

Rehabilitating the intermediary: Brokers and auctioneers in the 19th century Anglo-Indian trade.

Michael Aldous, Lecturer in Management, Queens Management School

Queens University Belfast, Queens Management School, Riddel Hall, 185 Stranmillis Road,
Belfast, Northern Ireland, BT9 5EE

Tel: +44 (0)28 9097 4200
m.aldous@qub.ac.uk

Abstract

The complications of long-distance trade restricted the expansion of the Anglo-Indian trade in the first half of the 19th century. The take-off occurred after 1850, and can be correlated to the growing number of brokers and auctioneers. This paper analyses the role and effects of these intermediaries, drawing on information economics theory. A new data-set shows that volatility in supply, demand and price of indigo was reduced by half as the number of intermediaries quadrupled. Analysis shows that they were uniquely placed to reduce information asymmetries significantly improving market coordination. These findings positively reassess the importance of these organisations and have implications for understanding the evolution of long-distance trade in the 19th century.

Key words: Long-distance trade, 19th century, brokers, auctioneers, information asymmetry.

Introduction

Trading firms entering the Anglo-Indian trade after the rescinding of the East India Company's monopoly in 1813 faced significant challenges inherent in long distance trade. The key markets of London and Calcutta were separated by 10,000 km, and although sailing times declined significantly in the first half of the 19th century, the average length of voyage in one direction was still between six to seven weeks.¹

The separation of market participants by distance and time made coordination of the markets difficult. Information regarding products and market conditions was hard to ascertain in a timely manner. These problems were further exacerbated by volatility in the production, supply and demand of trade products, with limited or inaccurate information a significant cause of market instability. A further problem caused by the separation of buyers and sellers was the high level of information asymmetry between participants. This could have particularly deleterious effects in markets for products with quality heterogeneity like indigo and tea. The threat of being sold a 'lemon' discouraged buyers from entering the market, whilst the difficulty in realising the value of the 'cherries' discouraged sellers.²

These problems led Braudel to proclaim, 'L'espace, ennemi numero 1,' for early modern merchants involved in long-distance trade.³ Greif characterised these issues as the 'Fundamental Problem of Exchange' (FPOE).⁴ Alongside the problems of market coordination, the separation by time and space, when coupled with a weak state, made contract enforcement a costly affair for merchants. Firms operating with agents in distant markets had to confront the difficulties of aligning the interests of the agents to those of the firm. The agency costs incurred from both the malfeasant behaviour of the agents and the costs of the incentives, enforcement and monitoring used to avoid these outcomes raised the costs of international trade to levels that made it prohibitive. The potential losses from opportunistic behaviour and high costs of enforcement reduced levels of participation and potentially led to market failure.

¹ Kaukiainen, "Shrinking the World." Appendix 2a. The median sailing time between London and Calcutta had declined from 154 days in 1820 to 47 days in 1850.

² Akerlof, "The Market for 'Lemons'."

³ Braudel, *La Méditerranée et le Monde Méditerranéen*, 355.

⁴ Greif, "The fundamental problem of exchange."

The importance of long-distance trade as a determinant of economic development has prompted a large literature analysing the mechanisms by which the efficiency and gains of trade were improved.⁵ This paper considers how entrepreneurs addressed these issues in the Anglo-Indian trade, specifically within the high value but volatile indigo market. Prior to 1850 the trade was characterised by slow growth, and volatility, yet the decades after saw the value of the trade rapidly take-off and stability in the indigo sector improved. The take-off correlated with the emergence of a growing number of specialist trade intermediaries, such as brokers and auctioneers.

To explain the take-off and explore the correlation with the rise of trade intermediaries the paper poses three research questions: How did entrepreneurs overcome the persistent problems of asymmetric information in the Anglo-Indian trade?; what role did auctioneers and brokers play within the organization of the trade?; why were they particularly adept at overcoming these problems?

To address these questions the paper details the organisation of the Anglo-Indian trade in the years after 1813. The focus is on the period prior to 1870 when the telegraph line between London and Calcutta was completed and the Suez Canal opened. These events significantly altered the communication and transportation systems and patterns of the Anglo-Indian trade, and the focus of this paper is to address entrepreneurs' response to an environment with persistent asymmetric information.

Data from Calcutta and London commercial registers, show the number of product auctioneers and brokers operating in Calcutta. A description of the Bengal indigo industry reveals the role of the brokers and auctioneers in conducting the trade. The paper analyses changes in the industry using a new dataset, drawn from brokers' circulars, of Bengal indigo production, British imports, consumption, stocks and prices, between 1814 and 1855. Coefficients of variation for each metric, taken at four decadal points, provides a comparable measure of volatility over time.

Finally, the paper considers why brokers and auctioneers were particularly successful in coordinating the market. This was a period when the production and dissemination of business information by

⁵ Broadly summarised, improvements in transport and communication technologies, evolving institutions and regulations, changing factor prices and the more effective organisation of business, incentivised and enabled more efficient long-distance trade. O'Rourke and Williamson, *Globalization and history*, Jones, *Merchants to Multinationals*.

commercial news suppliers increased rapidly.⁶ Trade associations and Chambers of commerce also proliferated across Britain and India, creating networks to support merchants through the exchange of information.⁷ The paper draws on two strands of information economics to consider the relative capacity of these different organisations in improving market coordination. First, analysing how these organisations reduced information asymmetries to solve principal-agent problems and market coordination. Second, drawing on Arrow's information paradox to consider the mechanisms that enabled the transfer of information between participants.⁸

The paper finds that the number of brokers and auctioneers grew by over 400 per cent between 1848 and 1858, whilst becoming increasingly specialised by product and service. As the number of intermediaries increased the volatility in the indigo market decreased. The coefficient of variation for production remained stable, but those for imports, consumption, stocks and price declined by half. The analysis of the roles of the brokers and auctioneers revealed that they occupied a unique position in the market, matching both buyers and sellers through their services. In this role they collated aggregated information on supply, demand, prices, quality, in real-time which they freely distributed via detailed circulars and reports to a wide networks of market participants. Through their role, and the mechanism of the circulars, the intermediaries were the most effective organisation in solving the effects of information asymmetries and Arrow's paradox, greatly reducing the effects of distance between buyers and sellers.

These findings contribute to a number of debates. Discussions on the role of market intermediaries such as trading firms and brokers has been somewhat polarised. They have often been regarded as exploiters of arbitrage opportunities, adding little value to the market, to be driven out as markets and business activities integrate.⁹ Conversely, recent research has shown the importance of intermediaries in

⁶ Bakker, "Arrow's fundamental paradox and the origins of global news networks," McCusker, "The Demise of Distance."

⁷ Webster, *The twilight of the East India Company*, details the role of the growing number of regional East India trade associations across Britain. Tyson, *Bengal Chamber of Commerce and industry*.

⁸ Arrow, "Economic Welfare and the Allocation of Resources for Invention."

⁹ Croker, *Advice to merchants or the Mysteries of a Colonial Brokers Office*. Croker writing in 1863 claimed that the brokers of Mincing Lane (the centre of colonial goods broking in London) were highly speculative in their activities, using many and varied tactics to skim profits away from merchants. In this pamphlet he, 'endeavoured to show ... a few of the 'dodges' which could be practised by some colonial brokers.' He concluded that London merchants should consolidate to establish a General Broker's Company, in which they were directors and shareholders, cutting out private brokers entirely.

providing matching functions and diversifying risks, in both contemporary and historical markets.¹⁰ This paper has sought to both identify the mechanisms and quantify the effects of such intermediation.

In the coffee trade of the late 19th and early 20th centuries, Van Driel identified four dimensions in which intermediaries' added value: (1) Place, in which geographical distance could be overcome through transportation; (2) Time, encountered in production, transportation and communication, was resolved through storage; (3) Quantity, the numbers of buyers and sellers, and the volume of flows and transactions could be matched and facilitated by collection and distribution; (4) Quality, either standardising or classifying of goods was enabled by procession, assorting and screening.¹¹

Sleeswijk found that auctioneers in the Dutch republic solved 'problems of price-fixing, classification and the distribution of goods,' in commodity markets.¹² In the wine trade they were particularly important as it was a highly diversified product as classification of quality was a major determinant of price. By classifying and communicating the quality of the produce to market participants the auctioneers mitigated threats of collusion and other opportunistic acts. It also generated information on supply, demand, quality and prices, as well as the reputation of participants, which lowered search costs and improved coordination.¹³

In both cases, the intermediaries proactively helped to manage the flows of trade, providing services such as transportation, storage and spaces in which transactions could be coordinated. This analysis also revealed the importance of improved flows of information in allowing participants in the market to make better decisions and monitor their investments more effectively, encouraging greater participation. It shows that information is not costless, but a resource or asset that needs to be carefully managed.¹⁴ Little, however, has been detailed about how this information was generated or transmitted. This paper has extended the analysis of brokers and auctioneers in long-distance trade through emphasis of their

¹⁰ Hoffman, Postel-Vinay, and Rosenthal, "What do notaries do? Overcoming asymmetric information in financial markets," is indicative of the growing literature in economic history exploring the functioning of markets and institutions, in which the role of intermediaries have been evaluated.

¹¹ Van Driel, "The role of middlemen," 81.

¹² Sleeswijk, "Hearing, seeing, tasting and bidding," 171.

¹³ *Ibid*, 192.

¹⁴ Casson, *Information and Organisation*, 3-6. Proposes a, 'vision of the economy as an information system... The focus is on the handling of data relating to goods and services rather than handling of goods themselves.' The organisation of firms and markets evolved to improve the efficiency of information sharing.

role as information processing organisations. It also provides some quantification of the effects, although for only this single case, of a 50 per cent reduction of volatility in a long-distance market.

The role of the intermediaries as specialist information brokers provides a rationale for their survival and proliferation. Theory would suggest that as markets integrate the need for services such as transportation, storage and the coordination of sellers and buyers provided by intermediaries would decline. Yet, the role and importance of intermediaries in contemporary international trade continues to be debated. Bernard et al., find that trade intermediaries in export markets thrive when access to markets is difficult and costly, in particular their role in ensuring the enforcement of contracts.¹⁵ This paper indicates a rationale for the continued importance of intermediaries, but confirms that their functions changed across time.

The evolving role of intermediaries has implications for the explanation of the expansion of early-modern long-distance trade. The transaction costs and related investments required to efficiently obtain, store and utilise information encouraged experimentation with different business forms and market structures to find efficient solutions to facilitate these flows.¹⁶ These intermediaries enabled a fundamental change in market architecture of long-distance trade in the 19th century, away from closed networks of general merchants who closely guarded information as a prized asset in the early-modern period, to one with increasingly anonymized market participants and investors linked by specialist intermediaries who widely distributed market information.

These findings also contribute to the literature on 19th century Globalisation. Alongside the institutional changes and improvements in technology and communication, the development of business organisations such as brokers and auctioneers were critical in enabling an information revolution, both in its generation and distribution, which significantly improved market coordination. This enabled a

¹⁵ Bernard, Grazi, Tomasi, “Intermediaries in International Trade,” details a current strand of International trade literature which seeks to identify the role played by intermediaries and test how they add value.

¹⁶ An extensive literature in economic history details the importance of managing information flows in long-distance trade, prominent examples such as Greif, “Reputation and coalitions,” Carlos and Nicholas. “Agency problems in the early chartered companies,” show the use of both hierarchies and networks to improve the efficiency of information flows.

take-off in the Anglo-Indian trade after 1850, predating the transportation and communication revolution in 1870.

The Anglo-Indian indigo trade after 1813

In the years after 1813 the Anglo-Indian trade was characterised by slow and volatile growth. Yet, as figure 1 shows, entrepreneurs operating in these markets were able to overcome these challenges and in the years after 1850 the value of the trade began to rise significantly. By 1860 the value of the trade had doubled, and would almost double again in the decade to 1870. The take-off in the Anglo-Indian trade saw it become an increasingly large proportion of Britain’s total trade balance. Asia and the Near East’s share of British exports increased from 7 per cent to 25.7 per cent between 1805 and 1860. Asia similarly accounted for 23.2 per cent of British imports in 1860, becoming Britain’s second largest export market, with only Europe receiving a greater quantity.¹⁷ This growth also contributed to the broader expansion of Britain’s international trade, which saw the total value of international exports and imports as a share of GDP increase from 21.4 per cent in 1820 to 43.6 per cent by 1870.¹⁸

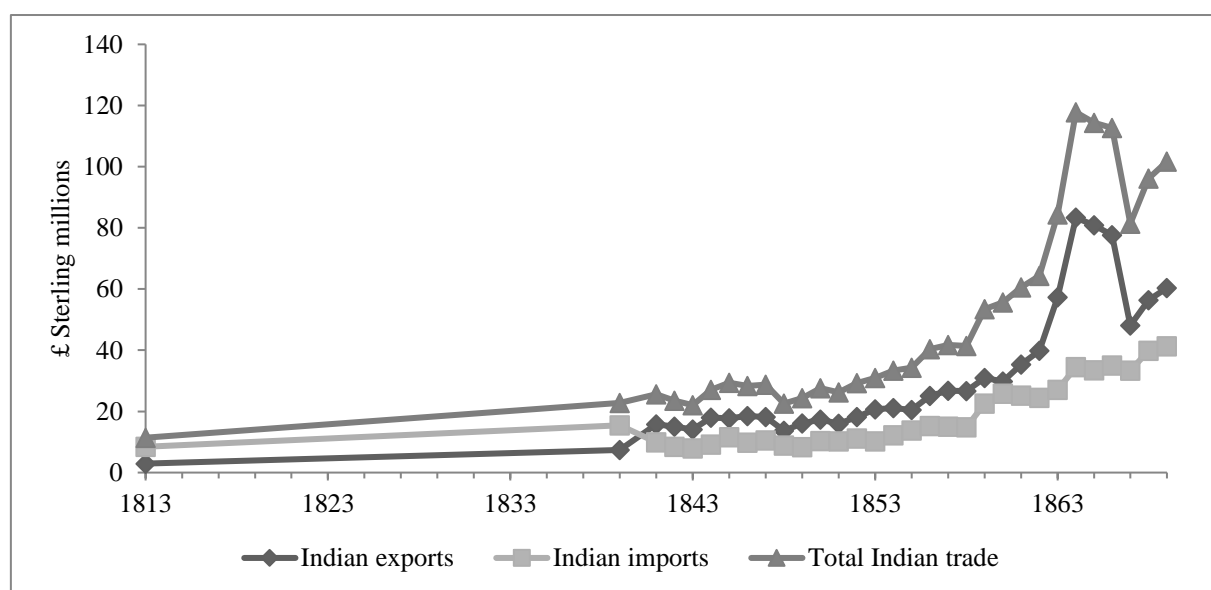


Figure 1. Real values of Indian exports and imports, 1813 to 1869.
Sources: Chaudhuri, “Foreign trade and balance of payments,” Digital South Asia Library (DSAL) statistics section, No. 27 and 31 (1840–1865) and No. 18 and 24 (1860–69).
Notes: The values have been deflated using the GDP deflator index in Broadberry and Van Leeuwen, “British Economic Growth and Business Cycle, 1700-1870”.

¹⁷ Chapman, *Merchant Enterprise*, 8.

¹⁸ O’Rourke, Prados de la Escosura, and Daudi, “Trade and Empire,” 106.

Despite the growing level and value of trade, the markets in Calcutta and elsewhere in India were volatile. Calcutta experienced two significant trade credit crises, strongly linked to failure in the indigo trade, in the early 1830s and 1847. The collapse of the six largest trading firms in the early 1830s led to a local liquidity crisis as trade credit dried up, whilst the downturn in British financial markets in 1847 saw contagion and failure amongst Calcutta's banks, bankrupting numerous firms reliant on their credit.¹⁹ The effects of both events carried throughout India; in Bombay following the collapse of the Calcutta firms in 1833 the value of exports declined by half between 1836 and 1839, but rebounded to record values in 1842, characteristic of the volatile swings in the trade.²⁰

The composition of both import and export goods changed somewhat over the period. British exports of textile piece goods and manufactured goods grew steadily. Demand for products such as metals expanded after 1840.²¹ In the case of Indian exports to Britain, the major products by value included raw cotton, indigo, sugar, and silk. Of these products it was indigo which became synonymous with the Indian trade in the first half of the 19th century.

In the 18th century, indigo imported to Britain had predominantly been produced in the West Indies. Although indigo cultivation in Bengal had increased in the late 18th century, lobbying by West Indian merchants saw high import tariffs retained against Indian indigo and the EIC monopoly further restricted the trade. The tariffs were reduced in 1789 and cultivation consequently boomed, so that by the end of the 18th century India was the source of the majority of Britain's indigo.²²

By the 1820s, indigo was the most valuable export crop in Bengal, and, although it was replaced by opium, it remained an extremely valuable export good until the late 19th century.²³ Likewise, until the

¹⁹ Webster, *The Richest East India Merchant*, discusses the genesis of the 1830s crisis. Singh, *European Agency Houses in Bengal*, 278–292 details the panic of 1833. Kling, *Partner in Empire*, chapter 9 discusses the fall of the Union Bank and the collapse of the indigo market in Calcutta in 1847. Bagchi, *The evolution of the state bank of India*, chapters 6, 7, 8, detail the financial panic of 1847 in India and its consequences.

²⁰ Barings Archive (BA) HC2 89, data taken from an article in the *Bombay Times*, March 6th 1850, which listed the trade statistics for the first half of the 19th century.

²¹ Crafts, *British economic growth*.

²² Chowdhury, *Growth of Commercial Agriculture in Bengal*.

²³ George Prinsep in Chaudhuri, *The Economic Development of India*. The value of indigo exports was amongst the highest in terms of percentage of the total value of Indian exports until the 1840s, and it remained, along with raw cotton and opium, one of the leading export crops until the 1870s.

1850s it remained amongst the highest valued of imports from India to the UK.²⁴ Alongside British demand there were increasing re-export opportunities to Europe and North America. This made it a staple trade product for many trading firms and attracted the attentions of auctioneers and brokers.

Indigo production and trade

In Bengal indigo was predominantly produced under what was called the ryoti system.²⁵ The indigo leaves were planted in December by thousands of peasants contracted by the owners of the indigo factories. The peasants were given an advance to cover the costs of cultivation and in return delivered a set amount of leaves to the factory owner.

The peasants cultivated the crop until the harvest in June when the leaves were brought to the factories. Once the leaves were delivered the extraction of indigo dye commenced. This process involved packing the leaves into tanks and fermenting with water to siphon out the dye. The dye was then dried and cut into 'cakes'. Once the production process was complete, the factory owners would transport the indigo cakes to Calcutta for sale. These sales were mainly conducted through an auction process in Calcutta operated by specialized auctioneers and brokers.

In the period between 1813 and 1850 the majority of indigo exported to Britain was purchased by 30 or so trading houses in Calcutta.²⁶ The trading houses subsequently stored and arranged for the indigo to be shipped to Britain. Once there the indigo was received by the trading houses' counterparties, either one of its own partners, or another firm who would conduct the final transaction of the chain.²⁷ There was a further auction in London, through which the indigo was sold via various brokers and merchants to the final consumers. There was a variety of firms who would deal with indigo in London; the Post Office London Directory of 1841 lists 23 East India Agents along with a further six specific indigo

²⁴ Thomas Tooke in Chaudhuri, *The Economic Development of India*, using contemporary Board of Trade statistics, showed that indigo remained amongst the top valued British imports from India until the middle of the 1850s.

²⁵ Ryoti/raiyyati was a production system in which peasants or ryots were contracted through systems of advances to grow and deliver produce such as indigo leaves to factory owners.

²⁶ Barings Archive (BA) HC2 259. Translated from French, "Comparative details of the Indigo harvest 1840/41 and 41/42." Listed 32 Calcutta firms as purchasers of Indigo between 1840 and 42.

²⁷ BA HC2 2.142 Indigo report Nov 29th 1837 named 27 London indigo importers in 1837.

merchants and sixteen indigo brokers.²⁸ These firms would arrange for the storage of the product before its auction and distribution in the UK.

Table 1. A commodity chain for indigo production and sale in 1840

Process	Season and time	Actor
Indigo leaf cultivation	Leaves were planted in December and cultivated through the spring.	1000's of Peasant cultivators
Sale of leaves	Harvest of the leaves occurred in June and July, they were then sold to factory owners.	Peasants to Factory owners
Manufacturing process to finished indigo cakes	Production of the cakes occurred throughout the summer.	Over 800 Factory owners
Transport to Calcutta		Factory owner
Public auction	Auction started in September and would run for a couple of months depending on supply and demand.	4 Indigo brokers and auctioneers coordinated sales with around 30 trading firms
Shipping to Britain	Sailing times of around four months saw the indigo arrive in London around February.	Trading firms consigned to around 30 corresponding firms in London
Public auction	Indigo auctions run through the spring when the first shipments arrived.	16 indigo brokers and auctioneers coordinated sales to wholesalers
Consumer market		Wholesalers coordinated sales with thousands of final consumers (predominantly textile manufacturers)

Sources: Chowdhury, *Growth of Commercial Agriculture in Bengal* and Ray, *Bengal industries and the British industrial revolution*.

²⁸ British Library (BL) The Post Office London Directory 1841.

Prior to 1850 the Anglo-Indian indigo trade was characterised by volatility in production. Figure 2 shows the dramatic fluctuations in the level of production in Bengal. Growing and production techniques remained fairly constant over this period although efforts were made to extend the total amount of land under cultivation, increasing the maximum crop size across the period. There were, however, significant difficulties in the production process with the harvest highly dependent on weather conditions. In 1843 the level of production in Bengal was 162,500 maunds (a maund was a unit of weight equated to around 83 lbs or 37.6 kg.), yet due to poor weather, output collapsed the following year to 79,000 maunds, whilst a year later a bumper harvest saw 172,250 maunds produced. Further problems in production were traced to the financial crises of the early 1830s and 1847, when lending to indigo factories contracted, leading to bankruptcies or cessation of production.

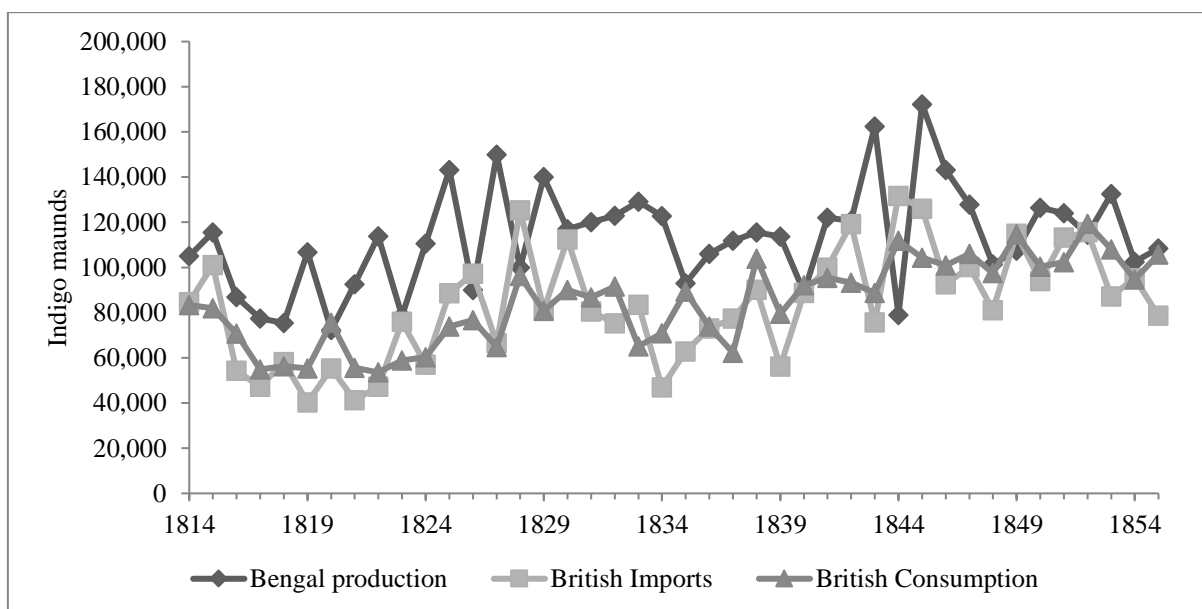


Figure 2. Bengal indigo production, British imports and consumption, 1814 to 1855.

Sources: BA HC2 188 170 Baring Bros and Co. Statistics of Indigo, BA HC2 2.352. Statement for the creditors of the Bengal Indigo Company prepared by William Moran & Co.

Note: In the original sources the import and consumption data is valued in ‘chests.’ A chest was a measurement of goods which in the case of indigo equated to around 3.5 maunds per chest, between 280 to 300 lbs or 127 to 136 kg. Here they have been converted to maunds. The consumption figure includes re-exports and can be read as the total purchases of British indigo buyers.

The vagaries of the harvest fuelled periods of under and oversupply in Calcutta which made coordination with demand and consumption in Britain difficult. Despite very similar annual mean levels of imports (79,863 maunds) and consumption (80,063 maunds) across the series, figure 2 shows there were periods of oversupply, particularly in the late 1820s and early 1840s, in Britain. The instability in supply and

demand was manifested in price volatility shown in figure 3. The average price paid for middling quality indigo at the London auctions experienced rapid and dramatic shifts, often linked to those in production. In 1826 prices fell from 120 pennies (d) to 56d, yet rebounded to 96d the following year.

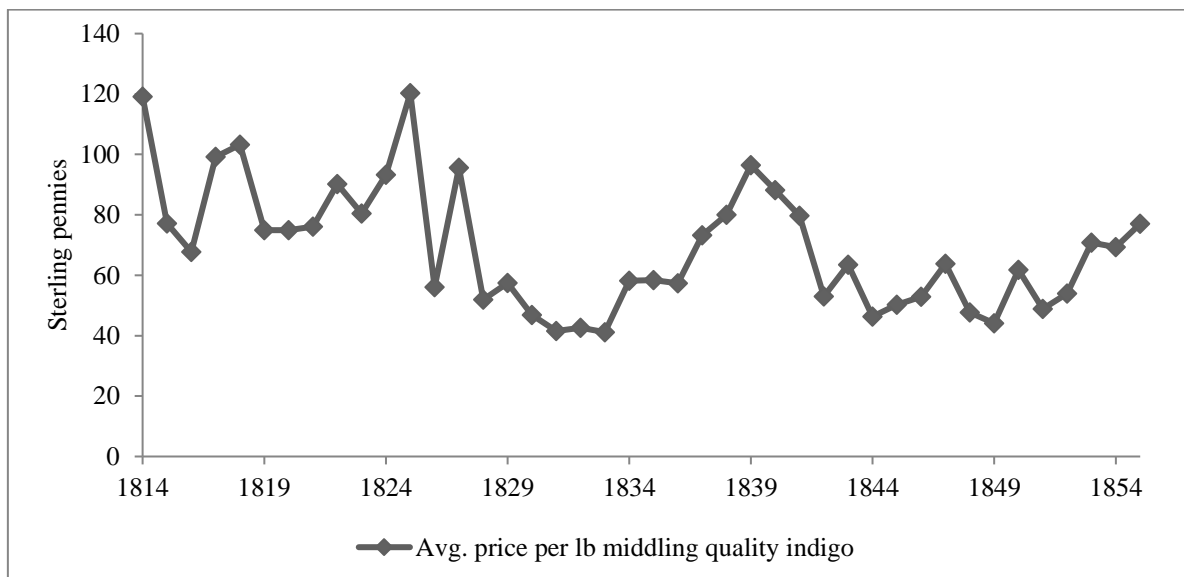


Figure 3. Mean average real price per pound of middling quality indigo in London auctions, 1814 to 1855.

Sources: BA HC2 188 170 and BA HC2 2.352.

Note: Prices are per pound, converted into pennies, then deflated using the CPI index in Feinstein “Pessimism perpetuated,” to give the prices as real values.

The threat to the various actors from poor coordination can be illustrated from this data. Between 1839 and 1842 British indigo consumption remained between 80,000 and 90,000 maunds per annum. Imports however fluctuated, growing from 56,000 in 1839 and increasing year on year to 120,000 in 1842. Prices, conversely, declined sharply, falling from 96d to 53d in 1842. Failure to predict the precipitous decline in 1842, as imports exceeded demand and prices fell by over 40 per cent, could wipe out profits and leave trading firms and factory owners exposed to significant losses. Accurate and timely information of the likely level of supply, when contrasted with news of demand and projected prices was critical to preventing these outcomes.

The auctioneers and brokers in the indigo market

In Calcutta and London the sale of indigo was conducted through an auction process, linking producers to trading firms and end users, through the activities of auctioneers and brokers. From 1821, the Calcutta

registers started to list auctioneers, and three were well-established by 1824.²⁹ There was some turn-over in these firms and the crisis of the 1830s and 1847 saw several failures. The number of auctioneers gradually increased after the 1847 crisis, as new firms entered the market, but there was longevity amongst the population with a number of the firms surviving for long periods.³⁰ The auctioneers became increasingly specialised in terms of the products they dealt in, and specific days of the week were devoted to certain products.³¹ By 1836 specialist indigo auctions were established and four were operating by 1854.

In 1843 the register included brokers as a specific category for the first time. It is unclear whether specialised brokers only appeared in Calcutta in the 1840s, it is plausible that such firms existed prior to this or that trading firms and commission agents may well have undertaken similar activities in earlier years. However, in 1843 brokers had become sufficiently important to require separate identification to the Calcutta mercantile community. By 1856 this expanding list was divided into areas of specialisation, including: indigo, silk, hides, bills and shares, freight and ships, produce and property. As table two shows the number of brokers grew throughout the 1850s and 1860s. An increasing proportion of this population was made up of bill and share brokers, but it is the produce brokers, those who specialised in goods such as indigo, that are of particular interest.

²⁹ BL Bengal Annual Register and Directory 1821 and 1824.

³⁰ BL Bengal Annual Register and Directory 1853, 1858, 1863, 1868. Four of the seven auctioneers in 1853 were not listed prior 1848. However, Mackenzie, Lyall and Co. listed first in 1824 were still present in 1868, Tulloh and Co. lasted from 1821 to 1858, whilst new arrivals in 1848, Mendes and Co. and Cook and Co. were still listed in 1868.

³¹ BL Bengal Annual Register and Directory 1821. The products were divided by day. Mondays: Horses, carriages, dogs, cows, birds, Palankeens and Saddlery. Tuesday: Prime fresh Europe, America, China and Country goods and assortments of Household furniture. Wednesday: Timber, wines and Property. Thursday: Landed property, ships, boats, indigo factories, books and effects. Friday: timber, wines and property. Saturday: Wines and liquors, paintings, prints, engravings, European goods.

Table 2. The number of brokers and auctioneers in Calcutta, 1821 to 1868.

Year	Auctions	All Brokers	Indigo Brokers	Indigo marts	Bill and Share Brokers	Produce Brokers	Brokers and Auctions	Trading firms
1824	3						3	36
1831	3						3	41
1838	3			1			4	67
1843	3	6	4	2		6	11	81
1848	2	10	5	2		10	14	94
1854	5	41	7	4	10	28	50	100
1858	7	68	7		24	26	75	144
1863	9	70	9		19	37	79	125
1868	7	82	5		38	26	89	169

Source: BL Selected editions of the Bengal Annual Register and Directory.

Notes: The Produce brokers' column removes bill, share, freight, ship and property brokers from the All brokers column. The Brokers and Auctions column is a sum of All brokers and Auctions columns.

Roy noted that, ‘The term “broker” in Indian business history has been used in two distinct meanings, as an agent of a trading or manufacturing firm and as an auction coordinator.’³² The terms, brokers and auctioneers, appear to have been somewhat interchangeable, and firms acted in both capacities. For example, Mackenzie, Lyall and Co. was listed as an auctioneer in the first half of the 19th century, yet acted as broker for tea companies, selling consignments for auction in Calcutta and London, in the second half. This suggests that these firms could undertake different activities and change or diversify their operations.

Of the four firms listed as operating indigo auctions in 1854, including William Moran and Co. and Thomas Marten and Co. (subsequently renamed J.Thomas and Co.), three were classified as Indigo brokers. In 1858 the separate listing of indigo marts disappeared, showing that these firms now combined the roles and had become increasingly specialised in Indigo. Of the nine indigo brokers in 1863 five had disappeared or switched to other lines of business by 1868, however Moran and Co., and

³² Roy, “Trading firms in colonial India,” 34.

Thomas and Co. became amongst the largest brokers and auctioneers in Calcutta and had great longevity.³³

Determining the extent to which these firms acted as agents or coordinators is difficult to assess from the registers, but it is notable that the larger firms such as Moran and Co. and Thomas and Co., were predominantly of the second order. These firms did not trade on their own account or transact as agents for others, but rather as Roy described them, ‘they were organizers of produce auctions on behalf of the planters and a guarantor of quality and fair packaging to the buyers. They were a spoke in the wheel of commerce.’³⁴ In Calcutta the intermediaries described by Van Driel and others, holding goods to match supply and demand, were complimented by market coordinators paid a fee or commission to ensure sales could take place, and there appears to have been growing specialisation between these groups.³⁵

Alongside the coordination of buyers and sellers one of the major tasks undertaken by the brokers was determining the indigo’s grade of quality. Quality was determined by the colour and fixedness of the dye. To help this process the auctions were held early in the morning when the light was best for inspecting the colour. Four main grades were used, from ordinary to fine, separated by good and middling.³⁶ The differentiation between the grades had a significant effect on price, with a mean average of 50 pence per pound difference in price at the London auctions between fine blue and low consigning quality.³⁷ The brokers and auctioneers were a crucial mechanism in protecting buyers from purchasing ‘lemons’ and allowed sellers to realise full value of their ‘cherries’.

The auction process was repeated when the indigo reached Britain, and was sold to wholesalers. By 1817 there were well over a thousand auctioneers and brokers recorded in London, including eight indigo brokers. These numbers increased, so that by 1841 there were sixteen indigo brokers and six indigo merchants. There were a further 25 India brokers and 47 colonial brokers also dealing with

³³ Roy, *A hundred and twenty five years*.

³⁴ Roy, “Trading firms in colonial India,” 34.

³⁵ Stavacre, *Tea and Tea Dealing*, and London Metropolitan Archive MS09936, Account of sales, Thompson and Co. September 1856, show that the brokers in tea charged fees of between 1 to 2 per cent of the revenues generated on a consignment, and interest on funds advanced to cover other costs such as shipping and storage. It is likely such fees were similar in the indigo sector. Similarly, the auctioneers received a percentage commission on all goods sold.

³⁶ Alternatively the definition was done by colour, from the least to most valuable: copper, violet, purple, and blue.

³⁷ 1833 Report from the Parliamentary Select Committee on Manufactures, Commerce, and Shipping; George Larpent’s evidence, quoting London auction prices from 1816 to 1833.

colonial export products. In 1869 there were 17 indigo brokers, 11 indigo merchants, with a 119 colonial brokers.³⁸

There are few record of the activities of indigo brokers in London, but those in the tea sector are well described in the 1850s. W Thompson and Co. organised a range of activities including the shipping and insurance of the batches from Calcutta and their storage in London. Acting for sellers they tested the quality of the tea and based on this assessment set a guide price for the various batches which were published in a catalogue distributed to interested buyers.³⁹ Brokers acting for the buyers also tested the quality, and undertook the purchasing through the regular auctions.⁴⁰ It is likely that indigo brokers provided similar services; coordinating the sellers in Calcutta to the buyers in Britain and providing a level of quality assurance.

The brokers' circulars

Through these activities the brokers and auctioneers generated a wide-range of information on the products, producers and buyers they interacted with. Using this information, the firms produced reports that listed prices and market forecasts.⁴¹ Brokers such as Thomas and Co. released regular '*Prices current*' bulletins, which recorded the prices of various export products.⁴² These bulletins were widely produced in Britain from the 18th century onwards, with brokers specialising in different products or regions releasing them regularly to their contacts.⁴³

These communiqués evolved to include increasingly detailed and specialised information. The brokers and auctioneers in Calcutta produced regular circulars on the indigo sector which included discussion on the growing season, levels of production, and the prices achieved at the Calcutta auctions.⁴⁴ These

³⁸ BL, Johnstone London Commercial Guide and street directory 1817, Post Office London Directory of 1841 and 1869.

³⁹ Stavacre, *Tea and Tea Dealing*, detailed the activities of the brokers and the auction process. London Metropolitan Archive (LMA) MS8803/1 Flyer for the sale of Assam tea by the Agents W. Thompson June 9th 1863.

⁴⁰ The London tea auctions at Mincing lane ran continuously from 1706 until 1998.

⁴¹ BA HC2 188 Indigo report written by Presgrave and Co. 1st September 1831.

⁴² BA HC6 31 Thomas, Marten and Co. Prices current, 8th December 1851 Calcutta.

⁴³ BL LOU.LON 38 Price Current of East India Produce. Main ed., contains a range of *Prices current* and *Brokers circulars* for London in 1855. These include weekly, monthly, bi-monthly, and annual reports for products including grain, tobacco, tea and indigo. Others were specialised by region including East India, the Caribbean and North America. They were published in various languages including French and German.

⁴⁴ BA HC6 31 Indigo Circular from William Moran and Co Calcutta 7th August 1852.

were coupled with similar reports from British brokers who tracked supply and demand with analysis of the prices at the London auctions.⁴⁵

These reports synthesised the conditions of the indigo market with those in the wider economic environment in an effort to understand the movements of the market.

‘The mercantile catastrophes of 1847, almost immediately followed by the political disturbances throughout Europe in 1848, had a most serious influence on prices and deliveries in both years, and we find a consequent falling off in production in the subsequent four years terminating with 1850, amounting to 20% in Bengal, and 48% in the Madras Presidencies. The highest year (1843/44) reaches 53,700 chests; the lowest (1847/48) is only 32,000 chests; difference 40%.’⁴⁶

The circulars used various statistics, such as mean averages and three to five year moving averages to identify trends. The reports included tables that presented average prices, and the level of supply and consumption per year over multiple years.⁴⁷ To better reveal the factors that shaped indigo prices, concepts such as ‘excess of supply over consumption’ were developed. This sought to account for stocks in Europe as a component in determining changes in price.⁴⁸

This example from Hickey, Bailey and Co., the Calcutta indigo auctioneers, shows the importance of the circulars in generating market information. Towards the end of the harvest they set-out to predict the total production for the 1844/45 season. Drawing on correspondence from indigo factory owners throughout Bengal the brokers assessed the reports and concluded,

‘Unfortunately the weather has not been favourable, rain, and nothing but rain, has been reported from most parts of Bengal since we addressed you last, the plant has not grown, a large proportion of it has been cut in an unripe state, the produce has been, with some exceptions here and there, miserable, the rivers are now rising rapidly upon us, there is no symptom of a change

⁴⁵ BA HC2 432 Straith and Co. 1st July 1854. BA HC2 432 E.I Mocatta Juniors Brokers July 25th 1854.

⁴⁶ BA HC2 364 Edward and Mattie, London. 1st November 1850.

⁴⁷ BA HC2 432 Straith and Co. 1st July 1854. BA HC2 432 E.I Mocatta Juniors Brokers July 25th 1854, both used tabulated decadal summaries.

⁴⁸ BA HC2 364 A report written by John Richmond of London 1st November 1850.

in the condition of the temperature, and we fear we are going to have what we announced a month ago' should rain predominate, a bad season.'⁴⁹

They then sought to calculate the finished indigo production using data on the previous five years of production and calculating the average finished indigo produced from the raw leaves in each district,

'In Bengal itself the average of the last five crops is Fy. Mds [Factory Maunds] 86,627, but having carefully calculated from past results what each Zillah [district of production] could do under such circumstances as are now reported, we cannot find more than 79,500 maunds ... or altogether for the cultivation of 1844/45 Fy mds 121,000'⁵⁰

The prediction of 79,500 maunds was very close to the figure reported in figure 2 for the production of the 1844/45 season of 79,000 maunds.

The circulars sought to overcome a lack of information, but also problems with inaccurate and misleading information. A report by Presgrave and Co. in 1831 was presaged by the statement, 'so much has been said by anonymous writers, and whose views are not clearly very understood ... that we thought it advisable to lay a statement before the public which by its authenticity may satisfy the minds of those whose fortunes are at stake in this important article of Bengal produce.'⁵¹ The issue was resolved by the brokers who, 'have taken some pains to collect from every possible quarter the necessary information ... all the principal Indigo agency houses have furnished us with particulars, and allowed us to publish them under their authority as authentic.'⁵² This appears to have been an endemic problem, twenty years later Edwards and Mattie began one of their reports, 'a most erroneous statement having been lately published.'⁵³ The brokers and auctioneers were battling to achieve accuracy in their reports and subsequently legitimacy in the supply of information.⁵⁴

⁴⁹ BA HC2 329 Hickey, Bailey and Co. Calcutta 7th August 1845.

⁵⁰ Ibid.

⁵¹ BA HC2 188 Indigo report written by Presgrave and Co. 1st September 1831.

⁵² Ibid.

⁵³ BA HC2 364 A report written by John Richmond of London 1st November 1850.

⁵⁴ The accuracy of the different reports was variable year on year, although these variation appears to have been limited. Drawing on three reports, BA HC2 188 170 Baring Bros and Co. Statistics of Indigo, BA HC2 432 Straith and Co. 1st July 1854, BA HC2 432 E.I Mocatta Juniors Brokers July 25th 1854, each covers the years 1842 to 1848. Taking the figures for imports, the coefficient of variation of the mean average of the three reported figures ranged from 0.02 to 0.04 over this period. Similarly, for consumption the coefficients ranged from 0 to 0.06.

Changing the structure of the indigo market

The impact of the growing number of auctioneers and brokers on the indigo market can be analysed by calculating coefficients of variation for Bengal production, British imports, consumption and stocks, and the mean average price of middling quality indigo at the London auctions.⁵⁵ This provides a comparative measure of volatility, with a higher coefficient showing a greater distribution of results around the mean in a given period. The coefficients for the various quantities and price is calculated for each decade between 1814 and 1853. Change in the coefficients show the extent to which volatility in production, supply and demand evolved across the period. Increasing coefficients indicate a greater probability of mismatches between the supply and demand sides of the market, and greater volatility and uncertainty in the prices.

The coefficient of variation for production remains stable across the whole period. There was little technological innovation in production to counter the threats of the weather, so the volatility in production remained constant. However, as figure 2 shows the years after the crisis of 1847 saw indigo production become smaller in scale. The total Bengal crop declined to an annual level of production of between 100,000 and 120,000 maunds throughout the 1850s. This potentially supports a view that efforts were made to control the levels of output and avoid the periods when over-production had glutted the Calcutta market.⁵⁶

⁵⁵ Van Driel, "The role of middlemen," 85, used decadal coefficients of variation in coffee production to show that high volatility in production increased the importance of intermediaries as a buffer and coordinator between buyers and sellers.

⁵⁶ Ray, *Bengal Industries*, Chowdhury, *Growth of Commercial Agriculture in Bengal*. The transformation of the indigo sector in Bengal has been ascribed to a period after 1860, when peasants reneged on the production of indigo leaves due to the exploitative nature of the contracts. This led to a change in production process, with factory owners integrating the cultivation of the leaves, and a relocation of these activities to Bihar. This resulted in a smaller output. However, there may have been earlier attempts to control the production output. As early as 1831, there had been proposals for the amount of production to be reduced or better controlled to reduce the possibility of oversupply, BA HC2 188 Indigo report written by Presgrave and Co. 1st September 1831.

Table 3. Indigo production, supply, demand and price, 1814 to 1853.

	Production (maunds)	Imports (maunds)	Consumption (maunds)	Stocks (maunds)	Total Supply minus consumption (maunds)	Real price (pennies)	Indigo brokers and marts
High	172,250	131,695	119,357	131,670	154,140	120	
Low	72,300	40,250	53,550	28,000	19,950	41	
Mean Avg.	112,947	83,201	84,468	80,197	78,929	69	
Std. Dev	22828	24620	18715	25096	34045	21	
Coef. Var							
1814 - 1853	0.20	0.30	0.22	0.31	0.43	0.30	
1814 - 1823	0.18	0.33	0.19	0.39	0.53	0.19	0
1824 - 1833	0.16	0.24	0.16	0.30	0.34	0.43	3
1834 - 1843	0.17	0.27	0.15	0.25	0.42	0.21	4
1844 - 1853	0.20	0.16	0.07	0.15	0.22	0.16	7

Sources: BA HC2 188 170 and BA HC2 2.352.

Notes: The production figures were stated in maunds, whilst the original figures for imports and consumption were expressed in 'chests' which have been converted to maunds. The prices reported in the first document were a spread of lowest to highest prices for three grades of indigo in London. In the second, a single average price is quoted for middling grade in London. The middling grade has been selected from the first and a mean average calculated to match the second series. Prices are per pound, converted into pennies, then deflated to give real values using the CPI index in Feinstein "Pessimism perpetuated." Total supply is imports added to stocks for a given year.

The trends in imports and consumption offer further indications that the market was changing. The coefficient for British imports dropped significantly across the period, falling from 0.33 in the decade after 1814 to 0.16 in the decade after 1844. Likewise, consumption also fell from 0.19 to 0.07. This clearly shows declining volatility on both the supply and demand sides of the market. This is supported by the trends shown in figure 2 which show more closely aligned imports and consumption after 1847, with fewer years when they were significantly unsynchronised. There was also a greater tendency for consumption to lead imports, reducing the conditions of over-supply that had bedevilled the market in the 1840s.

One of the key factors noted in the circulars affecting the levels of supply was the stocks held in Britain. Indigo cakes could be stored although quality did gradually deteriorate over time. It was important to retain sufficient stocks to fulfil demand throughout the year, as new imports from Bengal would predominantly arrive early in the year. However, in the years when production boomed and the levels of imports were high, the British market could be glutted if existing stocks were already high. Yet, as table 2 shows, the coefficient for the stocks also declined significantly from 0.39 to 0.15; a level very similar to those of the imports (0.16).

When considering change on the demand side, there were no further great technological advances spurred by the industrial revolution in textile production over this period; these had mainly been completed in the UK by mid-century.⁵⁷ The growth in production capacity, engendered by the factory system incorporating power looms, in cotton and wool, continued at a steady rate, although effected by the business cycle. Demand for dyes such as indigo moved in line. It wasn't until very late in the 19th century that the widespread use of synthetic indigo dyes dramatically effected demand.⁵⁸ There is no apparent external shock to explain the declining demand coefficient.

Accounting for the total supply of indigo, from new imports and stocks, and discounting the consumption, the level of stocks remaining in each period is indicative of the stability and coordination achieved in the market. The coefficient for this stock follows the wider trend, declining over the period. The results of the coordination can be seen in the declining coefficient for the prices, which figure 3 also show to have stabilised in the years after 1847.

Over the course of forty years, the indigo market continued to be blighted by the volatility in production caused by the effects of weather on the growing season, yet the market had become progressively better coordinated. The matching of supply and demand, accounting for stocks in Britain, had improved, lowering the volatility in prices. This process occurred in spite of the two trade credit crises in 1833 and 1847, which led to extensive disruption of the industry as numerous indigo factory owners and trading firms were bankrupted. Although one would anticipate that these disruptions to financing, production

⁵⁷ Landes, *The Unbound Prometheus*, 211.

⁵⁸ Kumar. *Facing competition*.

and trade would lead to greater volatility in these periods, it was notable that the decade around the crisis of 1847 contained the lowest coefficients.

Explaining the effectiveness of the brokers and auctioneers

The period of stabilisation corresponded with the expansion of the number of specialist brokers and auctioneers. The intermediaries in Calcutta were both active market participants, buying and selling goods to balance supply and demand between the distant markets, whilst also providing matching services for other participants, also acting as quality assurers and defining and enforcing the rules of the market. The brokers and auctioneers were coordination hubs, and a major aspect of their role was the dissemination of market information.

Analysis of the role and effectiveness of the intermediaries in coordinating markets can draw on the theory of information economics. Akerlof, proposed that markets for products with quality heterogeneity generate high information asymmetries, and participants in these markets seek mechanisms to signal the quality of the product or the trustworthiness of the seller.⁵⁹ Without these signals there is a potential for market failure. The paper considers the role of the intermediaries and the type of information required by market participants in reducing information asymmetries and improving market coordination.

Yet other participants were capable of undertaking these activities. Merchants experimented with networks and hierarchical structures to improve the exchange of business critical information. A growing number of commercial news providers were becoming specialised in the provision of market information throughout the 19th century. Similarly organisations such as the Calcutta Chamber of Commerce and the Indigo Planters Association supported their members by collating information and made efforts to regulate the market for their benefit. Why, then, were brokers and auctioneers particularly effective in improving market coordination?

To address these questions it is useful to characterise the content and form of the information required by the participants in the indigo market. The market was indelibly shaped by the volatility of production; ascertaining the likely level of production affected the decisions of actors throughout the chain.

⁵⁹ Akerlof, "Market for lemons."

Understanding demand was also important, with fluctuations in both supply and demand leading to dramatic swings in the price. Information on quantities were therefore of primary importance.

Indigo quality was diverse and the price difference between quality grades ensured sellers had a clear incentive to lower information asymmetries so they could efficiently sell higher quality indigo, whilst buyers sought signals to avoid being defrauded with a lower quality product. Information on quality coupled with information on the reputation of market participants, to weed out the malfeasant, was also invaluable. The prices in both Calcutta and London were required, as they were important signalling tools for all participants.

The information needed to be produced in a form that made it accessible and usable. In particular the information needed to be accurate, and most preferably aggregated to give better insight into the trends of the whole market. There was a need for frequency and speed in the production and dissemination, and subsequently a wide distribution to the market's participants. The producer needed to be reliable; trusted to produce accurate information on a regular basis.

A further piece of economic theory can be used to consider the relative capacity of different providers to collate and distribute information effectively. Arrow identified a paradox arising when a buyer required information of a product to determine its value, but once the information was transferred so was the products value, effectively for nothing. This was resolved by mechanisms such as intellectual property rights, which protected the value of the information.⁶⁰ Bakker showed this phenomenon at work in the provision of news. Obtaining and publishing information required investment, yet buyers wanted to see the value of the information before purchasing. News providers could guarantee returns, and thus undertake the investments through mechanisms like subscriptions which guaranteed purchases through prepayment.⁶¹ The mechanisms used to overcome the paradox and characteristics of the information can be used to analyse the effectiveness of different providers.

A growing number of specialist commercial news providers emerged in Britain and India across the 18th and 19th centuries. McCusker described the evolution of specialist business newspapers, dating their

⁶⁰ Arrow, "Economic Welfare." Arrow used the paradox to consider the effects on innovation in high-tech industries, where protection of intellectual property was a critical incentive to encourage investment.

⁶¹ Bakker, "Trading Facts: Arrow's Fundamental Paradox and the Origins of Global News Networks."

emergence in Europe from the 16th century.⁶² The production of *Commodity price current* and *Exchange rate current* news sheets gave way to more detailed and comprehensive newspapers, listing commodity prices, exchange rates, shipping news, and reportage on the political and business environment. As financial centres grew in scale and importance, the provision of local business news followed. In the 18th century, business newspapers grew in popularity in London, and in the 1780s growing business centres such as Philadelphia began local production. The newspapers, ‘provided business people in their own cities with news more consistently, reliably and conveniently than alternative modes of news-gathering.’⁶³ The newspapers also reached beyond their locality and encouraged more geographically dispersed merchants to utilise these markets.

In Calcutta this process began after 1814. By 1830 there were four English language daily newspapers with a commercial focus: *Exchequer Gazette*, *Daily Advertiser*, *Tulloh Advertiser*, *Loll Bazaar Advertiser*. Another four were published weekly: *Commercial Price current*, *Calcutta Exchange Current*, *Domestic Retail Current*, *Exports and Imports Current*.⁶⁴ Alongside these were a further 33 English language newspapers such as the *Bengal Hurkaru* which contained political and economic editorial.⁶⁵ Further, annual and bi-annual periodicals such as the *Asiatic Annual Register*, *Parbury’s Oriental Herald* and *Colonial Intelligencer*, and the *Bengal Annual registers*, carried a melange of government statistics, reports on products including indigo, and reportage on the conditions of the political and economic environment in India.⁶⁶

Alongside the regular notification of prices for the various qualities of indigo in the *Prices current* series, the newspapers sought to replicate the reportage and predictions on production found in the brokers circulars. Taken from the *Oriental Herald* in 1837 this comment is indicative of the general coverage of the indigo market from such sources,

⁶² McCusker, “The Demise of Distance.” News sheets were originally produced by licensed brokers on behalf of the exchanges in Antwerp and Amsterdam, but as publishing became a profitable business in its own right it attracted the establishment of increasingly specialised publishing businesses.

⁶³ McCusker, “The Demise of Distance.” 318.

⁶⁴ *The Printing Machine: Or Companion to the Library, and Register of Progressive Knowledge*, Vol. 1, Charles Knight London, Saturday October 4th 1834, 76.

⁶⁵ The collection of early Indian newspapers at the British Library listed over 200 distinct news titles that emerged across the late 18th and 19th centuries in India.

⁶⁶ BL Collections, *Bengal Annual Register*, *Asiatic Annual Register*, *Parbury’s Oriental Herald* and *Colonial Intelligencer*. BL MFM.MC1149 *Bengal Hurkaru*.

‘Indigo estimates of the crop are now reduced to 90,000 maunds though some parties are of the opinion that the quantity will be several thousand maunds larger. Little dependence is, however, to be given to such early estimates. The exportation to the above date was Fy. Mds. 101,047.’⁶⁷

The actual production for the 1837 season was over 111,000 maunds.⁶⁸

Analysing the commercial newspapers as a source of information based on the characteristics identified above reveals a number of benefits. The commercial news providers had a high frequency of service, with daily and weekly production. Information on prices were regularly reported and, as shown above, data on quantities and production were also collated.

The newspapers, however, were constrained by their capacity to obtain accurate and aggregated information. The investments required to build links to producers and buyers would result in either an expensive product or encourage the newspapers to become reliant on limited sources or second-hand news, hence the inaccuracy of the figure reported in the *Oriental Herald* and the comment that ‘little dependence’ should be given to these estimates.⁶⁹ Likewise, a newspapers’ capacity to maintain the expertise required to judge quality was doubtful, leaving them further reliant on second-hand reports.

To resolve Arrow’s paradox, newspapers had to find a mechanism to pass on the costs of obtaining the information and publishing it. Subscriptions appear to have been widely used, but the costs to subscribers could be substantial. In 1834 the Bengal Hurakuru cost Rupees (Rs). 80 a year, or £8, excluding postage.⁷⁰ McCusker estimated that a Philadelphia merchant in 1810 could spend \$15 a year on local commercial newspapers and a further £21 a year to obtain the British weekly commercial news.⁷¹ Keeping abreast of local and British commercial news required merchants to make a significant

⁶⁷ BL *Oriental Herald* 11th Sept 1837.

⁶⁸ See figure 2.

⁶⁹ McCusker, “The Demise of Distance.” The early commercial new sheets were collated and produced by licensed brokers, indicative that the news publishers were reliant on the brokers as their sources often reprinting information already published by the brokers and auctioneers.

⁷⁰ *The Printing Machine*, 76. This equated to a relative 2015 real price of around £640 a year, using Officer and Williamson, “Five Ways to Compute the Relative Value of a UK Pound Amount, 1270 to Present.”

⁷¹ McCusker, “The Demise of Distance.” 317. Taking the cost of the British newspapers as an estimate of what merchants in Calcutta would pay, a further £1300 would be added to their annual outlay on local sources, or in the region of £2000 a year for local and British commercial news.

annual investment. Although all participants in the market could access the newspapers, the distribution and reach was limited to those willing to bear the costs of subscription.⁷²

The desire for accurate and aggregated information saw the creation of autonomous organisations to provide it. The Calcutta Chamber of Commerce was founded in 1833 on the premise of securing,

‘a correct knowledge of the stock in first hands of the principal articles of our imports from Britain would be exceedingly valuable to the whole mercantile community ... We consider that the best mode of preparing such a statement will be to appoint one individual to receive confidentially from each house a note of the stock held by it from which he may prepare an aggregate statement of the quantity of each article ... without stating by whom they are held, a copy of which shall be circulated to all who have taken part in giving the information.’⁷³

The chamber aggregated information from its members twice a year, and circulated the reports to the participating firms.

Membership of the Chamber of Commerce was initially drawn from merchants and trading firms who paid an annual subscription. By 1853 the Chamber had 86 member firms in Calcutta. From amongst the membership executive officers were elected and who subsequently carried on the activities of the organisation. Similar organisations appeared including the Indigo Planters Association in 1854. Here the membership was predominantly indigo factory owners. In both cases, the organisations spent much of their time lobbying for the interests of their memberships, seeking to form codes of practice and regulations of markets and trade, whilst lowering taxes.⁷⁴ The organisations contributed submissions and evidence to various government inquiries and commissions.⁷⁵

The expertise and knowledge of the members, often closely involved with the production or trade of products such as indigo, ensured a high degree of accuracy and aggregation of the information collated

⁷² *The Printing Machine*, 76. The Bengal Hurkaru, the most widely read English language publication in Bengal, had a circulation of 1600 in 1834, similar to the London Morning Post.

⁷³ Tyson, *Bengal Chamber of Commerce*. The Bengal Chamber replaced the Calcutta Chamber formed in 1833

⁷⁴ Bhattacharya, *Financial foundations of the Raj*, 8, noted the involvement of the Indigo Planters Association in lobbying for changes to regulations related to land ownership

⁷⁵ For example, the East India indigo commission, 1861, established to investigate the widespread unrest amongst peasants cultivating indigo leaves contained extensive evidence collated by the Indigo Planters Association.

by these organisations. Through the selection and monitoring of members these groups also acted as quality assurers of market participants, imbuing a greater trust in the information provided. Yet, the frequency of reports was relatively low, mostly limited to the bi-annual surveys and ad-hoc reports. However, the Chamber and other organisations acted as repositories of information, often maintaining libraries of many different information sources, including newspapers and circulars, ensuring a regular supply for their memberships.

Similar to the newspapers, the information was only collated and distributed on the payment of the annual membership fee. This resolved Arrow's paradox, encouraging the publication of the reports but limited their distribution. In this case, distribution was limited to those willing to pay the membership fee, but the size of the organisations' membership was also limited to those represented by the interests of the organisation. Although the submissions and reports would find their way to a wider readership this would be a slow and infrequent process by which to distribute information to the market.

Brokers and auctioneers, acted for, and liaised with, the full range of actors in the market. They were optimally positioned, working closely with buyers and sellers of indigo throughout the year, to access and aggregate accurate information directly through their various activities. They were tasked with defining the rules and regulations of market exchange and ensuring that transactions were fulfilled, instilling them with a high degree of trust from other participants.

As the circulars showed, this led to highly detailed and nuanced reports on production, demand in the London markets, and the auctioneers were effectively generating the price data used in all other market reports. Both brokers and auctioneers acted as quality assessors and assurers, and were optimally placed to formulate data on quality. The circulars were produced regularly, with frequency usually varying between weekly or monthly. Whilst the networks of buyers and sellers established by these firms ensured they were able to distribute the information throughout the market to a wide range of participants.

The brokers and auctioneers solved Arrow's paradox in a different manner to the newspapers and chamber of commerce. The circulars were distributed to their clients for free or to other customers for

very little cost.⁷⁶ The costs of obtaining the information were incurred in pursuit of their other business activities, and the costs of publication and distribution were effectively marketing for the firms. The circulars often contained details promoting the firm's other activities, and the quality of their reports attracted customers to use their services.⁷⁷ In effect the news gathering and publication was a promotional tool, distributed to as wide a range of market participants as possible, for little cost with the intent of attracting them as customers.⁷⁸

These features gave the intermediaries advantages over the newspapers, who could not hope to match the capacity to accrue the information without incurring significant expenses. The extent to which the newspapers were trusted as sources of information also limited their reach. Likewise although the newspapers held an advantage in terms of speed of publication, the purchase costs potentially limited the scale of distribution. Whilst the Bengal Chamber of Commerce and other such organisations could elicit similar levels of information from their members, and were well-trusted not only by their members but many other market participants, they were restricted in both the breadth and frequency of distribution by the nature of the membership.

The brokers ability to collate accurate information in real-time as a by-product of their primary services, and then disseminate it for free as a mechanism to differentiate the quality of their brokerage services and attract more clients, offers a rationale for the survival of the firms in the face of the transport and communication revolution later in the century. With the availability of near instant communication why did firms not integrate their activities in Britain and India directly? First, it is unlikely that an individual agent could see as big a share of the total flow of goods going through the Indian markets as the intermediaries, limiting their capacity to collate as accurate information. Second, the agency costs of sustaining an agent in India were high, and although the agent could direct all their attentions to the

⁷⁶ On all examples seen by the author none were marked by a price. However, taking BL LOU.LON 38 *Price Current of East India Produce*, as an example, many of the circulars and *Prices current* had a 1 penny stamp. This was the stamp duty required on all 'newspapers' from 1836 until 1855. This meant there was a nominal price on the circulars but also suggests they may have been distributed like newspapers and thus had a wider distribution into the mercantile community beyond than the extended networks of the individual brokers.

⁷⁷ BL LOU.LON 38 *Price Current of East India Produce*. W.S.Shuttleworth and Co. were tea brokers whose regular tea catalogues and *prices current* circulars included a description of their services and terms of engagement.

⁷⁸ BA HC2 228 *Hints for those about to engage in the China trade*, Jardine, Matheson and Co. October 21st 1833. Alongside a regular *Prices current* type bulletin for the Canton trade, the partners at Jardine, Matheson and Co. produced this helpful crib sheet explaining key functions of the trade such as port charges, import duties, and product sales, encouraging others to enter the trade, perhaps using their services.

interests of the firm, the intermediaries had a great incentive to provide the aggregated, accurate information in order to keep the business of the firms they acted on behalf of.⁷⁹

These factors saw the system of brokers and auctioneers embedded in other markets. Thomas and Co. shifted its services from indigo to tea in the 1860s, establishing the first tea auction in Calcutta in the 1870s. In tea the system of brokerage and quality assurance lasted well into the 20th century, indeed Thomas and Co. to this day is the largest tea auctioneer in India.⁸⁰ In London, the auction system remained active until 1998. The brokers' deep expertise and knowledge of markets allowed them evolve their services, from shippers to coordinators to quality assurers.

Conclusion

Firms such as William Moran and Co. were amongst a growing number of increasingly specialised product brokers and auctioneers that appeared in Calcutta in the 1840s and 1850s. The firms provided a range of broking and auction services, often interchangeably. Many of the larger firms including Moran and Thomas and Co. predominantly acted as market coordinators, linking buyers and sellers through auctions and providing quality assurance services.

In their roles as market coordinators they were uniquely placed to gather extensive information on quality, quantity and prices of products such as indigo. Their position in the market widened their scope for the collation and aggregation of business critical information and the capacity to distribute it to a full range of market participants. Through the increasingly detailed and nuanced circulars, buyers, sellers and investors were able to obtain accurate information on distant products and markets from a trusted source. The business model of the brokers allowed them to resolve Arrow's paradox most effectively, distributing the information they collected for free, and bearing the costs of publishing in order to promote their other activities. News publishers and organisations like the Chamber of Commerce, conversely, had to invest in obtaining and publishing the information, and subsequently used paid subscriptions or membership fees to recoup the outgoings. This allowed the brokers to distribute their circulars more widely amongst the business community.

⁷⁹ Aldous, "Avoiding Negligence and Profusion."

⁸⁰ Stavacre, *Tea and Tea Dealing*.

The effect of the growing number of brokers and auctioneers was noticeable in the indigo trade, one of the highest value Indian export products. The trade was bedevilled by volatility in production, leading to difficulties in market coordination, and subsequent volatility in prices in the first half of the 19th century. However, the growing number of specialised intermediaries were a key components in reducing information asymmetries and improving market coordination. Whilst the volatility in production remained, the coefficients of variation for supply, demand, stocks and prices were halved, showing a significant decline in the volatility of the trade and indicative of improved market coordination. The price of indigo, which had fluctuated violently, on a downward trend between 1813 and 1844, stabilised.

The stabilised returns in a key export product like indigo, which had been perceived as volatile and risky, encouraged participation, not just in the indigo sector, but more generally in the trade. These improvements were strong determinants in shaping the growth in the value of the Anglo-Indian trade by over 260 per cent in the years between 1850 and 1870. This take-off predated the transport and communications revolution of 1870, indicating that business and market organisation were critical factors in enabling the expansion of global trade.

This analysis reassesses the role and importance of these intermediaries in long-distance trade. Alongside the ascribed roles of buying and selling goods on behalf of principals, matching supply and demand through transportation and storage, whilst assessing quality and coordinating sales through the auction process, their role as generators and disseminators of information was critical. The brokers and auctioneers capacity to generate more accurate, aggregated information, and their position as trusted assurers of quality, meant the intermediaries played a key role in lowering information asymmetries and resolving the fundamental problems of exchange in long-distance trade. On the basis of this logic the brokerage costs of between 1 and 2 per cent in both Calcutta and London, could provide a reasonable proxy to measure transaction costs in long-distance trade.

This made them an integral part of the expanding global market. The specialisation in the collation and production of information gave them a competitive advantage that allowed them to survive and prosper despite changes in the structure of markets that reduced the importance of their ascribed role in the coordination of goods. The intermediaries became embedded in different industries, and remain active to this day. The paper offers a rationale to explain the success of the intermediaries in this role, yet the

widespread efforts of both commercial news providers and organisations such as the Chambers of commerce to provide detailed market information allowed unprecedented access to these resources to an expanding range of market participants. This indicates that a significant change in the market architecture that structured the Anglo-Indian trade occurred in the middle of the 19th century.

The organisation of such long-distance trade had previously been dominated by merchants often acting within partnerships or closed networks that had tightly controlled the flows of information, which was seen as a business critical asset obtained by investing time and resources in the foreign markets. This allowed them to exploit and profit from arbitrage opportunities, and other prospects enabled by information asymmetries. This limited participation to those who could make the investments to enter these networks or build their knowledge unilaterally. The growing number of brokers and auctioneers, however, could break down the importance of these closed networks and firms, opening long-distance trade up to participants who did not have to make high investments into generating knowledge of these market. This opened the possibility for new forms of business and patterns of investment to emerge.

There are clear limitations to the findings of this paper, bounded as they are by the discrete nature of the Anglo-Indian indigo trade. The breadth of the brokers' activities, delineated by both the products and regions they specialised in, does, though, suggest that these activities were certainly occurring widely. Further comparative research into the organisation of different markets may offer insights into the timing and factors shaping the take-off of international trade in the 19th century, and shed further light on changes in the organisation of markets that enabled the first wave of globalisation.

References

Archival Sources

Barings Archive (BA) HC2 Statistics of General Trade series.

British Library (BL) Shelf mark OIR 954.14 ST 1216 CH Calcutta and Bengal Commercial registers.

Digital South Asia Library (DSAL), various series taken from the statistical abstracts relating to British India from 1840 to 1865, and from 1860 to 1869.

HC 690 1833 Report from the Parliamentary Select Committee on Manufactures, Commerce, and Shipping.

HC 72-2 1861 East India Indigo Commission, papers related to indigo cultivation in Bengal.

London Metropolitan Archive (LMA) The papers relating to the Assam Company.

The Post Office London Directory 1841.

Books and articles

Akerlof, George. "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism." *Quarterly Journal of Economics* 84, no. 3 (1970): 488–500.

Aldous, Michael. "Avoiding Negligence and Profusion: The failure of the Joint-Stock form in the Anglo-Indian Tea Trade, 1840-1870." *Enterprise and Society* 16, No.3 (2015): 648-685

Arrow, Kenneth. "Economic Welfare and the Allocation of Resources for Invention, in the Rate and Direction of Inventive Activity," *NBER* 609 (1962).

Bagchi, Amiya. *The evolution of the state bank of India, Part 1 1806 – 1860*. Delhi: Oxford University Press, 1987.

Bakker, Gerben. "Trading facts: Arrow's fundamental paradox and the origins of global news networks," in *International Communication and Global News Networks: Historical Perspectives*, edited by Peter Putnis, Chandrika Kaul, and Jurgen Wilke. New York: Hampton Press, 2011: 9-53.

Bhattacharya, Sabyasachi. *Financial foundations of the Raj: Ideas and Interests in the reconstruction of Indian public finance 1858 – 1872*. Hyderabad: Orient Longman, 2005.

Bernard, Andrew, Marco Grazzi, and Chiara Tomasi, "Intermediaries in International Trade: margins of trade and export flows," *NBER* 17711 (2010).

Braudel, Fernand. *La Méditerranée et le Monde Méditerranéen a l'époque de Philippe II*, English translation, Berkley: University of California Press, 1995.

Broadberry, Stephen and Bas Van Leeuwen, "British Economic Growth and Business Cycle, 1700-1870: Annual Estimates," *CAGE Online Working Paper Series*, 2010.

Carlos, Ann and Steve Nicholas. "Agency problems in the early chartered companies: The case of the Hudson's Bay Company," *Journal of Economic History* 50, no. 4 (1990): 853-875.

Casson, Mark. *Information and Organisation, A new perspective on the theory of the firm*. Oxford: Clarendon Press, 1997.

Chapman, Stanley. *Merchant Enterprise in Britain: From the Industrial Revolution to World War I*. Cambridge: Cambridge University Press, 2004.

Chaudhuri, Kirti (ed.). *The Economic Development of India under the East India Company 1814-58; a Selection of Contemporary Writings*. London: Cambridge University Press, 1971.

Chaudhuri, Kirti Narayan. "Foreign trade and balance of payments," in *The Cambridge economic history of India. Vol. 2, C. 1757-1970, edited by Dharma Kumar and Meghnad Desai*. Cambridge: Cambridge University Press, 1983: 828-829.

Chowdhury, Benoy. *Growth of Commercial Agriculture in Bengal*. Calcutta: Quality Printers, 1964.

Crafts, Nicholas. *British Economic Growth during the Industrial Revolution*. Oxford: Oxford University Press, 1985.

Feinstein, Charles. "Pessimism perpetuated: Real wages and the standard of living in Britain during and after the industrial revolution," *Journal of Economic History* 58, no. 3 (1998): 625-658.

Greif, Avner. "The fundamental problem of exchange: A research agenda in Historical Institutional Analysis," *European Review of Economic History* 4, no.3 (2000): 251-284.

Greif, Avner. "Reputation and coalitions in medieval trade: Evidence on the Maghribi traders," *Journal of Economic History* 49, no.4, (1989): 857-882.

Hoffman, Philip, Giles Postel-Vinay, and Jean-Laurent Rosenthal, "What do notaries do? Overcoming asymmetric information in financial markets: The case of Paris 1751." *Journal of Institutional and Theoretical Economics* no. 154 (1998): 499-530.

Jones, Geoffrey. *Merchants to Multinationals: British Trading Companies in the 19th and 20th Centuries*. New York: Oxford University Press, 2000.

Kaukiainen, Yrjo. "Shrinking the World: Improvements in the Speed of Information Transmission, 1820–1870." *European Review of Economic History* 5, no. 1 (2001): 1–28.

Kling, Blair. *Partner in Empire: Dwarkanath Tagore and the Age of Enterprise in Eastern India*. Los Angeles: University of California Press, 1992.

Prakash, Kumar. *Facing competition: The history of indigo experiments in colonial India, 1897-1920*. Dissertation for Georgia Institute of Technology, 2004.

Landes, David. *The Unbound Prometheus. Technological change and Industrial development in Western Europe from 1750 to the Present*. New York: Cambridge University Press, 1969.

McCusker, John. "The Demise of Distance: The Business Press and the Origins of the Information Revolution in the Early Modern Atlantic World." *American Historical Review* 110, no. 2 (2005): 295-321.

Officer, Lawrence, and Samuel Williamson, "Five Ways to Compute the Relative Value of a UK Pound Amount, 1270 to Present," *Measuring Worth*, 2015.

O'Rourke, Kevin and Jeffrey Williamson, *Globalization and history: The evolution of a nineteenth-century Atlantic economy*. Cambridge MA: MIT Press 1999.

O'Rourke, Kevin, Leandro Prados de la Escosura, and Guillaume Daudi, "Trade and Empire," in *The Cambridge Economic History of Modern Europe, Vol. 1, 1700–1870*, edited by Stephen Broadberry and Kevin O'Rourke. Cambridge: Cambridge University Press, 2010.

Ray, Indrajit. *Bengal Industries and the British Industrial Revolution*. New York: Routledge, 2011.

Roy, Dipak. *A hundred and twenty five years: The story of J.Thomas and Company, Calcutta*. J.Thomas and Company, Undated. British Library.

Roy, Tirthankar. "Trading firms in Colonial India," *Business History Review* 88, no.1 (2014): 9-42.

Roy, Tirthankar. "Indigo and the Law." *Economic History Review* 64, no. 1 (2011): 60–75

Singh, S.B. *European Agency Houses in Bengal 1783 – 1833*. Calcutta: Firma K.L Mukhopadhyay, 1966.

Sleeswijk, Anne. 'Hearing, seeing, tasting and bidding: Information at the Dutch auction of commodities in the 18th century', in *Information flows, New approaches in the historical study of business information*, edited by Muller & Ojala. Helsinki: SKS Finnish Literature Society, 2007: 169-192.

Stavacre, F. *Tea and Tea Dealing*. London: Sir Isaac Pitman & Sons Ltd, 1929.

Tripathi, Amal. *Trade and Finance in the Bengal Presidency 1793–1833*. Calcutta: Oxford University Press, 1980.

Tyson, *Bengal Chamber of Commerce and industry 1853 – 1953 a centenary survey*. Bengal Chamber of Commerce, 1953.

Webster, Anthony. *The Richest East India Merchant, the life and business of John Palmer of Calcutta 1767–1836*. Woodbridge, UK: Boydell Press, 2007

Webster, Anthony, *The twilight of the East India Company: The evolution of Anglo-Asian Commerce and Politics 1790-1860*. Woodbridge, UK: Boydell Press, 2009.

Van Driel, Hugo. "The role of middlemen in the international coffee trade since 1870: The Dutch case," *Business History* 45, no. 2 (2003): 77-101.