MERCANTILISM AS STRATEGIC TRADE POLICY:

THE ANGLO-DUTCH RIVALRY FOR THE EAST INDIA TRADE

Douglas A. Irwin

Abstract

This paper provides a reinterpretation of seventeenth-century mercantilist trade doctrine and policy in light of recent theories of strategic trade policy. Mercantilist economic thought, like strategic export-promotion theories, emphasized the use of government policy to capture rents that arise from imperfect competition in international trade. The economic structure of the Anglo-Dutch rivalry for the East India trade provides an excellent illustration of an environment in which the profit-shifting motive for strategic trade policies exists. Using data from the seventeenth-century East India trade, I find that the scope for strategic trade policies was clearly present, although the gains from such policies were probably quite small and are highly sensitive to assumptions about demand.

Mercantilism as Strategic Trade Policy:

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Douglas A. Irwin[1]

I. Introduction

The seventeenth century defined the age of mercantilism, both in terms of economic thought and commercial policy. Mercantilist economic thought held that the gains from international trade arose solely from exporting and that the nature of these gains made international trade equivalent to a zero-sum game. Mercantilist commercial policy entailed extensive government regulation of international trade to ensure that these gains accrued to one's own country, a pursuit which even carried European states into military conflict with one another over commercial interests.

Several interpretations of mercantilism have been put forward by modern scholars. Gustav Schmoller (1897) maintained that mercantilist policies were designed for the purpose of "state-building," to consolidate and expand the political and military power of new entities called nation-states. Eli Heckscher (1934) and Jacob Viner (1937, 1948) criticized the period's economic thought from the perspective of classical doctrine and debated whether political power and economic wealth were complementary or competing ends of policy in the minds of

mercantilists. More recently, Ekelund and Tollison (1981) portray mercantilism as reflecting the capture of government by rent-seeking guilds and merchants.

This paper proposes a different approach to mercantilism, but one that supplements rather than contradicts previous studies. This paper highlights the analogy between mercantilism and recent theories of strategic trade policy, which examine optimal trade policy for imperfectly competitive industries and which often find that tariffs and subsidies may improve economic welfare. This analogy is based not only on similarities in the economic thinking that underlies each framework, but also on the observation that the emerging trade between Europe and other regions of the world during the mercantilist period was undertaken chiefly by state-chartered monopoly trading companies and was therefore conducted under conditions of imperfect competition.[2] Imperfect competition gave rise to monopoly profits or rents, the international distribution of which could be altered by commercial policies. Recognition of this fact gave monarchs and statesmen a clear incentive to adopt policies to capture these rents for one's own country. These incentives were so overwhelming that property rights in international trade were not respected, and shipping on the high seas was vulnerable to looting by foreign merchants acting with the support of their government.

These features of international trade in the seventeenth century may account for mercantilist attitudes and policies of the period. Indeed, the necessity of state protection of commercial interests against foreign encroachment and the desirability of state promotion of overseas

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2. Intra-European trade, by contrast, was fairly well established and competitive by the seventeenth century.

trade for reasons of power and profit were unquestioned in mercantilist writings. These features also make the theory of strategic trade policy, with its emphasis on the rivalry between domestic and foreign firms in an imperfectly competitive setting, a particularly relevant framework in which to examine the mercantilist era. I will argue neither that seventeenth-century nation-states always acted with strategic trade policy considerations in mind, nor that mercantilist economic thought in any way anticipated these theories. Rather, economic writers of the period viewed international trade from a perspective similar to that provided by the theory of strategic trade policy. Furthermore, by focusing on one particular aspect of seventeenth-century international trade--the Anglo-Dutch competition for the East India trade--I hope to show that economic conditions at the time provide an ideal example of an environment in which to pursue strategic trade policies.

Section II of this paper provides a brief overview of English economic thought on international trade during the mercantilist period. In this section I discuss the parallels between the conception of international trade by seventeenth-century economic thinkers and recent research on strategic trade policy. Section III provides details about the rivalry between the English East India Company and the Dutch East India Company for Europe's trade with India and Southeast Asia. Evidence presented in this section suggests that the institutional and economic structure of the trade bears striking resemblance to, and indeed provides an excellent illustration of, the prototypical Brander-Spencer (1985) analysis of strategic trade policy.

Sections IV develops an analytical framework, similar to Dixit (1988), which allows the calibration of a simple duopoly model with data

from the East India trade. I use this model to illustrate the possible economic effects of various trade policies on the strategic rivalry between the two companies. Specifically, I examine competition in the 1620s in the pepper trade using a homogeneous product model and competition in the 1670s and 1680s in the textile trade using a differentiated products model. I find that the scope for strategic trade policies was clearly present, although the gains from such policies was probably quite small and are highly sensitive to key parameters of the model. Section V offers some concluding thoughts.

II. Mercantilism and Strategic Trade Policy

Modern examination of the seventeenth-century English mercantilist literature has tended to place emphasis on the international monetary aspects of the period's economic thought.[3] Concerns about flows of specie between nations and the importance of achieving a favorable balance of trade are usually cited as the central themes of mercantilist economic thought. Of interest here, however, is the mercantilist conception of the "real" as opposed to the monetary features of international trade. In this vein, a notable element of the mercantilist analysis was the perception that all gains from trade were derived from exporting domestic production or shipping goods between foreign markets. "Exportation is gain, but all Commodities Imported is loss," stated Carew Reynell (1695, p. 12). William Petyt (1680, p. 23) maintained that "The National Gain, by Foreign Trade, consist[s] either in vending home Commodities to Foreigners, or in Trading from Port to

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3. For surveys of the mercantilist literature, see Viner (1937), Schumpeter (1954), and Hutchison (1988).

Port." These gains from exports and the carrying trade, wholly unrelated to monetary concerns about the balance of trade, arose from the greater employment of labor, the larger mercantile profit, and the enhanced power and prestige of the nation which such commerce generated in increasing a country's domestic production and improving its maritime capability. Distant overseas trade received a disproportionate amount of attention from the mercantilists, as these trades were associated with extraordinary prestige and profit.[4]

Yet mercantilists believed that increasing a country's trade to be a difficult task because they took the total volume of world commerce to be fixed. The idea that "there is but a certain proportion of Trade in the World" led easily to William Petty's conclusion (1690, p. 82) that "the Wealth of every Nation consist[s] chiefly in the share which they have in the Foreign Trade with the whole Commercial World." A fixed volume of trade meant that the fixed gains from trade had to be distributed among the trading countries of the world. Consequently, international trade took on the characteristics of a zero-sum game. Trade was set along certain "channels" that could not accommodate more traffic, hence entry was only possible by displacing existing merchants. This led to jealousy in trade and to the belief that one's own country could be made better off by making others worse off. As Josiah Child (1693, p. 160) argued, trade should be managed to ensure "that other

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4. As Josiah Child (1693, pp. xxvi-xxvii) wrote, "no Trades deserve so much care to procure, and preserve, and encouragement to prosecute, as those that employ the most Shipping, although the Commodities transported be of small value in themselves; For, *first*, they are certainly the most profitable; for besides the gain accruing by the Goods, the Freight, which is in such Trades often more then the value of the Goods, is all profit to the Nation; besides, they bring with them a great access to Power."

Nations who are in competition with us for the same, may not wrest it from us, but that ours may continue and increase, to the diminution of theirs."

The mercantilists concluded that activist trade policies in the form of export promotion schemes were essential to preserve and enhance national welfare. Widely advocated policies to increase exports included elimination of all government hindrances and disincentives to export, particularly export taxes; enactment of direct financial support for exports, such as subsidies and drawbacks (tariff rebates on re-exported goods); and implementation of indirect measures that would lower rates of interest and reduce wages. While mercantilists criticized importation of almost anything other than raw materials, the frequent association of the doctrine with high tariffs and import protection can be somewhat misleading because export promotion appears to have been the principal foreign trade goal of the mercantilists. Indeed, many writers recognized that import protection could adversely affect export volume. As Petyt (1680, pp. 61-2) explained, "for the opening of a sufficient Foreign Vent and Market for our Home Commodities. . . it is not only necessary to remove all unequal cloggs on mere Exportations, but also those on Imported Goods; because . . . the value of our English Exportation must be in a manner confined to the value of the Goods Imported." In cautiously advocating a shift in the burden of taxation from exports to imports, Henry Robinson (1641, p. 8) warned that "here it is worth remembrance that a great part of foreign commodities brought for England are taken in barter of ours, and we should not have vented ours in so great quantity without taking them."

Yet competition over existing export markets was sure to be fierce if every government tried by export promotion to ensure that an ever larger share of world trade was captured by one's own country, even if demand in these markets was not perfectly inelastic. Indeed, seventeenth-century competition in international trade fostered commercial rivalries that extended beyond the marketplace, even spilling over into military conflict as the many commercial wars of the period attest. This was decidedly not the era of *doux commerce*: Josiah Child again captured the temper of the times in writing, "All trade [is] a kind of warfare."[5] Trade was not conceived as being mutually beneficial and the focus in contemporary writings was exclusively on national gain.[6] Because of the narrow focus on national gain and the jealousy of other's gains, there does not appear to be any recognition in the mercantilist literature of a prisoner's dilemma element to government intervention, in which international cooperation to control export promotion could make all parties better off.

This brief discussion of mercantilist trade doctrine is sufficient to reveal similarities to recent theories of strategic trade policy. This literature examines the implications for commercial policy when international trade is conducted under conditions of imperfect competition, particularly when the actions of each firm or government affect the profits and revenues of all other players.[7] These models share the feature that government intervention can impart strategic

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5. Quoted in Letwin (1963), p. 44.
6. Except for natural-law thinkers such as Grotius, the seventeenth century was devoid of the cosmopolitanism that was to emerge with the eighteenth-century Enlightenment and infect David Hume, Adam Smith, and, to a lesser extent, the classical economists of the early nineteenth century.
7. For an overview, see Helpman and Krugman (1989).

advantages on domestic firms in competition with foreign firms, i.e., government policy precommitment can shift a non-cooperative equilibrium to one more favorable to domestic firms, thereby giving trade policy the potential to improve national welfare. Such policies have been discussed in the context of foreclosing foreign entry into profitable markets, extracting rents from a foreign monopolist, or assisting firms with the fixed costs of research and development.

Perhaps the most prominent analysis of strategic trade policy comes from Brander and Spencer (1985), who use a Cournot duopoly model to examine competition between a domestic and a foreign firm exporting to a third market. Under certain conditions, a government export subsidy enables the domestic firm to precommit to a higher level of output, forcing foreign output to contract and thereby increasing domestic profits at expense of the foreign firm. Thus, government subsidies allow domestic firms to gain a larger share of the rents from international trade by extracting or shifting such rents from foreign firms. Brander-Spencer show that these subsidies increase national welfare because the gain in profits to the domestic firm exceeds the cost of the government subsidy. They also find that if all governments undertake such policies, the resulting Nash equilibrium is inefficient in that the welfare of all countries could be higher in the absence of such subsidies.

While almost all mercantilist economic analysis was crude and unsophisticated, the conclusions they reached about the nature of international trade and commercial policy appear to be implicit variations on what we know from the theory of strategic trade policy. Both suggest that large rents arising from imperfect competition are a prominent feature of international trade, both focus on capturing the

gains from exporting for one's own country at the expense of others by displacing rivals from the market, and both imply that an activist government can assist domestic firms engaged in international competition to the benefit of national welfare. This analogy can perhaps be seen more clearly in the context of a specific example--the seventeenth century Anglo-Dutch rivalry for the East India trade. In fact, the economic structure of the East India trade, a trade at the heart of many mercantilist debates, provides an ideal example of the Brander-Spencer framework in action.

III.   The Anglo-Dutch Rivalry for the East India Trade

For many centuries before the foundation of the English East India Company, goods from India and Southeast Asia, particularly spices and silks, were in high demand in Western Europe. Ancient and medieval trade between the two regions entailed the transportation of goods across the Asian continent in large caravans. Despite the exorbitant cost of land transport, traders still found it quite profitable to carry on a small trade with regularity. In 1498, the Portuguese explorer Vasco da Gama opened an entirely new route from Europe to Asia, traveling by sea around the Cape of Good Hope. Although this heralded a new age of trade between the two regions, a century elapsed before the sea route was fully exploited for commercial purposes.[8]

After individual English voyages to Asia in the 1590s met with mixed results, a group of merchants founded the East India Company in 1600 as a joint stock company designed to take advantage of the new

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8.   On the East India trade in general, see Khan (1923), Steensgaard (1974), and Furber (1976).

trading opportunities with Asia.[9] A royal charter from Queen Elizabeth
I granted the company a fifteen-year exclusive monopoly to all trade
beyond the Cape of Good Hope, as well as customs concessions and
permission to export specie. These privileges were renewed and expanded
by subsequent royal decrees. The purpose of the joint-stock arrangement
was to allow investors to pool their capital, lease or purchase ships,
hire crews and finance their provisions, and send the ships to India and
Southeast Asia (particularly Indonesia) with bullion to make purchases
and English goods to trade. Good fortune would have the ships return
safely with a tremendous booty of Asian goods--such as pepper, indigo,
silk, saltpetre, coffee, tea, and cotton goods--ready to fetch high
prices in England and Europe and thereby compensate the joint-stock
holders several times over for their expense and risk. For most of the
seventeenth century the company was simply a shipping concern,
arbitraging large price differentials between European and Asian markets,
and was not engaged in production.

In 1601, the East India Company investors put up £68,373 to
ready five ships, capable of carrying a total of 1530 tons, for the six
month voyage to Java and Sumatra, although this particular journey
actually took 15 months. Four ships, loaded almost exclusively with
pepper, returned in 1603. Because of a poor pepper season in Asia,
additional cargo to round out the tonnage on the English ships was taken
by looting a well-stocked Portuguese vessel. In subsequent voyages,
pepper dominated the East India Company's trade in both value and volume
terms. Because of the limited market for pepper in England, almost all

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9. The best references on the English East India Company are Krishna
(1924), Chaudhuri (1965), and Chaudhuri (1978).

of the spices were reexported from England to northern Europe and the Mediterranean. The East India trade also proved to be profitable: the first two voyages earned a 95 percent profit and returns on early individual voyages ran as high as 230 percent (Chaudhuri 1965, p. 209). These profits arose from the tremendous arbitrage opportunity open to the company: in the 20 years ending July 1620, purchases of £356,288 worth of goods in Asia fetched £1,914,600 in Europe (Khan 1923, p. 17). This, of course, excludes transportation costs, but is indicative of the mark-up (by a factor of five) achieved by the East India Company. Profits tended to decline with time as the expanding volume of trade reduced prices of Asian goods in Europe and as stinging competition from the Dutch forced the English out of important trading regions.

The Netherlands had been engaged in regular commerce with Asia for several years before the formation of the English company. Dutch trade with the East Indies was originally performed by several independent merchant groups, just like trade to other less distant regions. In an effort to compete more effectively with trade rivals, indeed to displace them altogether, the States General (the Dutch governing body) in 1602 initiated and helped finance the formation of the Dutch United East India Company, or V.O.C. for Verrenigde Osstindische Compangnie. By this stroke, the competing Dutch merchants were organized into a single company with exclusive monopoly rights to engage in trade with Asia. Starting with a capital of £550,000, much larger than the English, the V.O.C. easily dominated the early East India trade, achieving a greater shipping volume and earning greater profits than the English. Like the English, the Dutch largely traded in spices, with

pepper accounting for nearly 57 percent of company trade by value in 1619-21 (Glamann 1958, p. 13).

The rivalry between the two companies, the principal competitors for the East India trade, often became rough, especially on the part of the Dutch. The Dutch were tenacious in their efforts to eliminate foreign competitors from the spice islands. If the English began to impinge on Dutch trade too much, the Dutch would have no qualms about forcibly ejecting English traders from the area. The Dutch imposed monopoly contracts--backed by threats of violence--on Asian suppliers to foreclose the trade of the English and plundered foreign vessels that trespassed into the Dutch sphere of influence. Officials of the English East India Company complained bitterly about the "uncyvell and inhumaine wronges" of the Dutch company's policy of exclusion. But even though James I and his ministers sought a peaceful agreement with the Dutch, the English did not have the requisite force in the East Indies to make the Dutch respect their trade. In February 1623, the Dutch tortured and murdered several English merchants found trading in the "wrong" regions. The infamous "massacre of Amboina" created enormous resentment in England of the Dutch, but the English company effectively ceded further trade with the spice islands to the Dutch. The English withdrew to trade in the far western points of Southeast Asia and with the Indian subcontinent, initially crimping trade volume and profits.

Although pepper was still the single most important commodity for both companies in 1640, profit margins were shrinking as pepper prices in Europe fell (by roughly a quarter between 1609 and 1626) because of increased trade with Asia (Chaudhuri 1965, p. 151). Pepper was gradually replaced in importance by cotton piece goods as European

demand, fueled by the "craze for calicoes" in the 1670s, expanded rapidly. Even by the 1660s, textiles accounted for over two-thirds of the value of English East India Company exports, with the largest proportion shipped from Madras and Bombay. After achieving early control of the spice trade, the Dutch were slow to exploit the textile trade, which they sourced from Bengal. In 1668-70, textiles comprised only 36.5 percent of V.O.C. trade to Europe, a figure that was to rise to 55 percent by the end of the century (Glamann 1958, p. 13). Thus, the second half of the seventeenth century saw a dramatic reversal in the fortunes of the two companies as England came to account for most of the profits and trade volume with Asia.

Do strategic trade policies account for the success of the Dutch in the first half-century of the East India trade and the English in the second half-century? Before answering this question, another has to be posed: How closely do the institutional details of the seventeenth-century East India trade bear resemblance to the Brander-Spencer (1985) analysis of export competition for market share? To assess whether the conditions of the East India trade conform to the assumptions of the Brander-Spencer framework, let us identify eight key elements of their model in light of the East India trade, taking the perspective of the English East India Company throughout.

(a) *Partial Equilibrium*. Brander-Spencer depart from the traditional general equilibrium approach taken in international trade theory to focus on a situation of partial equilibrium. Such a departure can only be justified if the industry in question is small enough such that changes in its output do not affect resource allocation or factor prices in the economy. The seventeenth-century East India trade fits the

partial equilibrium assumption well. Throughout the century the value of England's trade with the East Indies comprised only a small part of its overall foreign trade. According to Davis (1962, p. 17), of the total 126,000 tonnage of ships engaged in England's foreign trade in 1663 only 8,000 tons were taken up servicing the East India trade route. In 1686, only 12,000 tons of 190,000 tons serviced East India trade routes. While contemporary economic writers were fascinated by the exotic and romantic East India trade, the more mundane intra-European trade accounted for an overwhelming proportion of England's international commerce.

(b) *Single Homogenous Good*. Brander-Spencer abstract from product differentiation, an assumption in accord with the early East India trade in commodities such as pepper and other spices. Product differentiation is an issue later in the century when textiles rose to prominence in the East India trade. Consequently, two models are employed in section IV to examine the competition between the English and Dutch companies, one based on trade in a homogenous good and another in differentiated products.

(c) *Duopoly with No Entry*. Brander-Spencer assume that only two firms of different nationality are engaged in export competition and that there is no free entry, despite the existence of monopoly profits. While it is difficult to find a pure duopoly in any period in history, this assumption is quite accurate in describing the rivalry between the English and Dutch East India Companies. Free entry was explicitly prohibited under the terms of the government charters granting the companies exclusive rights to the trade, rights enforceable against interlopers in courts of law. Consequently, the East India trade experienced almost no entry or smuggling from other English or Dutch

merchants for most of the century.[10] The maritime industries of other
European countries, such as France and Germany, had not advanced
sufficiently to engage in long distance overseas trade. Spain and
Portugal had ruled the seas in the sixteenth century, but different seas
owing to a papal decree in 1493 which allocated trade with the Americas
to Spain and trade with Asia to Portugal. In the early seventeenth
century, however, Portugal distinguished itself only in the rapidity of
its decline, a decline accelerated by not so gentle encouragement from
the Dutch, and by the late 1610s was only a residual trader in Asia,
shipping substantially less than 1 million lbs of pepper annually (see
Wake 1979).

(d) *Monopoly Profits*. The Brander-Spencer framework gives rise
to monopoly profits that are shared by the duopoly. As previously
discussed, there is no doubt that the seventeenth-century East India
trade was lucrative, suggesting that such rents did exist for the trading
companies engaged in the trade. According to Chaudhuri (1965, pp.
211ff), on the eleven separate returning voyages from 1601-12, English
East India Company investors were returned a dividend of 155 percent and
the first joint stock of 1613-23 produced a dividend of 187-1/2 percent.
The second joint stock of 1617-32, however, yielded only a 112-1/2
percent dividend. Thus the annual rate of return for the English East
India Company was about 10 percent during the first twenty years and
about 7 percent during the 1620s. By contrast, the V.O.C. was even more
profitable in the spice trade, according to figures in Krishna (1924, p.

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10.   After 1600, there was almost no leakage of Asian spices into Europe
from the Middle East via the Levant Company (see Wake 1979). The English
East India Company, however, was eventually challenged by interlopers
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77). A dividend of 307-1/2 percent was returned during 1605-20, or about 20 percent annually, and a dividend of 82-1/2 percent was declared from 1621-30, or about 8 percent annually. There is reason to believe that these are significant underestimates of Dutch profitability because, as will be discussed in Section IV, the V.O.C. was reluctant to declare dividends during this period.

The textile trade of the late seventeenth century was even more profitable than the early pepper trade. From 1658-81, the English Company declared dividends of 440-1/2 percent and the Dutch 433-1/3 percent, both amounting to an annual average of about 18 percent (Krishna 1924, p. 175). The next decade from 1681-91 saw the English declare dividends of 400 percent while the Dutch returned 232-1/2, or annual averages of about 36 percent and 21 percent, respectively. Not only were these profits greater than experienced earlier in the century, but the fortunes of the companies had been reversed, for reasons which will be discussed below.

(e) *Cournot-Nash Game*. The Cournot duopoly framework employed by Brander-Spencer entails two firms engaged in a static, non-cooperative, one-period, simultaneous move game. These assumptions fit very few industries at any period in history; it is difficult to find examples of pure duopolies where the competition does not have dynamic, sequential move, repeated game characteristics. Yet these assumptions fit the seventeenth-century competition between the English and Dutch East India Companies reasonably well. The competition was clearly non-cooperative to judge not only by the frequency and ferocity with which they clashed in commercial wars, but also by the scornful Dutch rejections of English proposals to merge the two companies or to divide

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Asian markets. The competition may be described by a static, one-shot, simultaneous-move game because of the nature of the annual sailing season to the East Indies. Ships returning from the East Indies to European ports had to depart within a window of less than six months to avoid the monsoon season, and had to avoid passage through the Cape of Good Hope in the middle of winter (see Davis 1962, p. 258). Ships that managed to leave during this period carried the bulk of the European supply of Asian goods for the entire next year. The decision about how many ships to return to European ports had to have been made more or less simultaneous by the two companies, and because of this short departure/return span neither firm had the ability to follow the decision of another or to take advantage of information on how many rival ships were to be sent or returned in a given season. Each sailing season was similar to one period because nothing obligated either firm to send any particular number of ships in subsequent years, as ships could be leased out for alternative uses. Once the separate, simultaneous decisions had been made, the annual season would end with all goods auctioned off to wholesale markets upon arriving in European ports.

(f) *Cournot (Quantity) Competition*. One key assumption of the Brander-Spencer framework is that the firm's choice variable is output (Cournot competition) instead of price (Bertrand competition) and that the firm makes no conjecture (a Cournot reaction) regarding the impact of changes in its output on its rival's output. As shown by Eaton and Grossman (1986), the nature of the optimal trade policy associated with the duopolistic rivalry depends critically on the nature of the competition and the conjectural variation entertained by each firm. In contrast to the Brander-Spencer finding that an export subsidy could

increase national welfare under Cournot competition, Eaton and Grossman found that the optimal policy becomes an export tax with Bertrand competition. This has been regarded as an important critique of Brander-Spencer because it is often difficult to assess whether firms are competing in prices or in quantities.

No such ambiguity arises in considering the East India trade because the firms clearly competed in quantities. The choice variable for both companies was the number of ships to send out and to have return in a given sailing season. In making this decision they determined the quantity of goods that would arrive at European ports in the coming months. Once both companies' ships arrived from Asia loaded with a fixed quantity of goods, these goods would be placed on European wholesale markets where they would fetch whatever price the market would bear. Neither firm maintained large inventories which might be associated with attempts to target a certain market price. The cost of the voyage was paid up front and the private investors had an interest in receiving dividends immediately to retire current debts by placing all returning goods onto the market upon arrival. Thus, the Brander-Spencer assumption of Cournot or quantity competition is appropriate here because the Anglo-Dutch competition took place in terms of shipping.

Less appealing is the idea that the companies necessarily entertained Cournot conjectures about how its counterpart would respond to changes in its output. This paper departs from the Brander-Spencer analysis by taking the more flexible conjectural variations approach, with the conjectures being determined by the data in section IV.

(g) *Constant or Increasing Costs.* Unlike many models of imperfect competition in international trade, Brander-Spencer assume that

the single good can be produced under conditions of constant or increasing marginal cost and without fixed costs, thereby ruling out economies of scale or dynamic learning curves. The assumption of constant costs fits well with the characteristics of the East India trade, which essentially had two cost components: shipping and acquisition. First, the costs of ships were not fixed because there existed a well-functioning capital market in ships. The East India Company could borrow ships from the competitive intra-European shipping market in the event that it was short of available tonnage in a given year, or could lend idle ships back to the market should it not wish to send its entire fleet to Asia in a given season. Pricing in rental market for ships was based not on a fixed charge per ship, but on freight rates which varied depending on the tonnage required.

Second, the English and Dutch East India companies made only marginal demands on the spices and textile goods produced and available in India and Southeast Asia and their competition had little effect on acquisition prices of these goods in Asia. For their purposes, the trading companies could purchase as much as they could fill ships at a constant price, although this price could vary from year to year depending on Asian production. In purchasing only a fraction of Asian output, the East India companies had little scope to exercise any monopsonist power.

(h) *Exports to Third Markets*. Another important assumption of the Brander-Spencer framework is that there is no domestic consumption of the good produced by the duopoly and all trade occurs in third markets. As a result, calculations of national economic welfare do not require an accounting of consumer surplus and the profits of the exporting firm

becomes equivalently identified with national welfare. In the case of the pepper trade, this assumption is accurate. The domestic English market for pepper was minimal compared with the English East India Company's total trade in pepper, which was almost entirely re-exported to Europe. This assumption is not plausible for trade in textiles, where English consumption of East Indian goods was more substantial. In examining the competition over the textile trade, I develop a model that accounts for English consumption of the good.

IV. Strategic Policies and the East India Trade

Despite the prominence given to the Brander-Spencer model in the strategic trade policy literature, few empirical studies of industries ripe for this type of profit-shifting trade policy have emerged. The burdensome list of assumptions in the Brander-Spencer framework makes difficult the art of matching their specific model to the characteristics of a particular industry, perhaps even raising the question of the relevance of their model to current trade policy debates. Several previous attempts to calibrate industry data to models of strategic trade policies, surveyed in Helpman and Krugman (1989), introduce economies of scale and dynamic learning curves. Because these were not characteristics of the East India trade, the approach here is much closer to that taken by Dixit (1988) in his examination of optimal policies for the U.S. automobile industry.

(a) Homogeneous Products: The Pepper Trade in 1622

The set up should now be familiar. A Cournot duopoly, consisting of a domestic and a foreign firm, produce--or, more accurately, trade in--a homogeneous good under conditions of constant

costs. All output is exported to a third market, so considerations of domestic consumer surplus do not arise and firm profits are equivalent to national welfare. A general, conjectural variations approach is taken.

A standard assumption in duopoly models is that the inverse demand function is linear

$$p = a - b (x + x^*),\tag{1}$$

where p is the price, x (x^*) is the quantity shipped by the English (Dutch) company. The price elasticity of this demand function is

$\eta = -\dfrac{p}{b (x + x^*)}$, which can be solved for b, and then used to solve for

$a = p (1 - 1/\eta)$. Now we can calibrate (1) by using price and quantity data and an assumed elasticity value to solve for a and b. There is no information on the price elasticity of demand for pepper in Europe, but for two reasons we can infer that demand was price elastic: first, pepper was a luxury commodity in Europe at this time, suggesting that demand would tend to be elastic; second, imperfectly competitive firms operate on the elastic portion of the demand curve so that price exceeds marginal revenue. Consequently, I initially assume that demand has a price elasticity of -2, although the sensitivity of the results to this assumption will be examined.

The baseline year for the simulation is 1622, chosen because it happens to be the best year for data, which are summarized on table 1. The year is also appropriate because the East India companies had twenty years experience with the trade and the Anglo-Dutch rivalry for the spice trade was at its peak. In that year both Thomas Mun, an officer of the East India Company, and officials of the V.O.C. presented broadly similar estimates of European consumption of pepper. From these estimates, along with company data on shipments of pepper, it can be inferred that in 1622

the English East India Company shipped 1.615 million lbs of pepper to
Europe from the East Indies, and the V.O.C. about 2.280 million lbs (see
Chaudhuri 1965, p. 144, Glamann 1958, p. 74, and Wake 1979, p. 321).
English consumption of 200,000-300,000 lbs of pepper will be ignored.
According to Chaudhuri (1965, pp. 148ff), the prevailing European price
of pepper was approximately £83 per '000 lbs, whereas the acquisition
price of pepper in the East Indies was about £19 per '000 lbs.
Steensgaard (1965) places English East India Company shipping costs at
£15 per '000 lbs in the 1620s. While Dutch shipping was considered to be
the most efficient in intra-European trade, Steensgaard notes that the
Dutch had no advantage in shipping costs over the English in the East
India trade. Consequently, total marginal costs for both companies are
assumed to be £35 per '000 lbs of pepper.

Now consider the objectives of the English and Dutch companies
in their duopolistic competition. The English East India Company was a
private firm organized and run solely by merchants with no government
stake or involvement. It seems very clear from the institutional makeup
of the company that its exclusive objective was to choose the quantity of
pepper to ship to Europe each year in order to maximize the returns to
investors. Thus, the English East India Company is assumed to maximize
profits, represented by the following expression

$$\pi = p(x, x^*) \cdot x - c \cdot x,$$

where π is profits, p is the inverse demand function for pepper in
Europe, x is quantity of pepper carried to Europe, and c is the constant
marginal cost, which includes both the cost of purchasing goods in the
East Indies and per-unit shipping costs. The following first-order
condition emerges from profit maximization

$$\partial\pi/\partial x = p - c + v\cdot x = 0, \qquad\qquad (2)$$

where $v = (dp/dx)\cdot(1 + dx^*/dx)$. The term v is the firm's perceived marginal revenue and has two components: the direct effect of changes in its output on price, and the indirect effect of changes in its rival's output on price in response to changes in its own output (the conjectural variation, with $dp/dx = dp/dx^*$); if $dx^*/dx = 0$, the firm believes that foreign output will not change when its own output changes (a Cournot conjecture); if $dx^*/dx = -1$, the firm acts as a perfect competitor and sets price equal to marginal cost; by setting $dx^*/dx = 1$, the firm acts in collusion with its rival to maximize joint profits.

Assessing the V.O.C.'s objectives present more of a puzzle because an explanation for the Dutch domination of the East India trade in spices is desirable. If the English and Dutch companies traded a homogeneous commodity for which they received the same price and paid the same acquisition and shipping costs, if both firms were identical in these respects, what accounts for the larger trade volume and hence greater profits achieved by the Dutch? With linear demand and Cournot conjectures, for example, the equilibrium is perfectly symmetric in output and profits for identical firms. Linear demand has been assumed here and the conjectural variation will emerge from the data. But to say that different conjectures account for the difference in trade volume and profitability is to be agnostic about the true source of Dutch advantage, there being no evidence that the Dutch had superior information or better perceptions about its rival's reaction than the other. Furthermore, there were no major sunk costs involved in the trade at this time such that the Dutch would have first-mover advantages, and trade had the potential of being equally profitable for both English and Dutch

investors. Neither is there compelling evidence that the Dutch
government engaged in ongoing subsidization of the V.O.C.

While there appear to be no clear economic differences between
the two companies, a slightly different Dutch objective function may
account for their domination over the English in the spice trade. This
answer arises from examining the institutional structure of the V.O.C.
(see Steensgaard 1974, pp. 126-141, and Steensgaard 1982). Before the
formation of the company, the trade was managed by *bewindhebbers* who made
business decisions regarding the details of particular voyages and the
sale of Asian goods in European markets. The *participanten* were passive
investors in the East India trade who acted through the *bewindhebbers*
and, as shareholders guided by the profit motive, greatly affected their
behavior. However, the granting of monopoly privileges and establishment
of close government ties, which accompanied the formation of the V.O.C.
in 1602, eroded the influence of the *participanten* on the *bewindhebbers*;
in effect, stockholder control over the management of the company was
supplanted by the government (see Glamann 1958, pp. 6ff). This division
led to a classic principal-agent problem in that the *bewindhebbers* had
different interests than the *participanten* and were no longer easily
accountable to them. As Steensgaard (1982, p. 243) explains,

> Maximization of dividends was the obvious aim of the participant.
> The *bewindhebbers* were participants themselves, but for several
> reasons they would tend to have other aims. *Their remuneration
> by provision made it their interest to maximize the turnover of
> the company, even at terms that were not advantageous to the
> participants.* For the same reason, they might prefer
> consolidation and maximum growth rather than dividends. The
> social and political distinction attached to their offices would
> work in the same direction. Finally, the close relations to the
> Dutch political leaders and the ultimate dependence on the
> political authorities for the continued existence of the company
> would tend to influence business decisions. So the charter of
> 1602, in spite of formal continuity, created a managerial group
> with interests deviating from those of the participants.
> [Emphasis added.]

The effect of this difference made itself felt almost immediately. In 1603, just a year after the company's foundation, the court of directors decided to abandon the peaceful commercial methods of the earlier Dutch traders to undermine more aggressively and even oust rivals from the East India trade. In 1609, the court of directors announced that their objective was the creation of a Dutch monopoly in the spice islands through the total exclusion of the English and the Portuguese. With the direct assistance of the States General, which occasionally supplied artillery and other war material (see Israel 1989, p. 103), the Dutch East India company became a military and commercial force--both power and plenty were its objectives. Thus began the exclusionary policies, such as harassment of foreign merchants and imposition of monopoly contracts.

Shortly after this policy became apparent, stockholders became distressed about the use of company resources for military and non-commercial ends. They felt that the government should assume all military costs and voiced fears that such expenditures would come at the expense of profits, particularly because the company refused to open its books to investors and was reluctant to declare dividends. The company also repudiated provisions of early agreements with investors, insisting that the *participanten* sell their shares instead of receiving their original investment plus dividends if they wanted to reduce their stake in the company. Despite government resistance, investors eventually restored their control over the *bewindhebbers* with renewals of the monopoly charter after the mid-1620s. But, as Steensgaard (1982, p. 252) writes, the results of the first decades of the company were that

> The trading partnership was replaced by a permanent, anonymous capital; the *bewindhebbers* became a managerial group with close affiliations to the political authorities; the participants

became holders of negotiable shares with not much more influence
on company business than a holder of government bonds has on
government policy, and the strategic aims of the company were
radically changed.

By all indications, particularly in regard to compensation and
susceptibility to government pressure, the interests of the *bewindhebbers*
who managed the V.O.C. dictated that the immediate objective function of
the company was not to maximize profits alone, but to maximize a
combination of profits and revenue. The *bewindhebbers* derived income
both from their position as stockholders, for which they earned
dividends that arose from profits, and from their position as managers,
for which they earned--as mandated in the government charter--a
percentage of gross revenue. The more the *bewindhebbers* earned from
their managerial role, the more they would be willing to sacrifice
profits for revenue. While at first glance this objective portents
inherent conflict between the managers and the investors, no such
conflicts need have arisen because in the end there was no tradeoff
between "power and plenty." Credible Dutch commitment to a strategy of
maximizing a mix of profits and revenues dominated the English strategy
of maximizing profits because it permitted the Dutch to achieve a larger
output at the expense of the English, and hence earn greater profits than
the English. When the Dutch States General formed the V.O.C. in 1602,
provided it with financing and military hardware, encouraged it to engage
in conquest and the use of force, created in the charter managerial
incentives to increase firm growth, and insulated such managers from the
demands of investors, they provided an institutional and contractual
mechanism allowing the company to commit to a higher level of trade and
enabling it to become, in effect, a Stackelberg leader against the

English. The Dutch example provides an excellent illustration of the Sklivas (1987) and Fershtman-Judd (1987) discussion of how hiring an output-maximizing manager can serve as a commitment that nets the principal a larger profit in a Cournot duopoly. By contrast, the English could not convincingly sustain such a strategy because private investors remained in charge of the company and the government had no role in its operation or activities beyond the enforcement of the monopoly charter.

Thus, the English and Dutch East India companies are modeled as being identical in every respect except their objective function, which reflects the different institutional organization of the companies. The V.O.C.'s more aggressive stance is taken to be the maximization of a linear combination of profits and revenue

$$L^* = \gamma \{p(x, x^*) \cdot x^* - c^* \cdot x^*\} + (1 - \gamma) \{p(x, x^*) \cdot x^*\},$$

where $0 < \gamma < 1$. The following first-order condition emerges from maximization

$$\partial L^*/\partial x^* = p - \gamma c^* + v^* \cdot x^* = 0, \tag{3}$$

where v^* is the Dutch perceived marginal revenue, containing its conjectural variation.[11] In stating the production rule for a firm that maximizes a combination of profits and revenues, equation (3) modifies the standard profit-maximizing condition only in attaching a shadow price γ to marginal costs, where γ is also the weight the firm places on profits in its objective function. The γ term equals one if the firm maximizes only profits, but is less than one to the extent that revenues enter the objective function. Such a firm would understate marginal cost

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11. The same first-order condition will arise if the firm's objective function was to maximize revenue subject to a profit constraint, the profit constraint being necessary because the firm still had to promise an above average return to retain investment. However, the constraint will not be binding in a Stackelberg equilibrium.

relative to its true value and thereby produce more output than the profit-maximizing level. As illustrated in figure 1, a change from pure profit to profit and sales maximization would shift the Dutch reaction function outward, establishing a new equilibrium at some position, say the Stackelberg point (S), where the Dutch potentially earn greater profits than at the original Nash equilibrium (N). The smaller is γ, the greater is the outward shift in the Dutch reaction function.

Before examining the equilibrium using the conjectural variations that emerge from the data under the assumptions in (2) and (3), the top half of table 2 summarizes simulation results in which certain conjectural variations are imposed under the assumption that both firms maximize profits (i.e., $\gamma = 1$). Under profit maximization and Cournot conjectures, the equilibrium is symmetric in outputs and profits and the equilibrium price, £65, is lower than the observed price of £83 in 1622. A much better outcome for both companies would have been collusion to maximize total industry profits. In fact, representatives from the two countries met in London in February 1619 and agreed to split the spice trade, with a 1/3 share going to the English East India Company and a 2/3 share to the Dutch, and to divide equally the pepper trade. Neither side took the agreement seriously, however, and it was moot before the ink was dry. Had they been able to enforce a collusive agreement, they might have been able to increase joint profits by 12 percent over the Cournot equilibrium, according to these results. In England, hostility toward monopolies sparked pressures for a "free trade," i.e. free entry into the East India trade by all merchants. Because Asian goods were almost entirely reexported, there would be little national gain from a policy that would have driven profits to

zero. Had England allowed such entry, or had both firms acted as perfect competitors, total output would have doubled from the collusion equilibrium.

The second part of table 2 describes the simulation results using conjectural variations that emerge from an equilibrium in which the English East India Company maximizes profits and the V.O.C. maximizes a linear combination of profits and revenues. While v and v^* result from parameterizing (2) and (3) with market data, information is needed on γ, the shadow price on Dutch marginal cost which reveals the weight placed on profit maximization in the Dutch objective function. This parameter was determined the following way: assuming that both the English and Dutch East India Companies are identical in every respect save their objective function, if $\gamma = 1$ (i.e., the V.O.C. maximizes profits), then the Cournot-Nash equilibrium should be symmetric (as in part I of table 2) in that $v = v^*$ and the quantities produced by both firms are equal. Then simply find the value of γ that replicates actual outputs observed in 1622 using these perceived marginal revenues. It turns out that the shadow factor attached to Dutch marginal cost is $\gamma = 0.4$, implying that more than half of real costs were discounted because V.O.C. managers placed almost equal weight on revenues and profits. Had the Dutch kept their conjecture the same and shifted to profit maximization ($\gamma = 1$), Dutch output would have shrunk by almost 0.5 million lbs of pepper while English output would have expanded marginally. Although the equilibrium price would have risen £3 and English profits would have increased, Dutch profits would have fallen by about £18,000. A shift to profit maximization would entail lower profits for the Dutch because they would

have retreated from an approximate Stackelberg position which committed
them to a higher output than a profit-maximizing firm would have chosen.

Assume again that the Dutch maximize sales and profits but that
the English East India Company persuades the Privy Council to subsidize
the company as part of a profit-shifting policy. Further assume that the
government sets the subsidy to maximize the gain-function $G = \pi - s \cdot x$,
where π is the company profit and $s \cdot x$ is the total cost of the subsidy
(the first-order condition indicates that the change in profits as a
result of the subsidy should equal the marginal cost of the subsidy).
The optimal subsidy turns out to be very large, £85 per '000 lbs of
pepper shipped, or roughly 100 percent of the 1622 price. This subsidy
would substantially lower the European price of pepper, increase English
shipments by 2.2 million lbs, and decrease Dutch shipments by 0.6 million
lbs. Even though the optimal subsidy is extremely high, the gains from
instituting such a subsidy are rather modest. English East India Company
profits would increase by £366,000 at a total cost of £326,000, resulting
in a net gain to England of only £40,000. Dutch profits fall by £53,000,
with European consumers gaining the balance through the lower price.
This example, of course, assumes that there is no retaliation on the part
of the Dutch government, an assumption that, given the contentious times
of the period and the drastic impact of the subsidy on Dutch profits, is
hardly plausible. Still, the effect of the subsidy is a perfect
illustration of the Brander-Spencer profit-shifting motive for export
subsidization.

Instead of using subsidies to expand England's trade, another
policy open to the English government would have been to shrink Dutch
trade deliberately by undertaking the more ambitious and aggressive

policy of interdiction and confiscation of Dutch shipping in transit from Asia to Europe. The English government could, for example, tax the profits of the English East India Company to finance the dispatch of a British man-of-war to intercept Dutch ships and confiscate and eventually sell the booty for the profit of the English crown. In the present case, a tax rate of 0.26 on East India Company profits would yield almost £20,000, enough to finance the costs of sending one English man-of-war to interdict a single Dutch ship and take its contents back to England for reexport.[12] This action would force the Dutch to pay shipping costs on all its trade, but only receive revenue from those ships that actually survived the journey back to the Netherlands. Such a policy would not change the market clearing price, but would depress English profits to £56,800 and Dutch profits to £84,600. The English crown would garnish £24,900 in revenue from the sale of the Dutch goods, thus increasing (£56,800 + £24,900 > £76,800) England's national welfare.

Because the English East India Company's records are detailed and because secondary research on the East India trade has been thorough, the market data used to parameterize the model--price, quantity, and cost--are fairly reliable. Information on the price elasticity of demand for pepper is notably lacking, however, and table 3 reports on the sensitivity of the model to different assumptions about the elasticity. The optimal subsidy appears quite sensitive to the value chosen to represent demand, but in predictable ways. The optimal subsidy and the net English gain are higher when the price elasticity is higher because then there is the greatest scope for expanding England's exports.

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12. Shipping costs on the East India trade amounted to £15 per '000 lbs and the average yield per ship for both English and Dutch was about 0.3 million lbs of pepper per ship.

Aside from this sensitivity to demand, there are two important caveats that severely qualify the robustness and the validity of these results. First, the conjectural variation framework presented above and used frequently in oligopoly models is an awkward method of dealing with the responses of firms to changes in rival's actions. Furthermore, the conjectural variation is not a parameter that appears to be derived from maximizing behavior. Second, each of the above policy experiments was conducted under the assumption that the conjectural variations of the two firms remains constant. Yet should one of the governments have actively intervened on the side of its firm, there is reason to believe that this would affect the conjectural variations of both firms, making the beneficiary more aggressive and the other more tentative in its assessment of its rival's behavior. Unfortunately, as pointed out by Helpman and Krugman (1989), there do not exist other tractable oligopoly models that easily lend themselves to empirical simulation. Until that happens, we should be extremely cautious about interpreting the results of any such exercise.

The English did not institute any of these commercial policies in the first half of the seventeenth century in response to the aggressive Dutch commercial tactics. Consequently, by the mid-1620s the Dutch had almost an exclusive foothold on the spice islands of Indonesia and had ousted the English from all but the western edge of Southeast Asia. Ironically, the Dutch success in the spice trade, which was declining in profitability with time, forced the English to trade with India. There the English were well-positioned to capitalize on the textile trade, which was to become the fastest growing and most profitable European import from Asia.

B. Differentiated Products: The Textile Trade in the 1670s & 1680s

Unlike spices such as pepper, textiles from the English and Dutch East India companies are modelled as imperfect substitutes because the mix of cotton piece-goods brought to the European market differed between them. Following Dixit (1988), we will assume the following linear demand system, which can be derived from a quadratic utility function, exists in Europe for textiles from the two companies

$$x = a_1 - b_1 p + c p^*, \tag{5}$$
$$x^* = a_2 + c p - b_2 p^*, \tag{6}$$

where x (x^*) is the quantity of English (Dutch) textiles brought to the European market. To solve this demand system for the parameters a_1, a_2, b_1, b_2, and c, additional assumptions are required. The total elasticity of European demand for textiles, ϵ, is assumed to be the effect of an equiproportionate rise in textile prices on a quantity aggregate. Thus, setting $p = \phi_1 P$ and $p^* = \phi_2 P$, where P is a proportionate factor of change, and $Q = \phi_1 x + \phi_2 x^*$, then $\epsilon = - \dfrac{P}{Q} \dfrac{dQ}{dP}$, or after manipulation

$$\epsilon = - \frac{b_1 p^2 + 2 c p p^* + b_2 p^{*2}}{p x + p^* x^*}. \tag{7}$$

Because textiles are treated as imperfect substitutes, the cross-elasticity of substitution is defined as

$$\sigma = \frac{d (\log (x/x^*))}{d (\log (p/p^*))}.$$

The condition for x/x^* to be a function of p/p^* alone is that $\partial(x/x^*)/\partial(1/p^*) = \partial(x/x^*)/\partial(p) = 0$, which yields the relationships

$$\sigma = - p \left(\frac{b_1}{x} + \frac{c}{x^*} \right), \tag{8}$$
$$\sigma = - p^* \left(\frac{c}{x} + \frac{b_2}{x^*} \right). \tag{9}$$

The differentiated products model for textiles can be calibrated with data for p, p^*, x, x^* and assumptions on σ and ϵ, and solved for the parameters a_1, a_2, b_1, b_2, and c using equations (5)-(9). To calibrate the model I have taken average annual data from the decades 1670-79 and 1680-89 to allow for a more representative portrait of the textile trade. These data are available in Steensgaard (1990, p. 126), supplemented by Chaudhuri (1978, p. 547) and Glamann (1958, p. 143). The price data are unit values (all converted to sterling using the exchange rate fl = 11 ff) and the quantity data are number of piece-goods. Invoice price data for textiles exists for the English company, but not for the Dutch. Prakash (1985, p. 62) reports cost and sale prices for Dutch textiles in 1701-02 that indicate the Dutch had lower mark-ups than the English at the same period; I assume here that the mark-up was lower than the English by this constant for earlier periods. Because Dutch did not have as complete an access to India as the English, higher Dutch (unit-value) prices reflected higher Dutch costs of acquiring cotton goods. Indeed, the English shipped nearly four times as many piece-goods as the Dutch in the 1670s, although the Dutch were catching up in the 1680s. Freight cost data in Krishna (1924, p. 322) matches with Steensgaard (1965) and again suggest similar costs for both firms.

As before, there is no information on either the total price elasticity of demand or the elasticity of substitution. Demand can again be presumed to be price elastic with the central case assumed to be $\epsilon = -3$. Description of the types of textiles purchased by the companies suggests that the elasticity of substitution should be relatively high, so as not to exaggerate the lack of substitutability between the goods, and an initial elasticity is taken to be $\sigma = -5$.

Unlike the spice competition in the early decades of the seventeenth century, the objective of both the English and the Dutch East India companies is to maximize profits. Thus, the first order conditions for both firms are equivalent to (2). As noted above, the agitation of the *participanten* led to a reassertion of their influence in V.O.C. operations by mid-century. The Dutch were also in a less advantageous position to exert their military power in the textile trade and could not easily control the English presence in India.

Table 4 presents the simulation results for the 1670s and 1680s. If the authorities in England set a subsidy without regard for domestic consumption of textiles, then the optimal policy turns out to be a modest tax the shipment of textiles. The loss in English East India Company profits is more than offset by the gain to the Exchequer in tax revenue. This appears to be an example of the Eaton-Grossman (1986) phenomena where the company's conjecture understates the response of foreign output to changes in its output (or the conjecture is less than the slope of the foreign reaction function). However, the optimal policy switches from a tax to a subsidy if the consumer surplus associated with domestic English consumption of Indian textiles is taken into account. There is no annual breakdown of imports and re-exports by the English East India Company, but Steensgaard (1990, p. 128) reports that the company's trade in textiles was divided almost equally between imports and re-exports during 1699-1701. If the English government is benevolent (a questionable assumption) and takes consumer surplus into account, the national gain function becomes $G = \pi - s \cdot x - dp \cdot \omega \cdot x - 1/2 \cdot dp \cdot \omega \cdot dx$, where ω is the portion of East Indian textile imports consumed at home ($\omega = 1/2$ in this case). As the English East India Company was given a monopoly in the

importation of Indian cotton goods, domestic consumer surplus includes only these goods and excludes Dutch goods. This calculation is also facilitated by the assumption that the English and European markets for English Company textiles are integrated, or alternatively that price discrimination between markets is not possible. As shown on table 4, the optimal subsidy is large and lowers the price to consumers by expanding the volume of trade in textiles. However, as in previous examples, the net gain from pursuing such a policy is extremely small at only £12,000. Table 4 presents similar results for the 1680s, although the costs of acquiring textiles is higher and prices in Europe are lower, thereby squeezing profit margins.

Table 5 illustrates how the optimal subsidy changes with variations in two key parameters about which assumptions had to be made, ϵ and σ. As before, the optimal policy (excluding considerations of consumer surplus) is quite sensitive to the particular assumption made about the elasticities of demand and substitution. As demand becomes increasingly price elastic, the scope for subsidies again improves because there exists a larger potential to increase the volume of trade. As the elasticity of substitution between English and Dutch textiles increases, they become better substitutes and the opportunity to shift profits by trade policies becomes greater. As before, of course, two key problems with the simulations are the assumption of no retaliation and the use of conjectural variations as constant parameters.

V. Conclusions

This paper has presented a reinterpretation of seventeenth century mercantilist economic thought and policy based on recent theories of strategic trade policy. Mercantilist economic thought on foreign trade, with its stress on the gains from exporting and the necessity of government intervention to encourage exports, was found to be analogous to theories of strategic trade policy, with its emphasis on export promotion in imperfectly competitive markets. The Anglo-Dutch rivalry for the East India trade, and perhaps other long distance trades of the period, illustrates a situation in which the profit-shifting motive for trade policies was clearly present. While mercantilist economic thought is often justly accused of analytical error, their crude notions of commercial policy were not entirely misconceived to the extent, which they nonetheless exaggerated, that imperfect competition (itself due to government intervention) was a feature of international trade in the seventeenth century.

References

Brander, James A., and Barbara J. Spencer, "Export Subsidies and International Market Share Rivalry," Journal of International Economics 18 (February 1985): 83-100.

Chaudhuri, K.N., The English East India Company: The Study of an Early Joint Stock Company, 1600-1640 (London: Cass, 1965).

Chaudhuri, K.N., The Trading World of Asia and the English East India Company, 1660-1760 (New York: Cambridge University Press, 1978).

Child, Josiah, A New Discourse of Trade (London: J. Everingham, 1693).

Davis, Ralph, The Rise of the English Shipping Industry in the Seventeenth and Eighteenth Centuries (London: Macmillan, 1962).

Dixit, Avinash, "Optimal Trade and Industrial Policies for the U.S. Automobile Industry," in R.C. Feenstra, ed., Empirical Methods for International Trade (Cambridge: MIT Press, 1988).

Eaton, Jonathan, and Gene M. Grossman, "Optimal Trade and Industrial Policy Under Oligopoly," Quarterly Journal of Economics 101 (May 1986): 383-406.

Ekelund, Robert B. Jr., and Robert D. Tollison, Mercantilism as a Rent-Seeking Society (College Station: Texas A&M University Press, 1981).

Fershtman, Chaim, and Kenneth L. Judd, "Equilibrium Incentives in Oligopoly," American Economic Review 77 (December 1987): 927-940.

Furber, Holden, Rival Empires of Trade in the Orient, 1600-1800 (Minneapolis: University of Minnesota Press, 1976).

Glamann, Kristof, Dutch-Asiatic Trade, 1620-1740 (The Hague: Nijhoff, 1958).

Heckscher, Eli, Mercantilism, 2 vol. (London: George Allen & Unwin, 1934).

Helpman, Elhanan, and Paul R. Krugman, Trade Policy and Market Structure (Cambridge: MIT Press, 1989).

Hutchison, T.W., Before Adam Smith: The Emergence of Political Economy, 1662-1776 (New York: Basil Blackwell, 1988).

Israel, Jonathan I., Dutch Primacy in World Trade, 1585-1740 (New York: Oxford University Press, 1989).

Khan, Shafaat Ahmed, The East India Trade in the 17th Century (Oxford: Oxford University Press, 1923).

Krishna, Bal, Commercial Relations between India and England, 1601-1757 (London: George Routledge, 1924).

Letwin, William, The Origins of Scientific Economics (London: Methuen, 1963).

Petty, William, Political Arithmetick (London: R. Clavel, 1690).

[Petyt, William], Britannia Languens, or a Discourse of Trade (London: T. Dring, 1680).

Prakash, Om, The Dutch East India Company and the Economy of Bengal, 1630-1720 (Princeton: Princeton University Press, 1985).

Robinson, Henry, England's Safety, in Trades Increase (London: N. Bourne, 1641).

Schmoller, Gustav, The Mercantile System and its Historical Significance (New York: Macmillan, 1897).

Schumpeter, Joseph, History of Economic Analysis (New York: Oxford University Press, 1954).

Sklivas, Steven D., "The Strategic Choice of Managerial Incentives," Rand Journal of Economics 18 (Autumn 1987): 452-458.

Steensgaard, Niels, "Freight Costs in the English East India Trade 1601-1657," Scandinavian Economic History Review 13 (1965): 143-162.

Steensgaard, Niels, The Asian Trade Revolution of the Seventeenth Century (Chicago: University of Chicago Press, 1974).

Steensgaard, Niels, "Dutch East India Company as an Institutional Innovation," in M. Aymard, ed., Dutch Capitalism and World Capitalism (New York: Cambridge University Press, 1982).

Steensgaard, Niels, "The Growth and Composition of the Long-Distance Trade of England and the Dutch Republic before 1750," in J.D. Tracy, ed., The Rise of Merchant Empires: Long Distance Trade in the Early Modern World, 1350-1750 (Cambridge: Cambridge University Press, 1990).

Viner, Jacob, Studies in the Theory of International Trade (New York: Harper, 1937).

Viner, Jacob, "Power versus Plenty as Objectives of Foreign Policy in the Seventeenth and Eighteenth Centuries," World Politics 1 (October 1948): 1-29. Reprinted in Jacob Viner, Essays on the Intellectual History of Economics, ed. D.A. Irwin (Princeton: Princeton University Press, 1991).

Wake, Charles, "The Changing Pattern of Europe's Pepper and Spice Imports, ca. 1400-1700," Journal of European Economic History 8 (Fall 1979): 361-403.
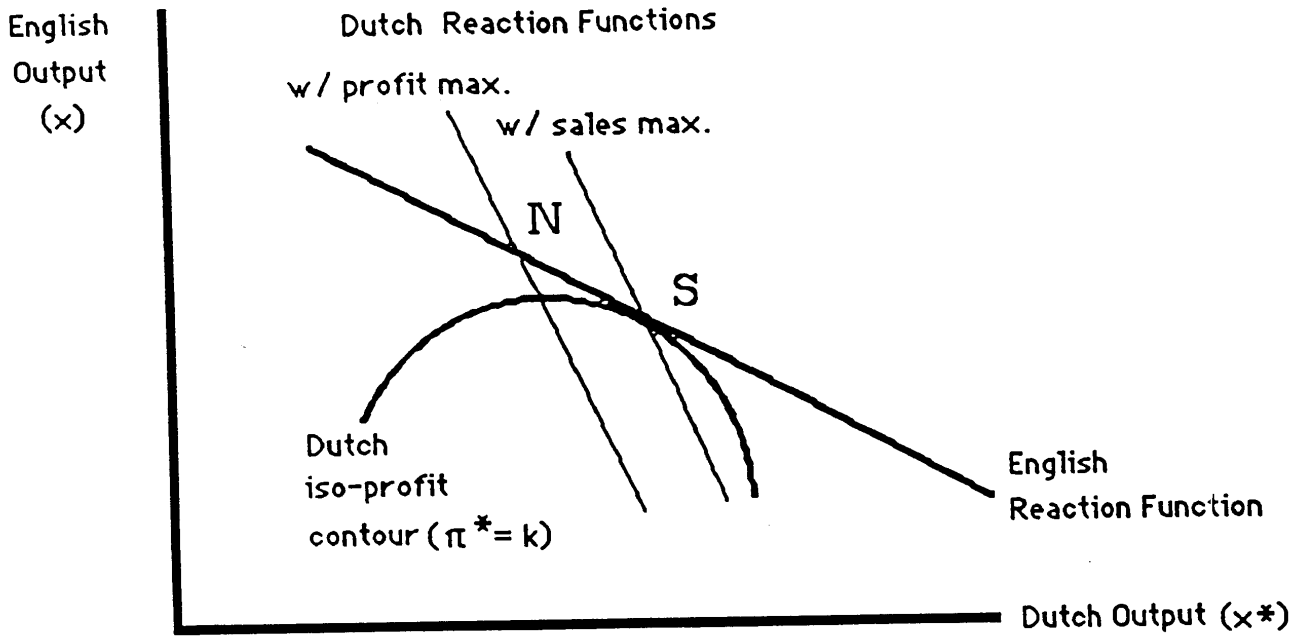
English
Output
(x)

Dutch Reaction Functions

w/ profit max.

w/ sales max.

N

S

Dutch
iso-profit
contour ($\pi^* = k$)

English
Reaction Function

Dutch Output (x*)

Figure 1: Duopoly Equilibrium

Table 1

Central Parameters

p	=	£ 83	'000	lbs
x	=	1.60	million	lbs
x*	=	2.28	million	lbs
c	=	£ 35	'000	lbs
c*	=	£ 35	'000	lbs
ϵ	=	-2.0		
γ	=	0.4		

Data Sources: See text.

Table 2

<u>Simulation Results: Pepper Trade in 1622</u>

(I)	p	x	x*	π	π^*	$\pi+\pi^*$
Cournot Competition						
(dx*/dx = 0)	64.8	2.789	2.789	83.2	83.2	166.4
Collusion						
(dx*/dx = 1)	79.8	2.092	2.092	93.6	93.6	187.2
Perfect Competition						
(dx*/dx = -1)	35.0	4.184	4.184	0.0	0.0	0.0

(II)	p	x	x*	π	π^*	$\pi+\pi^*$
Oligopolistic Rivalry (γ = 0.4)						
(dx*/dx from data)	83.0	1.600	2.280	76.8	109.4	186.2
Dutch Profit-Maximization (γ = 1)						
(dx*/dx from data)	87.2	1.741	1.741	91.0	91.0	182.0
English Subsidy (s = £85.0)						
(dx*/dx from data)	65.3	3.842	1.694	443.0	51.3	494.3
English Interdiction (t = 0.26)						
(dx*/dx from data)	83.0	1.600	1.980	56.8	84.6	--

Table 3

Sensitivity Analysis .
(Pepper Trade in 1622)

ϵ

	-1.0	-2.0	-3.0
optimal subsidy	£ 48	85	120
net English gain	£ 15.7	39.7	65.1
(in thousands)			
p	69	65	64
x	2.73	3.84	4.96
x^*	1.81	1.70	1.63
π	224	443	737
π^*	61	51	47

Table 4

<u>Simulation Results: Textile Trade in 1670s & 1680s[1]</u>

	p	p*	x	x*	π	π^*
1670s						
Duopolistic Rivalry						
(dx*/dx from data)	702	870	545	137	94	41
English Subsidy (s = -£32)						
(dx*/dx from data)	719	877	459	139	79	32
(w/out consumer surplus)						
English Subsidy (s = £251)						
(dx*/dx from data)	565	839	906	118	259	22
(w/ consumer surplus)						
1680s						
Duopolistic Rivalry						
(dx*/dx from data)	687	693	760	347	97	39
English Subsidy (s = -£55)						
(dx*/dx from data)	720	697	630	360	66	42
(w/out consumer surplus)						
English Subsidy (s = £99)						
(dx*/dx from data)	627	685	995	323	165	34
(w/ consumer surplus)						

1. Other assumptions:
   in 1670s, $\epsilon = -3.0$, $\sigma = -5.0$, $c = 530$, $c^* = 650$.
   in 1680s $\epsilon = -3.0$, $\sigma = -5.0$, $c = 560$, $c^* = 580$.

Table 5

<u>Sensitivity Analysis</u>

Textile Trade in 1680s

(optimal subsidy, exclusive of consumer surplus)

σ

		- 2	- 5	- 8
- 1.5		-188	-119	- 90
- 3.0		- 98	- 55	- 34
- 4.5		- 50	- 19	- 15

ϵ

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