

# **Discrimination or Community Networks? A Tale of Two Industrial Cities in Colonial**

## **India**

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### **Abstract**

This paper seeks to explain the pattern of industrial investment in India under British rule. While the export oriented industries, such as tea and jute relied largely on British investment, the major import substituting activity, the cotton textile industry, was dominated by Indian owned firms. While the existing literature has explained the dominant role of British investment mainly using political and social advantages arising from the imperial domination of policy and its access to economic and social networks, this paper argues that informational factors play an important role in determining this industrial divide. British entrepreneurs had good knowledge of the export market, in the mother country, that Indians did not have. On the other hand, Indian industrial entrepreneurs had extensive knowledge of the local market, coming from their background in trade. Thus the divergent flow of entrepreneurship can be explained by the comparative advantage that each type of had, Indians for the import substituting industry, and British for the export industries. The paper emphasizes the role of community networks in determining entry into industry.

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## **1. Introduction**

Bombay and Calcutta, both metropolitan port cities, experienced very different development trajectories in late 19<sup>th</sup>/early 20<sup>th</sup> century colonial India. One became the hub of Indian mercantile activity and the other the seat of British business. The Indian cotton traders from different communities moved from trade to import substitution in cotton goods and set up cotton textile mills in Bombay. Few British entrepreneurs were present. The 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.

This sectoral divide between British and Indian investment was superimposed on a regional divide. Jute factories were built along the banks of the river Hooghly, close to the city of Calcutta; coal mines were located mainly in the hinterland of Calcutta; tea plantations were also located across the foothills and slopes of the Himalayas in eastern India. The cotton mills, on the other hand were set up in and around Bombay on the west coast and in the neighbouring province of Gujarat. The hinterland of Calcutta had the right climate and soil for growing tea and jute and the coal deposits were found in this region. The hinterland of Bombay on the other hand was the main cotton growing region in India. Why did commercial activities of these two communities stay invest in different economic activities? Was this separation simply spatial and dependent of geography? Or were there intrinsic differences in the activities which attracted the British and those which drew India capital.

The role of community networks in long distance trade is well researched. Less is known about the role of community networks in investment. The early development of

Indian industry was one of the first instances of long-distance foreign investment in manufacturing. However the flow of British capital was restricted to certain industries. In eastern India, the export industries drew capital from investors in Britain and expatriates living in India. The entrepreneurship came from British firms. In contrast, the main industry that developed in western India was cotton textiles, an import substituting activity, which drew capital and entrepreneurship from Indian merchants. This paper explores the role of community networks in information flows determining the pattern of industrial investment in colonial India. I argue that access to information about markets differed across social groups and gave advantage to specific groups in specific markets. Conditional on the initial advantage, information flows within a network further accentuate the division segregation of social groups by economic activity.

What role does information play in decisions to invest? Lucas in his well known paper of 1990 argued that capital didn't flow from rich to poor countries, where returns were higher, even under colonial rule when political uncertainties less unimportant Bordo et. al. (1999) emphasize the importance of information to explain why firms do not incur 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. Indeed, even in the current period, when information flows and transport networks are substantially more developed, it has been argued that such asymmetric information and agency problems are important factors explaining the strong correlation between domestic savings and domestic investment, a correlation which should be absent with perfect capital markets (Bovenberg & Gordon, 1996). Empirical evidence

from recent cross-country equity flows support the view information asymmetries reduce the involvement of foreign investors. (Portes & Rey, 1999).

This paper explores the role of community networks in decisions to invest in industry in colonial India. Investors faced significant risks and problems of moral hazard and asymmetric information. Consequently, investment 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. The paper is organized as follows. Section 2 discusses the nature and magnitude of industrial investment in colonial India. Section 3 summarizes the recent literature on long distance capital flows and informational constraints and sets out a simple framework of to analyze the determinants of industrial investment in India. Section 4 presents statistical evidence that might have determined the differences between Indian and British firms. Section 5 analyzes the role of social networks in entry into industrial activity. The final section concludes.

## **2. Industry in Colonial India**

### **2.1: Capital and Entrepreneurship**

The early development of corporate business was in banking, insurance, shipping, and tea. The railways attracted the bulk of British investment in India. Corporate interest in manufacturing industry dates back to the mid 19<sup>th</sup> century. The changes in company law allowing the formation of limited liability companies paved the way for entry of the joint stock companies.<sup>2</sup> In eastern India the companies were set up by British merchants who could raise capital from markets in Britain as well from expatriate British individuals in army, civil services and trading companies.

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<sup>2</sup> Rungta, *The Rise of Business Corporations*, pp 43-45

Industrial firms were set up in Britain and 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. These firms were run by managing agents – specialist management firms that owned some shares, but were not required to have a majority share holding. These firms managed companies in different industries through long term agency contracts. Managing agents could be either British or Indian. In the context of India's industrial sector, the distinction between British and Indian firms is not usually in terms of ownership but in terms of the management. Although we can adopt a simple criterion to classify all sterling companies, as British owned, the picture is less clear for rupee companies. Capital was raised in India and did not show up as direct inflow of foreign capital. In this framework, the managing agents act as an indicator of control and firms are classified as Indian or British according to who manages the firm. This is a reasonable assumption as all decisions were undertaken by these agents and the raising of capital also relied on their reputation and social connections as will be discussed. In eastern India, the tea industry consisted largely of sterling companies, while in jute and coal, the norm was rupee companies managed by British agents. In western India, most firms were set up as rupee companies and were under Indian management.

The literature on early industrial development of 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.<sup>3</sup> Max Weber argued that the negative effect of Hinduism on entrepreneurial spirit was the main

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<sup>3</sup> Buchanan, *The Development of Capitalist Enterprise in India*, Anstey, *Economic Development of India*.

reason for India's economic backwardness, a view reiterated by Anstey. Morris criticized Weber, arguing that Indians did become industrial entrepreneurs when conditions were attractive.<sup>4</sup> Others have emphasized the negative impact British rule in circumscribing the sphere of operation for domestic capital<sup>5</sup>

While British capital dominated investment in infrastructure, in particular the railways, the picture appears to be quite different when we focus on manufacturing industry. The focus of this paper is on processing industry. British capital was concentrated in export oriented sectors, such as tea and jute, and in coal, which catered to the railways. However, the major import substituting industry, cotton textile, was an indigenous initiative. The magnitude of rupee investment in cotton was much larger than the investment in jute and coal and only lower than the investment in tea. We also need to distinguish between investors. They came from different communities. The British investors, who invested in Sterling companies registered in London. British investors resident in India bought shares in Rupee companies registered in India. The distinction between Sterling and Rupee companies was superficial as the same entrepreneurs managed both in different industries. Investment was demarcated by the type of industry rather than the place of registration of the company. Therefore the role of information is becomes important to understand why the source of capital differed by industry. A third group of investors came from the different Indian communities. Until the first World War they invested primarily in the cotton textile industry. Qualitative evidence suggests that they channelled their investments through community networks. Table 1 presents a summary picture of investment in industries in colonial India. There are three factors involved:

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<sup>4</sup> Morris, "Values as an Obstacle to Economic Growth", pp588-607

<sup>5</sup> Bagchi, A., *Private Investment in India*, Gadgil, *Industrial Evolution of India*.

capital, entrepreneurship and the regional effect. Table 2, shows the community divide across the two cities Calcutta and Bombay in the first quarter of the 20<sup>th</sup> century in commercial activity including a its industrial sub-sector. The racial and regional divide is striking suggesting a chasm between the commercial world of the two cities.

**Table 1: Dominant Source of Capital and Entrepreneurship, by Industry**

INDUSTRY	PRIMARY ENTREPRENEURS	MAIN INVESTORS	PRIMARY REGION
TEA	BRITISH	BRITISH IN BRITAIN	EAST
JUTE	BRITISH	BRITISH IN INDIA	EAST
COAL	BRITISH	BRITISH IN INDIA	EAST
COTTON TEXTILES	INDIAN	INDIAN	WEST

**Table 2: Percentage shares of communities in enterprises: Bombay and Calcutta.**

<b>BOMBAY: ALL COMMERCIAL ENTERPRISES<sup>1</sup></b>					
Year	European	Parsi	Hindu	Muslim	Jewish
1911	44	22	26	5	0
1920	19	25	48	6	0
<b>BOMBAY: COTTON MILLS<sup>2</sup></b>					
1915	14	30	22	13	20
1925	13	27	23	18	17
<b>CALCUTTA: <sup>1</sup> ALL COMMERCIAL ENTERPRISES</b>					
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
<b>CALCUTTA: JUTE MILLS<sup>3</sup></b>					

1915	100	0	0	0	0
1929	78	0	22	0	0

Note: Shares in total number of enterprises.

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

## 2.2: Estimates of Investment

Chapman estimated that the total British investment in India in Sterling and Rupee companies increased from £349 million in 1905-06 to £528 million in 1914-15.<sup>6</sup> Foreman-Peck estimates that the value of paid up capital of sterling companies operating in India was £78 million in 1911, with debentures issued totaling £45 million. This included 373 joint stock companies operating in India. Railways accounted for nearly half the capital and tea plantations one-fifth, that is £16 million or Rs.143 million.<sup>7</sup> In comparison, the paid up capital of the 2463 companies registered in India was only £46 million with £6 million debentures.<sup>8</sup> Thus sterling investment was much larger than rupee investment over all. However, most of this went into the railways. The estimates of investment in railways vary within a small range, but there are wide variations in the estimates of investment in other sectors.<sup>9</sup> What is uncontroversial is that sterling investment in tea was second only to railways. Table 3 shows the breakdown of investment in sterling and rupee companies. Tea accounted for the bulk 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

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<sup>6</sup> Chapman 1992: p 121

<sup>7</sup> Ibid.

<sup>8</sup> Foreman-Peck, Foreign investment and imperial exploitation , p366.

<sup>9</sup> Svedberg, portfolio- direct composition of private foreign investment, p768.

dominated by British companies and cotton textiles in Western India dominated by Indian companies.

**Table 3: 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.

Going back to the 19<sup>th</sup> century, Ifocus on the rupee investment in industry from the 1880s of which there exist systematic estimates. It is a reasonably good measure of investment in industries other than tea. Due to the share market boom in the 1860s and early 1870s many companies were floated in Bombay and in Calcutta. Many went bankrupt within a few years. Therefore 1880s is a good starting point for looking at investment trends in the industrial sector. We take firm- level paid-up capital as a good indicator of investment.<sup>10</sup> Paid-up capital is likely to underestimate the total volume of investment as enterprises raised fixed and working capital as loans, often accounting for 50% of capital paid up. This included loans from machinery producers.<sup>11</sup> There are no clear estimates of

<sup>10</sup> Rungta, The Rise of Busieness Corporations.

<sup>11</sup> Morris, The growth of large scale industry , p579

total borrowing by firms and assuming that these practices were common and available to all industries, the biases would underestimate the total magnitude of investment, but still make sectoral comparisons useful. However, there is a more serious problem in using paid-up capital as an indicator of investment. 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 more.

Figure 1 presents the relative position of different sectors in rupee investment. In 1880 tea had the largest share of rupee investment. However, by 1900 investment in cotton textiles was higher than that in tea and banking. Most of the investment in tea was by sterling companies, making tea the largest sector in terms of total investment. Therefore when we consider modern manufacturing industry, there was an overwhelming presence of Indian capital. As more firms were set up in cotton textiles towards the end of the century, there is a tendency to overestimate investment in this sector relative to tea. However, comparisons between tea and jute to not have the same bias.

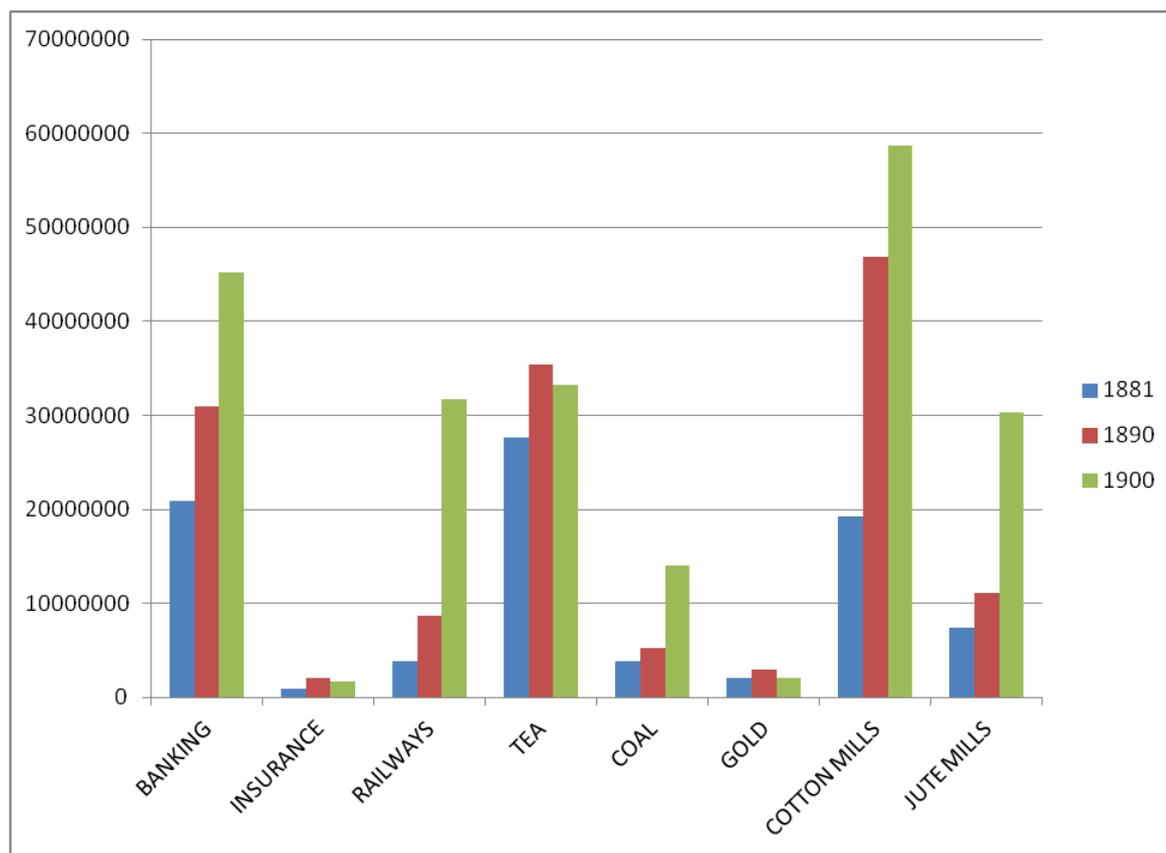
In this paper, the focus will be on cotton vs. jute as examples of manufacturing investment. Figure 2 shows Bagchi's estimates of industrial investment after 1900. Bagchi uses import of machinery as an indicator of investment. This gets rid of the biases introduced in the use of paid up capital. However, the availability of import data is more restricted, particularly before 1900. Bagchi finds increase in industrial investment 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.<sup>12</sup> After the war investment in cotton textiles as estimated by the import of industrial machinery grew relatively faster than investment in

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<sup>12</sup> Bagchi, Private Investment in India, p76

jute and reflected the change in the balance of investment between eastern and western India.<sup>13</sup> As cotton was dominated by Indian investment, the importance of Indian investment in industry was undisputed by the 1920s. But even before 1900 cotton was larger than jute in terms of paid- up capital.<sup>14</sup>

**FIGURE 1: RUPEE INVESTMENT IN DIFFERENT SECTORS, 1881-1900**



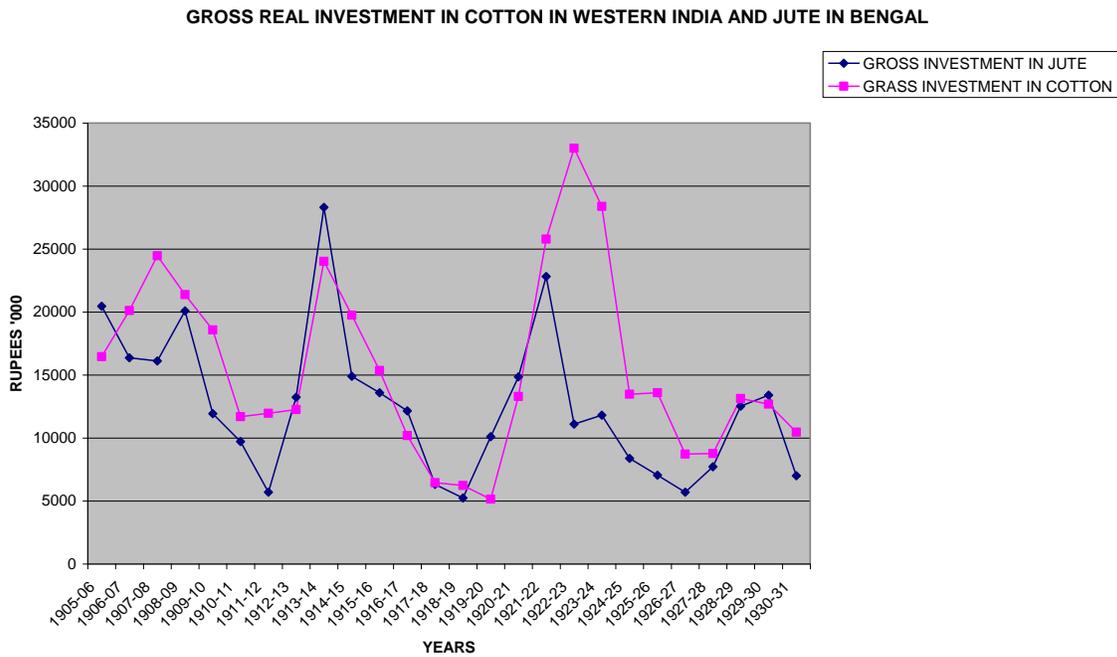
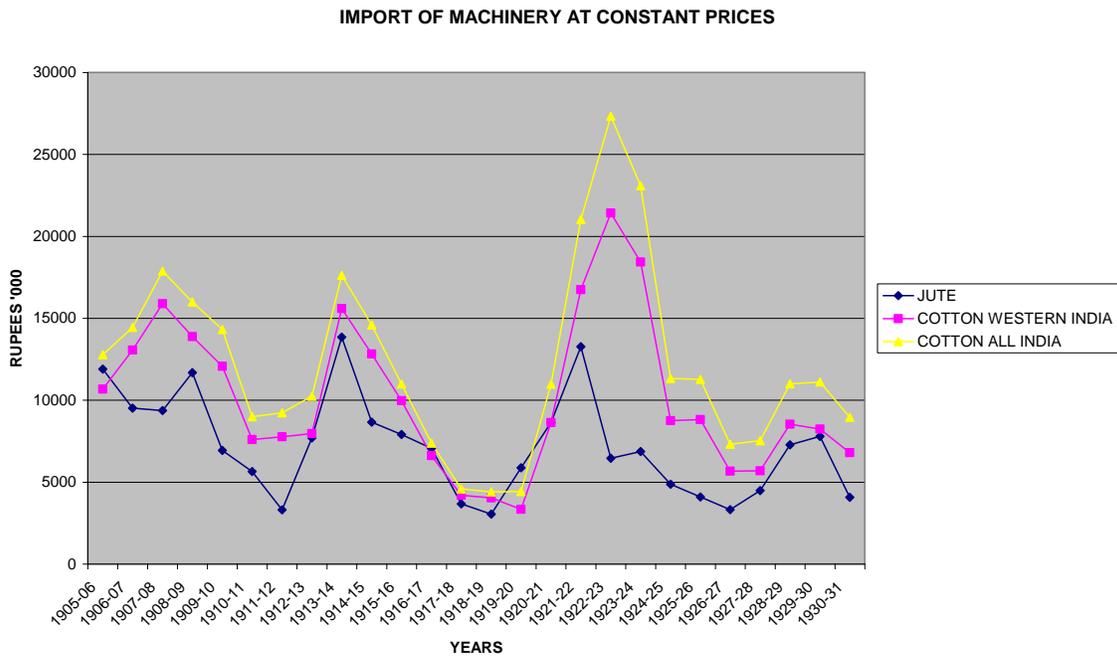
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Source: Rungta, *The Rise of Business Corporations*, p 296-29.

<sup>13</sup> Bagchi, *Private Investment in India*, p 83-84

<sup>14</sup> Rungta, *The Rise of Business Corporations*, p 296-299.

**FIGURE 2: ESTIMATES 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 mills. The figures are 1.54 for cotton and 1.72 for jute.

### **3. Information and Capital Flows**

The recent literature on international capital flows provides a valuable backdrop to our analysis of the Indian economy in colonial times. In his famous article, Lucas asks, why does capital not flow from rich to poor countries where returns are higher, even under colonial rule where political uncertainties were unimportant? If rich and poor countries have access to the same Cobb-Douglas type constant returns technology, and labour productivity is 15 times as high in the rich country as compared to the poor country, this implies that the marginal productivity of capital is an astounding 58 times higher in the poor country as compared to the rich one. Even if one assumes that there are differences in the efficiency of labour, so that the productivity of effective labour is only three times higher in the rich country, this still implies that the return on capital will be five times higher in India. Lucas points out that the poor country, that will be a net borrower, will have a strong incentive to appropriate capital investments, so that political risk is potentially important in the current period; however, in colonial times, this factor did not arise.<sup>15</sup>

Lucas argues that the imperial power might seek to exploit its monopoly position. Rather than allowing capital flows to the point where the differences in return between the two countries are eradicated, the rich country might seek to monopsonistically restrict inflows, as a way of keeping wages low and the return to capital high. However, this does not seem to have been the case in British India – one does not observe the taxation or discouragement of capital investments. On the contrary, large inflows of capital into railways was encouraged by guaranteeing favourable rates of return. Indeed, Davis and Huttenback argue that investment

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<sup>15</sup> Lucas, Why doesn't capital flow from rich to poor countries.

opportunities were freely available to firms from all countries<sup>16</sup> Therefore, the question remains how we can explain the restricted flows of capital to India in the colonial period.

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. Both types of investors compete for shares in these projects that are offered on the capital market. Projects vary in terms of their quality, i.e. in the future returns that they offer. Since they are worse informed, foreign investors are subject to the winners' curse – if they overbid domestic investors, this implies that the project must be of poorer quality and they will end up making losses. To avoid this, foreign bidders will bid conservatively, and not acquire shares in investment projects. Thus asymmetric information – between foreign and domestic investors – prevents capital from flowing to high return economies.<sup>17</sup> Empirical evidence from recent cross-country equity flows support the view information asymmetries reduce the involvement of foreign investors.<sup>18</sup> Bordo et. al. suggest that local producers have better information about local tastes and demands, an argument that can explain why firms do not incur 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.<sup>19</sup> Indeed, even in the current period, when information flows and transport networks are more developed, it has been argued that such asymmetric information and agency problems are

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<sup>16</sup> Davis & Hunttenback, *The political economy of British imperialism*,

<sup>17</sup> Bovenberg & Gordon, *Why is Capital so Immobile Internationally*.

<sup>18</sup> Portes & Rey, *The Determinants of Cross-Border Equity Flows*.

<sup>19</sup> Bordo et. Al, *Is Globalization Today really different from Globalization a Hundred Years Ago*.

important factors explaining the strong correlation between domestic savings and domestic investment, a correlation which should be absent with perfect capital markets.

The literature on British investment has emphasized the higher rates of return on foreign investment, even adjusting for risk in the latter half of the 19<sup>th</sup> century, which encouraged investment abroad. 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, while the railways offered a lower rate of return. A rough estimate of the rate of return in the opium trade put it above 9-10%, which was the average rate of return in money lending, internal trade and real estate transactions.<sup>20</sup> The return on these traditional investments was certainly higher than the 5% rate of return guaranteed on railway stocks, but carried a higher risk. The return on investment in the Empire has been estimated to be higher than investment in domestic securities.<sup>21</sup> While the average British investor in England would have been happy with a rate of return that compared with the return on investment in Britain, Indians sought higher rates of return that was comparable to those obtained in alternative activities in India.<sup>22</sup> Efforts for investment in the railways in India had not succeeded.<sup>23</sup> At the same time, the return on railways was guaranteed at a minimum of 5 per cent, making this attractive for British middle class investors.<sup>24</sup>

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<sup>20</sup> Tripathi, *The Oxford History of Indian Business*.

<sup>21</sup> Davis & Hunttenback, *The political economy of British imperialism*, p125.

<sup>22</sup> 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.

<sup>23</sup> Sanyal 1930

<sup>24</sup> Macpherson, *Investment in Indian Railways*, p186.

Indian entry into the jute industry began only after the jute cartel pushed up profits that the required rate of profit was higher for the Indian entrepreneurs.<sup>25</sup> Morris's argument, if correct would 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, given the higher returns obtainable there.

A different view is put forward by Bagchi (1972), who argues that social discrimination against local capital prevented the entry of Indian entrepreneurs in eastern India. For barriers to entry in one direction (on Indians) to explain the pattern of investment, it must be the case that the rate of return in British dominated industries was higher than that in cotton textiles, and there is little empirical evidence of this, even of a suggestive nature. Indeed, one might argue that since capital was more freely available to British firms, the required rate of return would have been higher in Indian dominated sectors such as capital sectors. But it does not explain why British capital stayed out of a major industry, despite all the advantages it enjoyed under the colonial state.

Sen argues that British reluctance to invest in cotton textiles was due to the competition such an industry would create for products from Lancashire. The evidence comes from the extensive lobbying against any advantage a local industry might enjoy vis a vis imports.<sup>26</sup> Sen suggests that British capital entered those sectors which were complementary to their domestic industrial interests. 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. Sen's argument is flawed. Indian jute products competed in

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<sup>25</sup> Morris, *Indian industry and Business in the Age of Laissez- faire*, pp136-137.

<sup>26</sup> Sen, A.K., *The pattern of British enterprise in India*, pp117-121

the world market with the industry in Dundee and managed to gain market share. More important is the following: Each entrepreneur decided whether or not an activity is profitable based on the individual's self interest. For British entrepreneurs to act as a group would require a mechanism which sustains common interest. Further, 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 the 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.<sup>27</sup> In general machinery makers had close contact with the entrepreneurs. They offered large commissions to promoters of the order of 5% and accepted deferred payment. These examples suggest that self interest was dominant; contrary to Sen's argument, British industrialists did not act as a group..

Morris was the first to recognize that familiarity with markets can explain why the spheres of investment were different for British and Indian capital.<sup>28</sup> Informational differences led to each social group having different assessments of profitability of each sector. Morris argued that Europeans tended to get involved in markets which were export oriented or closely supported by the state.<sup>29</sup> The following section suggests the channel through which this could work by looking at information available to individual investors. In a world where information about returns on investment were limited, the

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<sup>27</sup> Rutnagur, *Bombay Industries: The Cotton Mills*, p9.

<sup>28</sup> Morris, *The South Asian Entrepreneurship and the Rashomon Effect*.

<sup>29</sup> Morris, *Growth of large scale industry*, p580

sector that attracted most investment was the railways with guaranteed rates of return. For the industrial sector in the 19<sup>th</sup> century, information on profitability and long term prospects of different enterprises was more limited. Therefore the industry concerned and reputation of the entrepreneurs might have been more important. Familiarity with products could overcome this type informational constraint. Here we note that the largest component of sterling investment after the railways was in tea, a product which was widely consumed in Britain. Social cohesion might have a way to resolve the reputational constraints.

The Bovenberg-Gordon model explains the failure of *portfolio* investment flows to equalize returns across countries, for example the rate of return on capital in India might have been higher. It can also explain why the rates of return on capital may differ across industries within India. This implies that if British entrepreneurs, who had better access to capital, returns would be lower in activities where British capital dominated. The analysis based on information asymmetry can be applied to flows of entrepreneurship. Indian entrepreneurs had good information about local markets and conditions, while British entrepreneurs had information about foreign markets. This is information possessed by *entrepreneurs*, rather than investors and is useful in decisions to invest in the industry. Entrepreneurs decided which is a profitable enterprise and the investors chose whether to invest in the enterprise. Indian entrepreneurs entered industries catering to the domestic market, while foreign investors entered export industries. Notice that this argument explains differential flows of *entrepreneurship*, rather than flows of capital. Investors chose to put money according to who the entrepreneurs were or the type of industry.

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 railways and public utilities and in tea, while the second invested in rupee companies in tea, jute and coal. The capital for Indian railways was raised by private companies incorporated in the UK, who raised most of the money in Britain.<sup>30</sup> Britain was the main market for tea, and consumers were familiar with the product. Tea was sold in the domestic market in Britain and re-exported. It was still a consumption good largely unknown in India. 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. Only a handful of jute companies were registered in London. These were Scottish firms and Dundee was the centre of jute manufacturing. To local British investors, jute companies in Scotland might have might have been less risky

The demand for coal came from the British owned railway companies and this sector dominated by British firms. The majority of jute and coal firms were set up and managed by British managing agents. A majority of the investors were British expatriates living in India. In the jute companies owned by Bird and co, the British managing agent, Europeans owned six times the shares owned by Indian investors and in the coal companies more than 3 times. British expatriates had better information about these products and their markets and this is reflected in their involvement in financing the company. Jardine Matheson, the managing agent, argued that it was better to issue shares

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<sup>30</sup> Thorner Capital movement and transportation , p391.

in India where there was local knowledge.<sup>31</sup> The British agents found it relatively easy to borrow from the banks in India and could typically own a small share of the capital of the firm.<sup>32</sup>

The export trade in jute and tea was in the hands of British companies and this gave British entrepreneurs an informational advantage. Tea was mainly an exportable. The tea trade was in the hands of the East India Company at the beginning of the 19<sup>th</sup> century and later on was dominated by British trading companies. However, jute and coal were sold both in local and foreign markets, but these sectors remained dominated by British capital until the 1920s. Over 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 products<sup>33</sup>, but the local traders were reluctant to become entrepreneurs. Coal was sold in the Indian market as well as in the international market, but the demand for coal in India came from sectors that were dominated by British capital. Railways were the largest consumer of coal in India. 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 dramatically making Bengal coal competitive in the home market as well as in the nearby export markets.<sup>34</sup> Railways accounted for over 30% of total demand for coal.<sup>35</sup> The Indian coal firms were small and produced poorer quality coal that was sold in the local market.

The managing agency system was institutional development, which address the problem of informational constraints in long distance investment. This system was

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<sup>31</sup> Chapman 1992, p124.

<sup>32</sup> Ibid

<sup>33</sup> Morris, Indian industry and business , p136.

<sup>34</sup> Rungta, *The Rise of Business Corporation*, pp174-75.

<sup>35</sup> Buchanan, *The Development of Capitalist Enterprise*, p264.

universally adopted by British business in Asia. The managing agents were partnerships of joint stock companies set up in Britain and acquired managerial rights through share ownership in companies in different industries. Typically a managing agent did not have majority shareholding, but were responsible for the managerial decisions. The reputational value of the managing agent can be seen as an important factor attracting investors in another country. If a new firm was unknown to the British investor, the managing agent associated with it had a reputation. The managing agency system can be seen as an institutional innovation for directing capital flows and helped to alleviate agency problems in the context of long-distance investment for the British.

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 was too in the hands of these local merchants in Western India. These groups were community specific. Marwaris in the eastern jute trade and Parsi and Bhatia and Bohra merchants in the cotton trade in the west. These community based trading networks had in long history in intra regional as well as Indian Ocean trade.

While the idea of barriers to entry in the export sector by Indian firms is easier to understand in a context, where the British firms controlled shipping and insurance companies. It is more difficult to see why the British were less willing to enter the cotton trade unless informational disadvantage acted as a constraint. British agents were less keen to enter the market as cotton textile producers. They had little knowledge of the local product market, where Indian traders dominated. The capital for the cotton textile industry

was raised from Indian investors through family and community connections. Here the Indian agents had an informational advantage over their British counterparts.

In this framework, Informational asymmetries are defined by social groups. Information flows were easier within social group and restricted across groups. Therefore if members of a social group chose one industry, others could be persuaded to invest in it too. The signal of what is a good investment opportunity was provided by the social group of the entrepreneur. In contemporary India kinship has determined investment decisions. A recent study of finds significant differences in investment decisions across communities within the same industry in a small region in India today.<sup>36</sup> In colonial India too, family and social networks provided the channels through which problems of reputation and trust could be resolved. Communities that became involved in industrial investment were those that were involved in trade. Members of a community made similar decisions to diversify from trade to industry. Indian family firms learnt to diversify in response to changing economic conditions of the 18<sup>th</sup> century and community networks formed the basis of these decisions.<sup>37</sup> Members of a community tended to move together either from one activity to another or from one town to another in response with changes in opportunities. Bhatia and Parsi merchants moved from Surat to Bombay as the city began to grow in the 18<sup>th</sup> century.<sup>38</sup> Marwari traders moved from North –Western India in groups in search of business opportunities.<sup>39</sup> The community based on caste or religion was the core of the information network. and social ties were also important in decisions to diversify from trade to industries in Indian communities.

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<sup>36</sup> Banerjee and Munshi

<sup>37</sup> Smith

<sup>38</sup> Ibid

<sup>39</sup> Timberg.

I set out a simple model of the role of community networks in investment. (See appendix). There are two sectors and two communities. First, any initial entrant is like 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.

#### **4. Measuring constraints**

It is difficult to identify the effects of community ties. The empirical strategy adopted in this paper is to rule out alternative explanations that suggest barriers to entry. Did the minimum efficient scale differ across sectors? Did this determine who entered as a producer? If Indian entrepreneurs were capital constrained, then they would be more likely to set up firms in 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. We can test both propositions using firm-level data

Table 3 presents comparative start-up capital outlays required in different industries using both aggregate data from Rungta and firm-level information from various sources.<sup>40</sup>

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<sup>40</sup> Morris 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.<sup>40</sup> 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.

Our findings suggest that the average cotton mill needed a lower investment outlay. The capital requirement of jute mills was larger in comparison to that of cotton mills right from the 1880s. Table 4 shows details of machinery employed and employment cotton and jute industries. Although the machinery employed is not directly comparable across the two sectors, we see that jute firms employed significantly more labour than cotton firms, often ten times as much. The working capital requirements for jute are likely to have been much larger than for cotton textiles. This could have given Indian entrants a disadvantage if they were capital constrained. However, rupee companies in tea required much less capital on average but there were hardly any Indian entrepreneurs in this sector.

Our second test for the presence of capital constraints is to see if there is difference in size between British and Indian firms, in industries where they co-exist. If capital constraints were systematically greater for Indians, one might expect Indian firms to be smaller than British firms. We choose the two main industries, cotton and jute, and compare firms only *within* the industry. That is, we ask if Indian firms were smaller than British firms within cotton, and if they were smaller within jute. (Note that Indians were the majority group in cotton, but the minority in jute.)

**Table 3: Average Paid-up Capital of Rupee Companies, Rs Thousand**

	Cotton	Tea	Jute	Coal
1881 <sup>a</sup>	688 (28)	244 (113)	958 (8)	649 (6)
1889 <sup>b</sup>	876 (99)			
1891 <sup>a</sup>	852 (57)	253	1071 (11)	560 (11)
1900	889 (66)	246 (135)	1444 (21)	411 (34)
1910 <sup>c</sup>		339 (87)	3351 (34)	591 (87)

Source: <sup>a</sup> Based on Rungta's industry level information,

<sup>b</sup> Based on firm level information from Bombay Millowners Association Report, 1889,

<sup>c</sup> Based on firm- level information from Investors' India Year Book for 1911

Note: figures in parenthesis indicate the number of firms.

**Table 4: Looms and Employment: Relative Position of Cotton and Jute**

<b>Year</b>	<b>No. of mills</b>	<b>Average no. of loom equivalent/ looms per mill</b>	<b>Average no. employed per mill</b>
<b>Cotton</b>			
1883-84	79	1043	60
1893-94	142	1067	130
1903-04	191	1121	185
1913-14	271	1210	260
<b>Jute</b>			
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. (See table 3 for details of the method)

This procedure has the advantage that we can use a physical measure of capital, rather than a value measure, since we only make intra industry comparisons.<sup>41</sup>Table 5

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<sup>41</sup> For cotton textiles we have to aggregate two types of machinery, spindles and looms. We do this by converting them into equivalent units.

presents our results for the year 1933.<sup>42</sup> Our main finding is that in each industry, the majority group has the larger firm, although this difference is not statistically significant. That is, 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 are uniformly more capital constrained, is not borne out. Instead it appears that the minority group may face more difficulty in raising capital. On the basis of the measures loom equivalent and looms, we can make comparisons across firms according to ownership. If capital had been a constraint for Indian firms, then British firms would tend to be larger in all sectors.

We can also ask, are there systematic differences in capital intensities in mills run by different communities in the cotton textiles in Bombay. The only group which has a higher capital- labour ratio is the Sassoon group, reputed to be most efficient in the industry. The ratio is similar across all other groups. (See table 6) Capital requirements alone cannot determine the industrial divide between British and Indian capital

Although Indian entrepreneurs might have faced capital constraints, this constraint was not absolute. 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 capital to set up the first cotton mills were supplied by the Parsi entrepreneurs from their own resources and contribution from family and friends. The Bhatia merchants, who were the early Hindu entrepreneurs,

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<sup>42</sup> I have chosen the year 1933 as there was a significant group of Indian firms in the jute industry by this period.

also raised their own finances<sup>43</sup> 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 can be taken up by a larger number of investors.<sup>44</sup>When Davar floated the first cotton mills in 1854, fifty leading traders of Bombay paid up the initial capital of Rupees 500,000. Majority of the share holders, were Parsis, the same community as the entrepreneur, but many were from other communities, including two Englishmen.<sup>45</sup> Davar retained a large chunk of the shares, Parsis and Gujaratis subscribed one-third.<sup>46</sup> Although Davar had failed 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.<sup>47</sup> 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 venture into weaving in the first decade of the 20<sup>th</sup> century.<sup>48</sup> European capital was no more than 10-20% of total capital invested in cotton. In eastern India, the average jute or tea firm did not have problems in mobilizing capital in eastern India. The capital for the rupee companies came from British civil servants, army personnel and traders.

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<sup>43</sup> Rutnagar, *Bombay Industries*, p46

<sup>44</sup> Rungta , *The Rise of Business Corporations*, pp59-60.

<sup>45</sup> Morris, *Growth of large scale industries*, p574.

<sup>46</sup> Tripathi, *The Oxford History of Indian Business*, p97

<sup>47</sup> Morris, *Growth of large scale industries*, p575.

<sup>48</sup> Morris, *Growth of large scale industry*, p579.

**Table 5: Average Machinery and Employment by Category of Owner, 1924**

	<b>Number of firms</b>	<b>Looms/Loom Equivalent per firm</b>	<b>Workers per firm</b>	<b>Average capital-labour ratio</b>
<b>Cotton firms in Bombay</b>	67	2516		
<b>Indian</b>	55	2615*	1929	1.14
<b>British</b>	12	2061*	1773	1.13
<b>Jute firms in Calcutta</b>	54	961		
<b>Indian</b>	8	823**		
<b>British</b>	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 (2004) for details of the estimation.

\*The regional average is computed from the aggregate data. The group averages have been computed by regressing loom equivalent/loom on ownership, within each industry.

**TABLE 6: Capital-Labour 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.

## **6. The role of social networks**

In early industrial development when institutions are poorly developed as in India in the 19<sup>th</sup> century community ties appears to have important in decisions to enter into industrial activity. These ties were based on religious and caste formations. 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. There were broadly five social networks in industry western India: Parsis, Hindus, Muslims, Jews and Europeans. The Hindu community was represented by specific trading castes, such as the Bhatias. These caste boundaries were clearly defined. Caste and community networks had been important in Indian Ocean trade in the 17<sup>th</sup> and 18<sup>th</sup> centuries.<sup>49</sup> These same ties formed the basis of industrial investment.

The role of social networks in economic activity in Sub-Saharan Africa has been highlighted by Fafchamps when information about possible sources of demand and supply is not widespread and involves search costs.<sup>50</sup> Evidence from traders in Madagascar finds that family ties were important in training and starting up businesses, but less important in the long run.<sup>51</sup>

In India, the Parsis were the first social group to become industrial entrepreneurs. A close knit community they made their wealth from opium and cotton trade. They were also

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<sup>49</sup> Ray, Asian capital in the age of European domination.

<sup>50</sup>Fafchamps, Market Institutions in Sub-Saharan Africa, pp16-17

<sup>51</sup> Fafchamps and Minten , Relationships and traders in Madagascar.

one of the first groups to embrace western education. As a community, the Parsis had fewer barriers to mixing with other groups and on foreign travel, which gave them greater contact with western economic developments. The existing literature has tended to view the role of the Parsi community as something special and arising due to their religious ethic and high level of human capital.<sup>52</sup>

Tripathi emphasizes the exposure to western education and liberal values as a major determinant of entry into industrial enterprise. Tripathi argues that the exposure to new ideas and values and a desire to learn western industrial practices was common to the pioneers in Bombay and in Ahmedabad.<sup>53</sup> The first Hindu textile entrepreneur, Khatau Makanji, was a merchant who set up a mill in Bombay. He belonged to a small group of progressive Bhatia merchants and had links with Parsi merchants.<sup>54</sup> The Bhatias came from the Kutch region of Gujarat and traded in raw cotton, textiles and grain. The community began to play an important role in the religious reform movement of the 1870s. Mulji Thackersey, one of the leaders of this community, had visited England and was keen to adopt western industrial values.<sup>55</sup> Tripathi and Mehta argue:

“The loosening grip of social dogmas coupled with the demonstration effect of industrial ventures promoted by the Parsees, with whom they had close business connections, seems to have broadened the business outlook of the Bhatia merchants.”<sup>56</sup>

These were the groups that specialized in trading and finance. One successful entry by a member of a particular group triggered entry by other members. Guha argues that the

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<sup>52</sup> White, *Competition and Collaboration: Parsi Merchants and the English East India Company*, Desai, *Origins of Parsi Enterprise*, Bagchi, *The Private Investment in India*.

<sup>53</sup> Tripathi, *Historical Roots of Entrepreneurship*, p108.

<sup>54</sup> Tripathi *Historical Roots of Entrepreneurship*, p109.

<sup>55</sup> Tripathi and Mehta, *Business houses in western India*.

<sup>56</sup> Tripathi and Mehta, *Business houses in western India*, p78

success of the Parsis and other Gujarati communities to the advantage of being in one of the most developed regions in India, where the British had a less imposing presence.

This was yet another example of members of a community following on the foot steps of a fellow member. However, what was important in this context is that this was a community that was involved in trade and followed a fellow member into industry. In the case of another pioneer the argument does not hold. Education and contacts outside the community had made Ranchhodlal willing to break out of caste based occupation and seek new avenues of investment, but he remained the sole representative from his community for a long time.<sup>57</sup> He belonged to a community with little involvement in commerce and those groups that were involvement in commerce did not follow him. The Jains, who were traders, refused to get involved in the textile industry when Ranchhodlal approached them for funds. It took them and their traditional rivals, the Vaishnava Baniyas another couple of decades to move into this industry. It was only when one member of these communities had become involved that others followed.

Western education did not necessarily lead industrial entrepreneurship. What was common among the groups that invested in cotton textiles was information of markets. The entrepreneurs had *little knowledge of the technology of manufacture of cotton textiles, but possessed intimate knowledge of the cotton trade.*<sup>58</sup> All these entrants had been involved in cotton trade. By the early 20th century a few business families controlled the textile industry. These included the Wadias, Tatas and Petits, who belonged to the Parsi community, Khatau, Golcaldas and Thackersey from the Hindu Bhatia community,

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<sup>57</sup> Mehta, *Indian merchants and entrepreneurs in historical perspective*, 1991, p196.

<sup>58</sup> Rutnagar, *Bombay Industries*, p46.

Curimbhoys from the Muslim community and the Baghdadi Jewish family, the Sassoons. British business interests were also represented in Bombay by the firms Greaves & Cotton, Brady and Killick Nixon. All these entrepreneurs had moved from trade to industry. In southern India, the Naidus, the pioneers in cotton textile production had moved from cotton cultivation to cotton trade. The Chettiars got involved in the industry in a major way only in the 1930s.<sup>59</sup>

The first successful cotton mill in India was set up in 1854 by Davar, a Parsi. Davar had been a broker to English trading companies. He was also involved in trade to East Asia, import of machinery, banking in Bombay and had set up the first steam –powered cotton press.<sup>60</sup> His entry was followed by other members of his community. The second mill was set up by another Parsi, Manekji Petit, who had been a prominent China trader and Broker. His next venture was jointly with Framji Panday, who had also been a cotton trader.<sup>61</sup> Wadias who became successful entrepreneurs in cotton textiles started out as shipbuilders for the East India Company, made their fortune in the cotton trade and became owners of large ships.<sup>62</sup> Jamsetji Tata, one of the prominent names in Indian industry was a key figure in the opium trade. His firm handled one-third of the total imports into Canton, but lost out to the “new breed of European companies” who entered the market with the opening up of China.<sup>63</sup>

The success of the firms run by the Parsis had little impact on the traditional Hindu business groups until 1875.<sup>64</sup> The first non Parsi to enter the industry in Bombay was

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<sup>59</sup>Tripathi, *Historical Roots of Entrepreneurship* , p120.

<sup>60</sup> Morris, *The growth of large scale industry*, p574.

<sup>61</sup> Tripathi, , *The Oxford History of Indian Business*, p97

<sup>62</sup> Tripathi, *The Oxford History of Indian Business*, p77

<sup>63</sup> Tripathi, *The Oxford History of Indian Business*, 83-4.

<sup>64</sup> Morris, *The growth of large scale industries*, 1982, p580-1

Khatau Makanji , a Bhatia merchant from Gujarat.<sup>65</sup> He was followed by many Hindu merchants. The majority of the Hindu mills in Bombay belonged to the Bhatia merchants. There were no Muslim entrepreneurs until the entry of Curimbhoy in 1888, who soon became one of the largest agents in the industry. David Sassoon, a Jewish entrepreneur,<sup>66</sup> migrated to Bombay from Baghdad and established himself in the opium trade. One of the main British companies in the cotton textile industry in western India 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 the next 20 years.<sup>67</sup> The managing agent Greaves & Cotton and Bradbury & Brady were two British managing agents who controlled twelve out of fifteen British enterprises.<sup>68</sup>

The decline of trade in opium and cotton created interest in an alternative activity. Shipbuilding was the other activity where the Parsis were involved. Here too, they began to lose out to European companies who had new technology and better ships.<sup>69</sup> With the development of the railway lines, the internal trade in cotton, which had been dominated by Indian merchants, now became accessible to British companies. This reduced the reliance on the Indian merchant, who had been involved in various parts of the marketing process and increased the market share of large British firms.<sup>70</sup>

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<sup>65</sup> Tripathi, *Historical Roots of Entrepreneurship* , p 108.

<sup>66</sup> Rutnagur , Bombay industries, p58.

<sup>67</sup> Greaves Cotton and Company: A century of Progress, Bombay 1959.

<sup>68</sup> Morris, , The growth of large scale industries , p580

<sup>69</sup> Bagchi, *Evolution of the State Bank of India*, p100.

<sup>70</sup> Viczianny, Cotton Trade and Commercial Development of Bombay, 370-372.

The Indian merchants in eastern India traded in jute, rice and other agro-based commodities. The Marwaris as a group worked closely with British firms and exporting interests, but did not enter industrial activity right up to the First World War. The Bengalis from the land-owning class included a group that had been exposed to western education. This group entered into partnerships with the British in banking, insurance and shipping in the early decades of the 19<sup>th</sup> century, but disappeared in 1851 after the financial crisis. This marked the end of Bengali involvement in the industrial sector in eastern India. The Marwaris had no presence in Bengal's commercial sector in the 1870s. (See table 5) By the end of the century, they had emerged as the main brokers to the British companies. Their network all over India made gave them extensive knowledge of local markets.<sup>71</sup> Timberg documents the rise of the Marwaris as industrial entrepreneurs. The Marwaris is initiated the futures market in opium, specie and later in raw jute and jute products in Calcutta. They also began to speculate in the share market.<sup>72</sup> Birla and Hukumchand, started the first two Indian- owned jute mills in Calcutta, and this encouraged entry by several others Marwaris into this industry in the 1920s.

The decision to enter into industry was made easier by the presence of entrepreneurs from the same community suggesting that informational flows were easier within the community. Table 7 shows the patterns of entry in Bombay's textile industry. Once a member of a group make the decision to enter, other member of the group were more likely to enter. In eastern India, the Indian entrepreneurs entered as a group in the 1920s after the successful entry of two Marwari firms. The majority of the Hindu mills in

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<sup>71</sup> Bagchi, *Evolution of the State Bank of India* , p73.

<sup>72</sup> Timberg, *The Marwaris: From traders to Industrialists*, pp161-166.

Bombay belonged to the Bhatia merchants. In Ahmedabad most of the entrepreneurs belonged to the Hindu merchant communities.

**Table 7: Bombay cotton mills: Number of Entrants, by 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
<b>Total</b>	31	22	5	15	5

Source: Calculations based on Rungta, 1929, pp9-23.

## 7. Conclusion

We have argued in this paper that the role of Indian entrepreneurship and capital in the industrialization of India has been underestimated. British domination of Indian industry was concentrated in agro- industries and facilities such as railways and finance which were essentially supporting the export network. In modern manufacturing industry, the important cotton textile industry was dominated by Indian capital, while the British were important in jute. We argue 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 community in providing capital and information is also emphasized.

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## Appendix:

Consider the following model of investment in an industry.

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 favourable 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.

Let  $G$  denote the break-even level of profit where the above expression equals zero.

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.

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 also observes the niche that the first entrant is in, if he has not exited. Thus, he now believes that the probability that this niche is profitable is 1 rather than  $p$ .

On the other hand, 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.

Consider now an individual who is from a different community,  $\hat{C}$ , 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

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

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  $i$ .

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, although possibly different.

Let us assume that at each date, there are two possible entrants, one from each industry.

Thus at date 1, in a pure strategy equilibrium, the two entrants will choose different industries.

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 one.

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 in industry  $B$ , chooses a wrong niche since he gets the wrong signal. In this case, he will choose to exit, and the succeeding entrants are in the situation where one of them is informed about the profitable niche in industry  $A$ , while the other is uninformed.

We claim that 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.