no obvious reasons why British firms were not attracted by higher profits. Existing estimates suggest an average rate of profit of 9 percent in jute and 10 percent in cotton.⁶⁴ Table 9 shows the profit rates and dividend rate across sectors using firm level data. There were no systematic differences in profits across export and import substituting sectors. Cotton and jute showed comparable mean profit rates, while tea had a higher return. Coal shows a much lower profit rate with the median firm making no profit. Higher dividends were paid in tea, but comparable rates were paid in jute and cotton. If lower median profit rate discouraged British business in cotton, this was clearly not the case in coal. Lastly, I test if profit rate and dividend rate differed across British and Indian firms in the cotton textiles industry. Indian firms show a lower profit rate compared to British firms, but paid out higher dividends. A T test shows that these differences are not statistically significant. The empirical

⁶² Morris, Growth of large scale industries, p575.

⁶³ Morris, Growth of large scale industry, p579.

⁶⁴ Morris, Growth of large scale industry, p572

exercise shows no evidence that Indian entrepreneurs were drawn to industries with particularly high rates of return or that capital constraint alone determined the industrial divide between British and Indian capital

Social Network Effect

The role of social networks in economic activity in Sub-Saharan Africa has been highlighted by Fafchamps when information about the market is limited and involves search costs.⁶⁵ Evidence from traders in Madagascar finds that family ties were important in starting businesses, but less important in the long run.⁶⁶ In contemporary India, the effect of social network in entry has been explored in the context of the diamond industry. The study finds that the entry of a few members of a community in the diamond trade led to further entry from the same community which had few outside options.⁶⁷ In 19th century India too community ties were important in decisions to enter into industrial activity. These caste boundaries were clearly defined. Caste and community networks had been important in Indian Ocean trade in the 17th and 18th centuries.⁶⁸ These same ties formed the basis of industrial investment. Given the non-formal structure of dissemination of information about markets, the community was a relatively costless way to acquire information about new markets and opportunities. The cotton textile and jute industries provide suitable context to study the role of social networks in the early stages of India's industrialization. In cotton textiles, there were broadly five social networks i: Parsis, Hindus, Muslims, Jews and Europeans. The Hindu community was represented by specific trading castes, such as

⁶⁵Fafchamps, Market Institutions in Sub-Saharan Africa, pp16-17

⁶⁶Fafchamps and Minten , Relationships and traders in Madagascar.

⁶⁷Munshi, Strength in Numbers.

⁶⁸Ray, Asian capital in the age of European domination.

the Bhatias. The jute industry was initially dominated by British firms, but Marwari traders became entrepreneurs in the 1920s.

What was common between the firms that entered the two industries and what was the pattern of entry? Was the common factor greater contact with western society and higher level of human capital? Tripathi argues that the exposure to new ideas and values and a desire to learn western industrial practices was common to the pioneers from different communities.⁶⁹ Parsis were the first social group to become industrial entrepreneurs. They were also one of the first groups to embrace western education. As a community, the Parsis had fewer barriers to interacting with other groups and on foreign travel, which gave them greater contact with western society. They were among the most educated in Indian society.⁷⁰ Hindus had religious restrictions on foreign travel. The first Hindu textile entrepreneur in Bombay, Khatau Makanji belonged to the Bhatia community. They had links with the Parsis. The community played an important role in the religious reform movement of the 1870s. Mulji Thackersey, one of the leaders visited England and admired Western *industrial values*.⁷¹ Ranchhodlal, who set up the first cotton mill in Ahmedabad was educated in English and became a civil servant.⁷²

If education and western contact were the driving factors, then we should observe a high level of human capital to be the common factor among the pioneers rather than the social network. The first entrants belonged to the Parsi community and as a community they enjoyed high level of human capital making it difficult to distinguish between the effects of human capital and social network. The success of the Parsi firms had little

⁶⁹Tripathi, *Historical Roots of Entrepreneurship*, p108.

⁷⁰ White, *Competition and Collaboration: Parsi Merchants and the English East India Company*, Desai, Origins of Parsi Enterprise, Bagchi, *The Private Investment in India*.

⁷¹ Tripathi *Historical Roots of Entrepreneurship*, p109.

⁷² Tripathi and Mehta, *Business Houses in Western India*, pp4041

impact on the traditional Hindu business groups until 1875.⁷³ What is significant is that once Khatau Makanji set up a cotton mill, other Bhatia merchants followed.⁷⁴ The majority of the Hindu mills in Bombay belonged to the Bhatia merchants. This was the second community to dominate the industry.

What was common between the Parsis and the Bhatias was the history of involvement in cotton trade. The Parsis had made their wealth in opium and cotton trade. The Bhatias came from Gujarat and traded in raw cotton, textiles and grain. In the case of another pioneer Ranchhodlal, who belonged to a community with little involvement in trade, entry into the cotton textile industry had a different outcome. Other social groups in his city with links to cotton trade did not follow. The Jains, who were cotton traders, refused to get involved when Ranchhodlal approached them for funds. It took them and their traditional rivals, the Vaishnava Banias another couple of decades to move into this industry.⁷⁵

Cotton and opium trade was also common history among the pioneers from other social groups. David Sassoon, a Jewish entrepreneur, had migrated to Bombay from Baghdad and established himself in the opium trade.⁷⁶ He was a pioneer in his community. One of the main British companies was Greaves & Cotton. The company was set up in 1863 by James Greaves who had been involved in the cotton trade in Gujarat and had extensive knowledge of the local markets. George Cotton was an agent of the East India Company and was involved in the cotton trade as well. Five spinning mills were set up in

⁷³Morris, The growth of large scale industries, 1982, p580-1

⁷⁴ Tripathi, *Historical Roots of Entrepreneurship*, p 108.

⁷⁵ Mehta, Indian merchants and entrepreneurs in historical perspective, p196.

⁷⁶ Rutnagur, Bombay industries, p58.

the next 20 years.⁷⁷ The managing agent Greaves & Cotton and Bradbury & Brady were two British managing agents who controlled twelve out of fifteen British enterprises.⁷⁸ With the development of the railway lines, the internal trade in cotton, which had been dominated by Indian merchants, had become more accessible to the British companies.⁷⁹ Currimboys were Muslim merchants in the Indian Ocean trade although they did not act as agents of the English merchants.⁸⁰ Guha sees the success of the Parsis and Gujarati communities in Bombay as a consequence of the less imposing presence of the British in the commercial sector rather than religion and Western education.⁸¹ This view does not contradict the idea of informational advantage arising from participation in economic activity.

The presence of Indian interests in Calcutta was less significant. The Indian merchants in eastern India traded in jute, rice and other agricultural commodities. The Marwaris as a group worked closely with British industrial and exporting firms, but did not enter industrial activity right up to the First World War. The Bengalis with western education entered into partnerships with the British in banking, insurance and shipping in the early decades of the 19th century, but disappeared after the middle of the 19th century and the Marwaris emerged as the main brokers to the British companies. Timberg documents the rise of the Marwaris as industrial entrepreneurs from the futures market in opium, and specie to trade in raw jute and jute products in Calcutta.⁸² By 1900 Marwari traders began to get more prominence in the trade in raw jute and large trading firms

⁷⁷ Greaves Cotton and Company: A century of Progress, Bombay 1959.

⁷⁸ Morris, , The growth of large scale industries , p580

⁷⁹ Vicziany, Cotton Trade and Commercial Development of Bombay, 370-372.

⁸⁰ Ray, *Entrepreneurship and Industry*, p43.

⁸¹ Guha, "More about Parsi Seths"

⁸² Timberg, *The Marwaris: From traders to Industrialists*, pp161-166.

emerged. These traders became entrepreneurs two decades later.⁸³ The Marwaris started to buy shares in British owned jute firms registered in Calcutta in Calcutta that paid high dividends. They also gave loans to cash strapped British firms in return for block shares. The entry of the Marwaris into the British boardrooms changed the British dominance of the industry.⁸⁴ Birla and Hukumchand invested their wartime profits in the jute trade in the first two Indian- owned jute mills in Calcutta after and this encouraged entry by several others from the community in the 1920s. Indian entry followed a pattern of social groups moving from trade to industry within a sector suggesting the importance of knowledge of markets in entrepreneurship and the role of social connection in information sharing.

The cotton textile industry provides the context to test the role of the social network as a determinant of entry. Five different communities, including the British were involved in this sector. The largest investment was shared by the Parsis and the Hindus. . The entry of different groups happened in clusters and is shown in figure 3. We use entry dates of 97 firms between 1850 and 1915 to test if there is an association between the presence of community members in the industry and entry. Table 10 shows the pattern of entry in Bombay's textile industry by social groups. Table 11 presents the probability of entry. The results show an association between the cumulative presence of members of a community and the probability of entry. Total number of firms in the industry also increased the probability of entry, but the effect was much smaller, confirming that social network effect mattered for decisions to enter. In the jute industry too, for the first fifty years, the British firms were the only social group. Table 3 shows that all firms in 1915 were British. In 1929 over 20 percent of the firms were Indian owned and set up by the Marwari traders.

⁸³ Goswami, Industry, *Trade and Peasant Society*, pp84-85

⁸⁴ Goswami, Industry, *Trade and Peasant Society*, pp 106-109.

Conclusion

I have argued that informational asymmetry explains the industrial divide between British and Indian business. Geographical factors contributed to the location of tea, jute and coal in the hinterland of Calcutta and the cotton textile industry in Bombay. It is possible that discrimination against Indian business made their access to capital and certain product markets difficult. However discrimination cannot explain their overwhelming presence in cotton textiles and the insignificant presence of British business in this sector. Indian entrepreneurs had an informational advantage in the cotton textile industry. The involvement of British entrepreneurs in the export oriented industries and their limited presence in the main import substituting industry is best explained by informational constraints rather than discrimination. The paper argues that this divide reflects the nature of the two product markets, local versus international, and highlights the importance of informational constraints in determining flows of entrepreneurship and capital. The role of the social networks in information flows further accentuated the segregation by economic activity.

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Data Sources:

- Investors India Year Books
Bombay Cotton Mills Association Annual Reports
Statistical Abstract of British India

**Table 1: Control by the Top British Managing Agents in 1911- 14
(No of Companies)**

Managing Agent	Tea		Jute		Coal	
	Sterling	Rupee	Sterling	Rupee	Sterling	Rupee
Andrew Yule & Co		10		6		11
Begg Dunlop & Co		10		2		
Bird & Co				8		11
Davenport & Co		8				
Duncan Bros	6	12				
James Finlay	5					2
Jardine Skinner & Co		2		2		2
McLeod	5					
Octavious Steel & Co	13	10				
Planters' Stores & Agency	6	1				
Shaw Wallace & Co	5	2				11
Thomas Duff			4			
Williamson Magor & Co	18	10				5
Total	124	88	4	29		87

Source: Bagchi (1972) , Tables 6.5 and 6.6, based on Investors' India Year Book 1911 and Tea Producing Companies 1914

Note: There were many smaller agents, some managing one company in any one sector and more in others, some concentrated in one particular sector.

**Table 2: Dominant Source of Capital and Entrepreneurship by Industry
(1914)**

INDUSTRY	PRIMARY ENTREPRENEURS	MAIN INVESTORS	PRIMARY REGION
TEA	BRITISH	BRITISH IN BRITAIN	CALCUTTA
JUTE	BRITISH	BRITISH IN INDIA	CALCUTTA
COAL	BRITISH	BRITISH IN INDIA	CALCUTTA
COTTON TEXTILES	INDIAN	INDIAN	BOMBAY
NO. OF JOINT STOCK COMPANIES IN THE CITY AND HINTERLAND			
	CALCUTTA	BOMBAY	INDIA
TEA	376	0	385
JUTE	54	0	55
COAL	225	5	232
COTTON TEXTILES	18	178	227

Source: Statistical Abstract of British India.

Table 3: Percentage shares of communities in enterprises: Bombay and Calcutta.

BOMBAY: ALL COMMERCIAL ENTERPRISES¹					
Year	European	Parsi	Hindu	Muslim	Jewish
1911	44	22	26	5	0
1920	19	25	48	6	0
BOMBAY: COTTON MILLS²					
1915	14	30	22	13	20
1925	13	27	23	18	17
CALCUTTA: ¹ ALL COMMERCIAL ENTERPRISES					
Year	European	Bengali	Marwari	Parsi	Muslim
1875	66	03	0	3	1
1890	66	12	2	2	2
1911	55	29	5	2	1
1920	42	36	10	5	1
CALCUTTA: JUTE MILLS³					
1915	100	0	0	0	0
1929	78	0	22	0	0

Note: Shares in total number of enterprises.

Source: ¹Calculated from Bagchi, 1997, pp98 & 105 ²Calculated from Rutnagar 1926, p54, ² Calculated from Goswami, 1992, pp 99-100 &107

Table 4: Sterling and Rupee Investment in 1914-15 (£m)

COMPANIES	STERLING	RUPEE	TOTAL
TEA	19.7	2.9	22.6
COTTON	0.4	13.0	13.9
JUTE	2.7	7.8	10.5
GOLD	2.3	0.3	2.4
COTTON&JUTE PRESS	1.2	1.2	2.4
TOTAL	27.4	29.0	56.9

Source: Chapman(1992) based on Indian Industrial Commission, II, p854, p123.

Table 5: Average Paid-up Capital of Rupee Companies, Rupees '000

	Cotton	Tea	Jute	Coal
1881 ^a	688 (28)	244 (113)	958 (8)	649 (6)
1889 ^b	876 (99)			
1891 ^a	852 (57)	253	1071 (11)	560 (11)
1900 ^a	889 (66)	246 (135)	1444 (21)	411 (34)
1910 ^c	1575 (43)	339 (87)	3350 (29)	614 (87)

Source: ^a Based on Rungta's industry level information,

^b Based on firm level information from Bombay Millowners Association Report, 1889,

^c Based on firm- level information from Investors' India Year Book for 1911

Note: figures in parenthesis indicate the number of firms.

Table 6: Looms and Employment in Cotton and Jute Textiles

Year	No. of mills	Average no. of loom equivalent/ looms per mill	Average no. employed per mill
Cotton			
1883-84	79	1043	60
1893-94	142	1067	130
1903-04	191	1121	185
1913-14	271	1210	260
Jute			
1883-84	23	267	2081
1893-94	28	342	2471
1903-04	38	484	3260
1913-14	64	563	3379
1926-27		554	3605
1936-37		621	2765

Source: Loom Equivalent for Cotton has been calculated using data from Morris 1982, p576 Jute is based on Morris 1982, p569, 615.

Notes: For cotton, we aggregate looms and spindles into a loom-equivalent by multiplying spindles by 0.033, and adding the number of looms. See Gupta (2011) for details of the estimation.

Table 7: Average Machinery and Employment by Category of Owner, 1924

	Number of firms	Looms/Loom Equivalent per firm	Workers per firm	Average capital-labor ratio
Cotton firms in Bombay	67	2516		
Indian	55	2615*	1929	1.14
British	12	2061*	1773	1.13
Jute firms in Calcutta	54	961		
Indian	8	823**		
British	46	985** (0.78)		

Notes: * T- statistic for the difference between these numbers is 1.4 (not significant at 5% level). ** T- statistic for the difference between these numbers is 0.8 (not significant at 5% level).

Source: Bombay Cotton Mills' Association Report for 1934, Investors India Year Book for 1934, Jute Mills Review 1935

Notes: For cotton, we aggregate looms and spindles into a loom-equivalent by multiplying spindles by 0.033, and adding the number of looms. See Gupta (2011) for details of the estimation. The regional average in table 5 is computed from the aggregate data. The group averages have been computed by regressing loom equivalent/loom on ownership, within each industry.

TABLE 8: Capital-Labor Ratios by Community, Bombay Cotton Mills, 1924

PARSI	HINDU	MUSLIM	JEWISH	EUROPEAN
1.1	1.1	1.1	1.4	1.1

Source: Calculations based on Rutnagar, 1927, p55.

Table 9: Profit Rate and Dividend across Sectors in 1910

Sector	Profit Rate (%)		Ordinary Dividend (%)	
	Mean(S.D)	Median	Mean (S.D)	Median
Jute	12 (12.9)	10	5.5 (0.05)	5
Tea	16 (14.0)	12	12 (10.5)	10
Coal	4 (13.9)	0	6.4 (16.0)	0
Cotton	10 (19.0)	4	5.7 (6.6)	5
Indian firms	9.4 (15.8)		6.6 (7.3)	
British firms	11.6 (25.6)		3.6 (4.1)	

Source: Investors' India Year Books 1911-1913

Note: Profit Rate is calculated as a ratio of net profit and paid- up capital

Table 10: Bombay cotton mills: Number of Entrants, by Social group

DECade	PARSI	HINDU	MUSLIM	ENGLISH	JEWISH
1850s	3	0	0	0	0
1860s	5	2	0	0	0
1870s	2	9	0	2	1
1880s	9	5	1	9	2
1890s	7	5	2	3	2
1900s	2	0	1	1	0
1910s	3	1	1	0	0
Total	31	22	5	15	5

Source: Calculations based on Rutnagar, *Bombay Industries* pp9-23.

Table 11: Probability of Entry

Dependent Variable: Entry

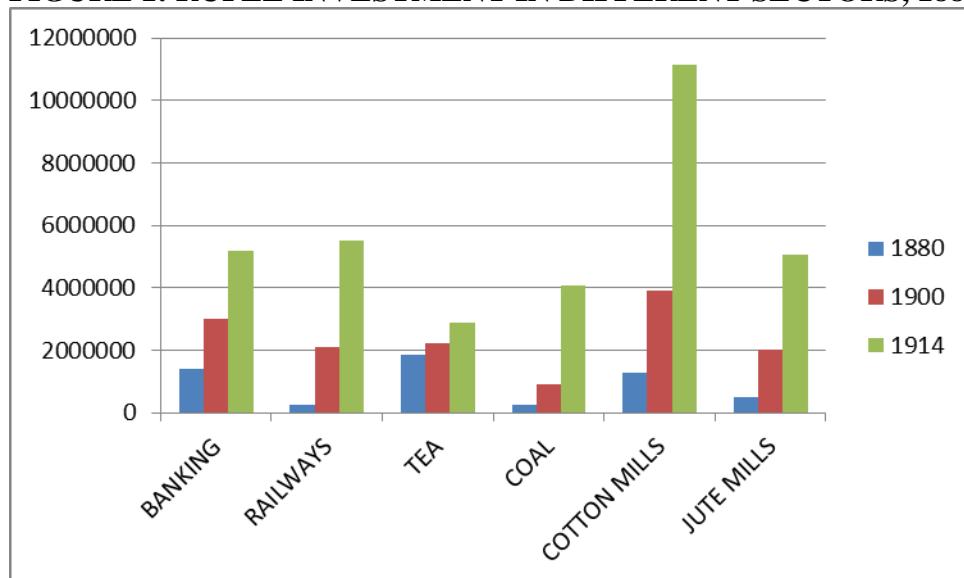
	Specification 1	Specification 2	Specification 3
Cumulative Group Presence	.73 (.07)**		0.54 (.10)**
Total Firms		0.13 (.03)**	0.14 (.04)**
Social Group Effect	Yes		Yes
Year Effect	Yes		Yes
Log Likelihood	-381.1	-386.5	-374.7

Source: Bombay Cotton Mill's Association Reports, Rungta, 1929, and Rutnagur

Note: The model is estimated as an unbalanced panel Probit, Social groups are numbered as follows: 1. Parsi, 2. Hindu 3. English, 4. Jewish and 5. Muslim.

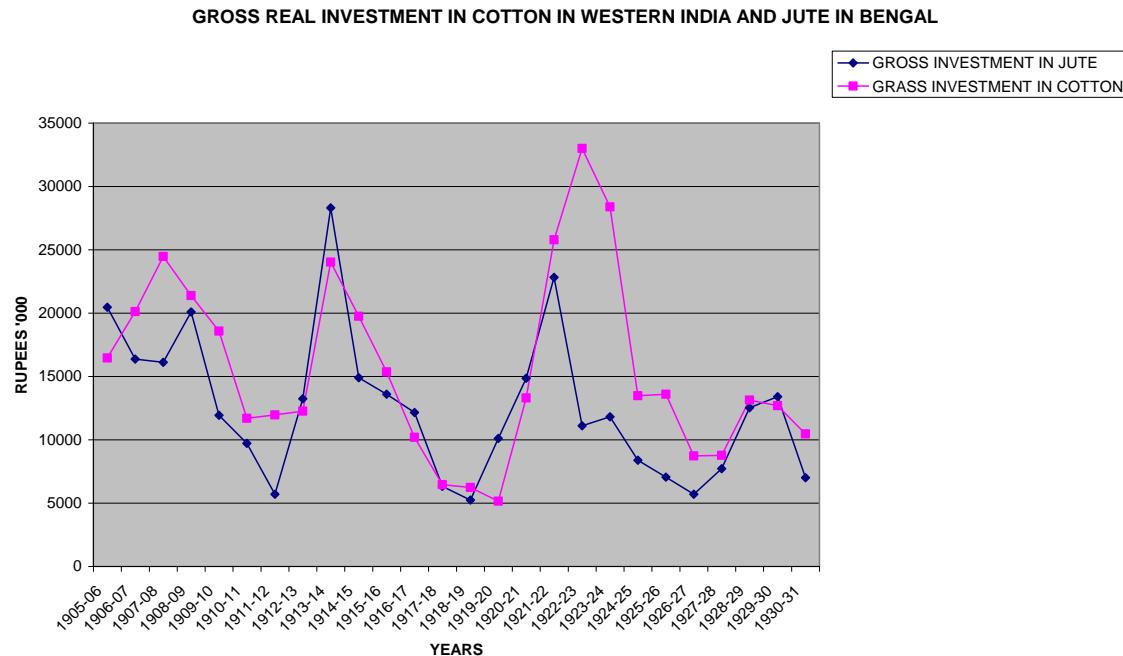
Standard Errors are reported in parenthesis. Cumulative group presence is the total number of firms from the social group.

FIGURE 1: RUPEE INVESTMENT IN DIFFERENT SECTORS, 1880-1914



Source: Rungta, *The Rise of Business Corporations*, p 296-29 for 1880-1900

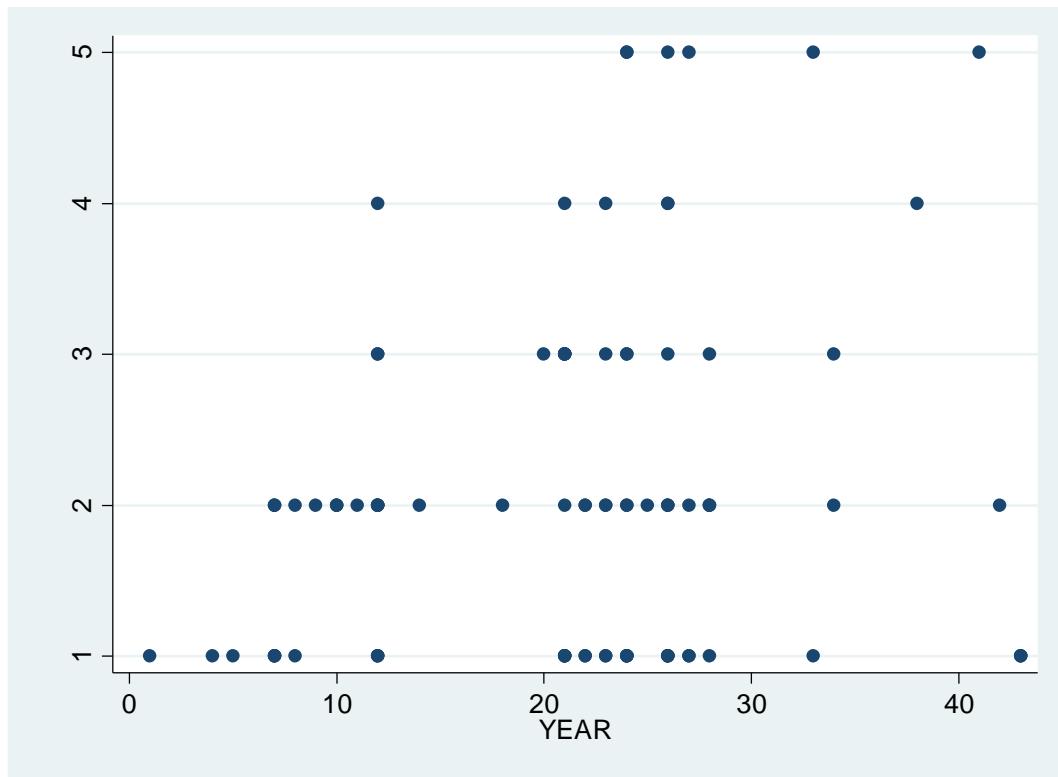
FIGURE 2: ESTMATES OF INVESTMENT IN COTTON AND JUTE MILLS



Source: Bagchi, *Private Investment*, pp 258, 273.

Note: Gross investment is calculated by multiplying the real import value by the ratio of the block value of mills to the total value of plant and machinery in those mils. The figures are 1.54 for cotton and 1.72 for jute.

Figure 3: Entry by Social Group



Note: Comm No. lists social groups 1. Parsi, 2. Hindu, 3. English, 4. Jewish and 5. Muslim