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Mercantilism as Strategic Trade Policy: The Anglo-Dutch Rivalry for the East India Trade

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This paper interprets seventeenth-century mercantilism in light of recent theories of strategic trade policy. Long-distance international commerce during the mercantilist period was undertaken chiefly by state-chartered monopoly trading companies and was therefore conducted under conditions of imperfect competition. 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. Dutch supremacy in the early East India trade was facilitated by a managerial incentive scheme in the monopoly charter that enabled it to achieve a Stackelberg leadership position against the English. Using data from the East India trade around 1620 in a Cournot duopoly model, I find that the managerial incentives yielded greater Dutch profits than would have been obtained from a standard profit-maximizing objective and that the scope for other strategic trade policies was clearly present.

I.   Introduction

The seventeenth century defined the age of mercantilism, in terms of both 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 en-

sure that these gains accrued to one's own country, a pursuit that even carried European states into military conflict with one another over commercial interests.

This paper proposes a new interpretation of mercantilism based on an analogy between mercantilism and recent theories of strategic trade policy.[1] The literature on strategic trade policy, reviewed in Helpman and Krugman (1989), examines optimal commercial policy when international trade is conducted under conditions of imperfect competition. These models share the feature that government intervention can impart strategic advantages on domestic firms in competition with foreign firms, giving trade policy the potential to increase national welfare. In one prominent analysis, for example, Brander and Spencer (1985) 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 commit to a higher level of output, thereby forcing foreign output to contract and shifting profits to the domestic firm at the expense of the foreign firm. Brander and Spencer show that these subsidies increase national welfare because the additional profits of the domestic firm exceed the cost of the government subsidy (although 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).

The analogy between mercantilism and strategic trade policy is based 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 interventionist trade policies to capture these rents for one's own country. 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

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[1] In previous studies, Schmoller (1897) maintains that mercantilist policies were designed to consolidate the political power of the nation-state, Heckscher (1935) and Viner (1948) debate whether considerations of "power" and "plenty" were substitutes or complements in mercantilist doctrine, and Ekelund and Tollison (1981) explain how mercantilist policies arose as a result of rent-seeking merchants.

[2] Intra-European trade, by contrast, was less hindered by government monopoly policies and was actually fairly well established and competitive in the seventeenth century.

state promotion of overseas trade for reasons of power and profit were unquestioned in mercantilist writings.[3] 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.

   The purpose of this paper is to illustrate the analogy between mercantilism and strategic trade policy by examining the seventeenth-century Anglo-Dutch rivalry for the East India trade. Section II of this paper provides details about the competition between the English East India Company and the Dutch East India Company for Europe's trade with India and Southeast Asia from 1600 to roughly 1630. Evidence presented here suggests that the economic structure of the trade bears striking resemblance to the prototypical Brander-Spencer (1985) analysis of strategic trade policy. Section III assesses how strategic trade policies contributed to the Dutch domination of the East India trade during the first half of the seventeenth century. Forsaking the standard tariff and subsidy instruments of commercial policy, the Dutch government used the monopoly charter to institutionalize managerial incentives to deviate from profit maximization. This enabled the Dutch company to commit to a higher level of output and reap greater profits, as in the models of Fershtman and Judd (1987) and Sklivas (1987). Results from a duopoly model calibrated with data from the East India pepper trade in 1622 illustrate the possible economic effects of various trade policies and institutional arrangements on the strategic rivalry between the two companies. Section IV offers some concluding thoughts.

II. 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 great 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, merchants still found it profitable

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[3] In an earlier version of this paper (Irwin 1990), I discuss the similarities between mercantilist economic thought and the thinking that underlies theories of strategic trade policy. Both suggest that 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.

to carry on a small trade with regularity. In 1498, the Portuguese explorer Vasco da Gama opened an entirely new route between Europe and 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.[4]

After individual English voyages to Asia in the 1590s yielded 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 trading opportunities with Asia. A royal charter from Queen Elizabeth I granted the company a 15-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.[5] 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 with bullion to make purchases and English goods to trade. Good fortune would have the ships return with a tremendous booty of Asian goods—such as pepper, cloves, nutmeg, indigo, silk, tea, and cotton goods—ready to fetch high prices in England and Europe and thereby compensate the joint stockholders several times over for their expense and risk. In the first half of the seventeenth century the company was simply a shipping concern, arbitraging large price differentials between European and Asian markets but not engaging in production.

During its first decade, the English East India Company dispatched one ship a year on average to Asia, but by the mid-1620s sent about four ships a year (Steensgaard 1974, p. 170). Losses due to shipwreck diminished with time—about 7 percent of the roughly 135 voyages before 1630 never returned (Krishna 1924, p. 334 ff.)—although the threat of looting and piracy was an additional concern. Yet the East India trade proved to be profitable: the first two voyages earned a 95 percent profit, and net 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

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[4] On the East India trade in general, see Khan (1923), Steensgaard (1974), and Furber (1976). The best references on the early English East India Co. are Krishna (1924) and Chaudhuri (1965); on the Dutch East India Co., see Glamann (1958) and Bruijn, Gaastra, and Schöffer (1979–87).

[5] The East India Co. was not required to pay for its monopoly privilege. The crown had an interest in granting the charter as a form of patent protection to encourage investment in the trade route and was indirectly compensated by revenues from customs duties and by expansion of England's maritime capability.

in Asia fetched £1,914,600 in Europe (Khan 1923, p. 17). This excludes transportation costs but is indicative of the markup (by a factor of five) achieved by the company. Pepper from Indonesia dominated the company's trade in both value and volume for the first several decades of the East India trade. Profit margins shrank as the trade expanded, with pepper prices falling in Europe by roughly a quarter between 1609 and 1626 (Chaudhuri 1965, p. 151).

For a few years before the formation of the English company, independent Dutch merchant groups had been engaged in routine commerce with Southeast Asia. In 1602, the States General (the Dutch governing body) initiated and helped finance the formation of the Dutch United East India Company, or VOC (Vereenigde Oostindische Compagnie), which was granted exclusive monopoly rights to engage in trade with Asia. By this stroke, Dutch trade was consolidated under the management of a single company in a government-sponsored effort to compete more effectively with trade rivals. Like the English, the Dutch mainly imported and reexported spices, with pepper accounting for nearly 60 percent of company trade by value in 1619–21 (Glamann 1958, p. 13). But the VOC clearly dominated shipping volume in the early East India trade, returning 65 ships to England's 35 during 1615–25 (Steensgaard 1974, p. 170), with shipping losses comparable to those of the English (Bruijn et al. 1987, 1:91).

While the rivalry between the English and Dutch companies in Asia was not plagued by outright commercial wars like the frequent conflicts in the European theater, the Dutch were tenacious in their efforts to eliminate foreign competitors from the spice islands of Indonesia. The VOC sought monopoly contracts with the principal spice-supplying regions to foreclose competitors and, unlike its English counterpart, was empowered to make treaties, acquire land, and build forts, thereby laying the groundwork for future colonization. The VOC penchant for looting rival vessels on occasion and intimidating English merchants in the region led to constant tensions and even an outbreak of hostilities in 1617–19 when the Dutch seized four English ships. After the mid-1620s, the English gradually ceded further trade with the spice islands to the Dutch and withdrew to trade in the far western points of Southeast Asia and with the Indian subcontinent at initially reduced trade volume and profits.

While territorial control (either direct or indirect) ultimately provided the basis for the Dutch domination of the region's international trade, a particular type of strategic policy facilitated the Dutch success. Before one asks how such policies contributed to the Dutch position during the first half century of the East India trade, another question has to be posed: How closely do the economic and institu-

tional details of the early seventeenth-century East India trade (from 1600 to roughly 1630) bear resemblance to the Brander-Spencer (1985) analysis of duopolistic export competition? To assess whether the conditions of the East India trade conform to the assumptions of this framework, consider eight key elements of their model in light of the trade from the perspective of the English East India Company.

a) Partial equilibrium.—The partial equilibrium assumption is appropriate here because the early seventeenth-century East India trade was a very small and emerging trade, if a particularly intriguing and exotic one, in contrast with the more mundane intra-European trade that accounted for the overwhelming proportion of England's international commerce. Even by 1663, according to Davis (1962, p. 17), only 8,000 of the total 126,000 tonnage of ships engaged in England's foreign trade was taken up servicing the East India trade route.

b) Single homogeneous good.—Brander and Spencer abstract from product differentiation, an assumption in accord with the early East India trade in homogeneous commodities such as pepper and other spices.

c) Duopoly with no entry.—Brander and 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. This assumption is quite accurate in describing the rivalry between the English and Dutch companies. Entry by other English and Dutch merchants was explicitly prohibited under the terms of the government charters granting the companies exclusive rights to the trade, rights legally enforceable against interlopers.[6] Other European countries were not competitors at this time because their maritime capabilities were not sufficiently advanced in long-distance overseas trade. (France did not form an East India company until 1664.) Spain and Portugal ruled the seas in the sixteenth century, but different seas owing to a papal decree in 1493 that 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 with forceful encouragement from the Dutch. The Portuguese quickly became a residual trader in Asia, and the English and Dutch accounted for about 80 percent of the East India pepper trade by the early 1620s (Chaudhuri 1965, p. 144). Moreover, as Wake (1979) and Steensgaard (1974, p. 171 ff.) document, overseas shipments of Asian goods to Europe after 1600 entirely displaced the more costly land transport of such goods via the Levant.

[6] Consequently, the East India trade experienced almost no entry or smuggling from other English or Dutch merchants for much of the century, although the English East India Co. was eventually challenged by interlopers in the 1680s.

d) *Monopoly profits.*—Imperfect competition gives rise to monopoly profits that are shared by the duopoly. As previously discussed, there is little doubt that the early East India trade was lucrative, suggesting that such rents did exist for the trading companies engaged in the trade. Table 1 shows that an English East India Company investor received an annual average return of about 25 percent over the first decade of the trade (inclusive of shipping losses), about three times the market rate of interest in London, although profits fell off after 1615 owing in part to increased Dutch competition. This was high enough to elicit numerous complaints against the monopoly from resentful merchants who were excluded from the trade. Figures in Krishna (1924, p. 77) suggest comparable profitability for the VOC: a total dividend of 307.5 percent was returned to Dutch investors over 1605–20, amounting to roughly 20 percent annually.

e) *Cournot-Nash game.*—The assumptions of the Cournot duopoly framework, which entail two firms engaged in a static, noncooperative, one-period, simultaneous-move game, fit very few cases at any period in history but can be partially justified here. The competition was clearly noncooperative to judge by the tense relations between the firms and by the failure of collusive agreements to hold.[7] The two companies made decisions about how many ships to return to Europe in a given year more or less simultaneous because of the nature of the annual sailing season to the East Indies. Ships returning to European ports had to depart within a window of less than 6 months to avoid the monsoon season in Asia and to avoid passage around the Cape of Good Hope in winter (Davis 1962, p. 258).[8] Neither firm had the ability to determine precisely how many rival ships were to be sent or returned in a given season. Once the separate, simultaneous decisions had been made, the annual season would end with all goods auctioned off on wholesale markets on arriving in European ports. Consequently, the firm's choices are modeled as a repeated game, each of whose constituent subgames has a significant probability of being the terminal period (the monopoly charters could expire, be revoked, or be rendered moot by interlopers). The repeated one-shot game is motivated by the fact that, in the early years of the trade, the companies were busy arbitraging prices of goods

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[7] Government representatives met in London in February 1619 and agreed to split the spice trade (one-third for the English and two-thirds for the Dutch, with an equal division of the pepper trade), but company actions ensured that the agreement was moot not long after the ink was dry (see Glamann 1958, p. 76).

[8] Dutch shipping records indicate that from 1602 to 1624, over 64 percent of ship departures from the East Indies were concentrated from November to January, and over half of all departures from the Netherlands took place between December and February (with about 85 percent by May) (see Bruijn et al. 1987, 1:63, 78).

TABLE 1

ENGLISH EAST INDIA COMPANY PROFITABILITY

Years	Voyages	Total Profit (%)	Average Annual Return to Stockholders (%)
1606–08	3d–5th	234	. . .
1609	6th	121$\frac{2}{3}$	14
1610	7th	218	26$\frac{1}{3}$
1611	8th	211	66
1611	9th	160	26$\frac{2}{3}$
1611	10th	148	24$\frac{1}{2}$
1613–20	1st joint stock	87$\frac{1}{2}$	>7$\frac{1}{4}$

SOURCE.—Chaudhuri (1965), pp. 211–17.

between the two markets and were not incurring fixed costs of pro-
duction, undertaking irreversible ship investments, or engaging in
preemptive acquisition of territory. Under these conditions, the
unique subgame perfect equilibrium may be described by the static
Nash equilibrium in each period.

   f) Cournot (quantity) competition.—A key assumption of the
Brander-Spencer model 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 Eaton and
Grossman (1986) demonstrate, 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 the Brander-Spencer model because it is often difficult to
assess whether firms are competing with quantities or prices.

   No such ambiguity arises in considering the East India trade be-
cause the firms clearly competed with quantities. The choice variable
for both companies was the number of ships to have return in a given
sailing season, thus determining the quantity of goods that would
arrive at European ports in the coming months. Once both compa-
nies' ships arrived from Asia loaded with a fixed quantity of goods,
these goods would be auctioned on European wholesale markets. Be-
cause the cost of each voyage was paid up front and the private
investors had an interest in receiving dividends immediately to retire
current debts, in most instances all returning goods were placed onto
the market on arrival.

Less appealing is the idea that the companies necessarily enter-
tained Cournot conjectures about how one counterpart would re-
spond to changes in the other's output. This paper departs from
the Brander-Spencer analysis by taking a more flexible conjectural
variations approach in Section III.

g) *Constant costs.*—In contrast to many models of imperfect competi-
tion in international trade, Brander and Spencer assume that the
single good can be produced under conditions of constant or increas-
ing marginal cost and without recoverable fixed costs. The assump-
tion of constant costs is taken to be a reasonable reflection of the two
cost components of the East India trade, shipping and acquisition.
First, the cost of ships was not fixed because there existed a well-
functioning capital market in ships. The East India Company could
lease ships from the competitive intra-European shipping market in
the event that it was short of available tonnage in a given year.[9] Pric-
ing in the rental market for ships was based not on a fixed charge
per ship, but on a flat freight rate on the required tonnage.

Second, the English and Dutch East India companies made only
marginal demands on many goods produced and available in South-
east Asia during the early years of the trade. There is little evidence
that the companies had much scope to exercise monopsonist power
at this time. Prices in Asia could still vary from port to port depending
on local conditions and from year to year depending on production.
Yet cost prices of pepper in Asia were roughly constant in the early
1620s despite variation in the volume of English East India Company
shipments (Chaudhuri 1965, p. 148). Consequently, acquisition costs
are treated as constant in a given year, with the various sources of
supply in the Asian market as a whole ensuring that the trading
companies could purchase as much as they could fill ships with at a
given price.

h) *Exports to third markets.*—Brander and Spencer assume that all
trade occurs in third markets so that calculations of national economic
welfare do not require an accounting of consumer surplus and the
profits of the exporting firm become equivalently identified with na-
tional welfare. This assumption is reasonably accurate here: About
80–90 percent of English East India Company pepper was reex-
ported to northern Europe and the Mediterranean because of the
limited market for pepper in England.

III.   Strategic Policies and the East India Trade

To determine the basis for the Dutch advantage in the pepper trade
around 1620, the institutional structure of the two companies will be

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[9] The East India trade grew at a modest pace during its early decades, leaving little
occasion to lend idle ships back to the market.

described and a simple duopoly model will be calibrated to explore more fully the economic consequences of various institutional arrangements and government policies on the relative standing of the rivals.[10]

The setup should now be familiar. Two quantity-competing firms (one domestic and one foreign) export a homogeneous good to a third market under conditions of constant costs. Considerations of domestic consumer surplus do not arise, and firm profits are equivalent to national welfare. A standard assumption in duopoly models is that the inverse demand function is linear, so that European demand for pepper takes the form

$$p = a - b \cdot (x + x^*), \qquad (1)$$

where p is the price, and x (x^*) is the quantity shipped by the English (Dutch) company. The price elasticity of this demand function is $\eta = -\{p/[b \cdot (x + x^*)]\}$, which can be solved for b and then used to solve for $a = p \cdot [1 - (1/\eta)]$. We can now calibrate equation (1) 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 we can take imperfectly competitive firms as operating on the elastic portion of the demand curve so that price exceeds marginal revenue. Demand is initially assumed to have a price elasticity of minus two, although the sensitivity of the results to this assumption will be examined.

The data appear in table 2. The baseline year for the simulation is 1622, which by all accounts is fairly representative of the 1615–25 period, when, after two decades' experience with the spice trade, the Anglo-Dutch rivalry was near its peak. From contemporary estimates and company data on pepper shipments, the English East India Company shipped 1.615 million pounds of pepper to Europe from the East Indies in 1622, with the VOC contributing roughly 2.280 million pounds (see Glamann 1958, p. 77; Chaudhuri 1965, p. 144; Wake 1979, p. 391). English consumption of 200,000–300,000 pounds of pepper will be ignored. According to Chaudhuri (1965, p. 148 ff.), the prevailing price of pepper in Europe was approximately £83 per thousand pounds, whereas the acquisition price in the East Indies was about £19 per thousand pounds. The VOC invoice price of pepper was equivalent to the English import price (Glamann 1958, p. 76). Steensgaard (1965) places English East India Company shipping costs at £15 per thousand pounds in the 1620s. While Dutch shipping was considered to be the most efficient in intra-European trade,

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[10] Helpman and Krugman (1989) review several recent attempts to calibrate industry data to models of strategic trade policy. The modeling approach used in the simulations here is similar to that in Dixit (1988).

TABLE 2

DATA FOR PEPPER TRADE IN 1622

Price	p	£83 per thousand lbs.
English quantity	x	1.615 million lbs.
Dutch quantity	x^*	2.280 million lbs.
English cost	c	£35 per thousand lbs.
Dutch cost	c^*	£35 per thousand lbs.
Elasticity of demand	η	-2.0
Weight on profits	γ	.4

Steensgaard finds that the Dutch had no advantage in shipping costs over the English in the East India trade. Consequently, total marginal cost for both companies is taken to be £35 per thousand pounds of pepper.

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, what accounts for the larger trade volume and hence greater profits achieved by the Dutch? Linear demand and Cournot conjectures, for example, establish the presumption that the Nash equilibrium is perfectly symmetric in output and profits for identical firms. Neither firm had an entrenched advantage initially because there were no major sunk costs involved in the trade in the first quarter of the century, since forts and factories were to come later. While territorial control was an important long-run factor accounting for the Dutch success, at this stage all aspects of the East India trade were still open to each firm. Comparison of the structure and objectives of each firm, however, reveals a mechanism that facilitated Dutch ascendancy in the trade.

The English East India Company was a private firm organized and run solely by merchants, with no government stake or involvement beyond granting the monopoly charter. It seems very clear from the institutional makeup of the company that its exclusive objective was to choose the quantity of pepper to ship each year to Europe in order to maximize the returns to investors. Thus the English East India Company is assumed to maximize profits, represented by the 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 the quantity of pepper carried to Europe, and c is the constant marginal (shipping and acquisition) cost. The following first-order condition emerges from profit maximization:

$$\frac{\partial \pi}{\partial x} = p - c + v \cdot x = 0, \tag{2}$$

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 $dp/dx = dp/dx^*$).[11]

The institutional structure and economic objectives of the VOC, however, differed significantly from those of the English company. Before the formation of the VOC, Dutch trade with the East Indies was managed by the *bewindhebbers,* who made business decisions regarding the details of particular voyages and the sale of Asian goods in European markets. The *bewindhebbers* were directly accountable to shareholders (*participanten*), who were guided solely by the profit motive. But the granting of monopoly privileges and establishment of close government ties that accompanied the formation of the VOC 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 (Glamann 1958, p. 6 ff.; Steensgaard 1974, pp. 126–41). In characterizing the objective function of the VOC, one must look to the particular incentives facing the *bewindhebbers* who determined the company's shipping schedule. Steensgaard (1982, p. 243) describes these incentives:

> 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]

As a consequence, for the first decades of the company,

> the trading partnership was replaced by a permanent, anonymous capital; the *bewindhebbers* became a managerial group

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[11] If $dx^*/dx = 0$, the firm anticipates that foreign output will not change when its own output changes (a Cournot conjecture); if $dx^*/dx = -1$, the firm becomes a perfect competitor and sets price equal to marginal cost; and by setting $dx^*/dx = 1$, the firm acts in collusion with its rival to maximize joint profits.

with close affiliations to the political authorities; the partici-
pants became holders of negotiable shares with not much
more influence on company business than a holder of gov-
ernment bonds has on government policy, and the strategic
aims of the company were radically changed. [P. 250]

By design, as mandated in the government's monopoly charter, the
bewindhebbers derived income both from their position as stockholders,
for which they earned dividends that arose from profits, and from
their role as managers, for which they earned a percentage of gross
revenue.[12] In essence, the *bewindhebbers* can be thought to have chosen
x^* to maximize a linear combination of profits and revenue,

$$\gamma[p(x, x^*) \cdot x^* - c^* \cdot x^*] + (1 - \gamma)[p(x, x^*) \cdot x^*],$$

with $0 < \gamma < 1$, yielding the following first-order condition:

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

where v^* is the Dutch perceived marginal revenue. Equation (3) mod-
ifies the standard profit-maximizing condition in attaching to mar-
ginal cost the weight the firm places on profits in its objective function
(γ). The *bewindhebbers* would be willing to sacrifice profits for revenue
the more they earned from their managerial role, leading the firm
to understate marginal cost relative to its true value and thereby pro-
duce more output than a profit-maximizing firm.[13]

At first glance such an objective portends conflict between manag-
ers and investors. However, there is no trade-off between "power"
and "plenty" in the context of a Cournot duopoly: Credible Dutch
commitment to a strategy of maximizing a mix of profits and reve-
nues dominated the English strategy of maximizing profits because
it prompted the Dutch to market a larger quantity, and hence earn
greater profits, at the expense of the English. When the Dutch States
General helped form the VOC in 1602, created managerial incentives
in the charter to increase shipping volume, and insulated its managers
from the demands of investors, it institutionalized a contractual in-
centive mechanism enabling the company to commit to a higher level
of trade and to achieve something that approached a Stackelberg
leadership position against the English. This example provides an

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[12] According to the charter, the 60 directors of the VOC were obligated to hold
shares in the company and were to receive 1 percent of the value of equipment and
ships and 1 percent of the proceeds of sales from each returning voyage. This changed
in 1647, when the directors received a fixed salary as compensation (see Bruijn et al.
1987, 1:11 ff.).
[13] An attractive feature of (3) is that the discounting of marginal cost by γ lends itself
to a wide variety of interpretations and can accommodate any conduct that credibly
subordinates considerations of profit to other objectives.

excellent illustration of the Fershtman and Judd (1987) and Sklivas (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 setting. By contrast, the English could not convincingly sustain such a strategy because private investors remained in charge of, and did not wish to relinquish control of, the company and the government had no role in its operation or activities beyond the enforcement of the monopoly charter.

After the formation of the VOC in 1602, the peaceful commerce of the earlier Dutch traders was abandoned in favor of more aggressive behavior to oust rivals from the East India trade. Shipping volume increased sharply and exclusionary tactics were initiated, including harassment of foreign merchants and pursuit of monopoly contracts. Indeed, Dutch stockholders quickly became distressed about the use of company resources for ends not directly related to profits. Their concern over the principal-agent problem proved to be well founded, as the company refused to open its books to investors, declared dividends with reluctance, and repudiated provisions of early agreements with investors by insisting that *participanten* sell their shares instead of receiving their original investment plus dividends if they wanted to reduce their stake in the company. Their concerns may even have been well based: Even though the Dutch as Stackelberg leader earned greater profits than otherwise, investors might still be worse off if revenue payments to the *bewindhebbers* left the overall pool of disbursable profits smaller than in the profit-maximizing equilibrium.

Several simulations using the data in table 2 and equations (1)–(3) allow further insight to be gained into the economic consequences of these institutional arrangements and potential government policies on profits and outputs of the two firms. The first part of table 3 summarizes simulation results in which certain conjectural variations are imposed under the assumption that both firms maximize profits (i.e., $\gamma = 1$). With Cournot conjectures, the equilibrium is symmetric in outputs and profits and the price is lower than that observed in 1622. An enforceable collusive agreement to maximize industry profits might have increased joint profits by 12 percent over the Cournot equilibrium, according to these results. In England, hostility toward monopolies sparked pressures for a "free trade," that is, free entry into the East India trade by all merchants. Had England allowed such entry or had both firms acted as perfect competitors, total output would have doubled from the collusive equilibrium. Because the Asian goods were almost entirely reexported, there would be little national gain from a policy that would have driven profits to zero.

The second part of table 3 describes simulation results using conjectural variations that arise from parameterizing equations (2) and (3)

TABLE 3

Simulation Results: Pepper Trade in 1622

	p	x	x^*	π	π^*	$\pi + \pi^*$
Cournot competition	64.8	2.804	2.804	83.6	83.6	167.3
Collusion	79.8	2.103	2.103	94.1	94.1	188.2
Perfect competition	35.0	4.205	4.205	.0	.0	.0

	p	x	x^*	π	π^*	$s \cdot x$
Duopolistic rivalry $(\gamma = .4)^\dagger$	83.0	1.615	2.280	77.5	109.5	...
Dutch profit maximization $(\gamma = 1)$	87.1	1.754	1.754	91.4	91.4	...
Dutch optimal subsidy $(s^* = £91)$	68.1	1.115	4.176	36.9	518.4	380.0
English optimal subsidy $(s = £83)$	65.4	3.815	1.730	432.7	52.6	316.6
English interdiction $(t = .26)$	83.0	1.615	1.980	56.8	84.6	...

Note —Units: p, s: pounds sterling per thousand lbs., x, x^*: million lbs.; π, π^*: thousand pounds sterling.
† dx^*/dx from the data.

with data from 1622. The actual quantities observed in 1622 are replicated when $\gamma = 0.4$, implying that VOC managers placed almost equal weight on revenues and profits. Had the VOC maximized profits ($\gamma = 1$), Dutch pepper shipments would have shrunk by over 0.5 million pounds (28 percent) whereas English shipments would have expanded marginally. Although the equilibrium price would have risen £4 per thousand pounds and English profits wo·'ld have risen about 18 percent, Dutch profits would have fallen by about 17 percent. Profit maximization entails lower profits for the Dutch because they would have retreated from a Stackelberg leader type of position that committed them to a higher shipment volume than a profit-maximizing firm would have chosen. Thus, at roughly 17 percent according to these results, the Dutch gain from having its particular form of the monopoly charter instead of England's may have been substantial.

Instead of creating distinct managerial incentives in the charter, the States General could have shifted profits from the English to the VOC by an export subsidy. Under the assumption that the VOC maximized profits and that the government set the subsidy to maximize the gain function $G = \pi^* - s^* \cdot x^*$, where π^* is VOC profits and s^* is the per unit subsidy, the optimal subsidy is roughly equivalent to the prevailing market price in 1622. Dutch shipments would have increased to over 4 million pounds, substantially greater than the figure actually recorded, with English shipping greatly reduced

and the market price much lower. The net Dutch gain from enacting the subsidy is just over 50 percent vis-à-vis the profit-maximizing equilibrium. While this is larger than what was achieved under the incentives given by the monopoly charter, the charter could have been modified to provide the necessary incentives to replicate this equilibrium without incurring the cost of the subsidy.

The English did not strive to check the Dutch domination of the East India trade, but had the company persuaded the Privy Council to subsidize it as part of a profit-shifting policy against the VOC, the optimal English subsidy yields results comparable to those of the Dutch subsidy. The subsidy significantly lowers the European price of pepper to the gain of European consumers, increases English shipments by 2.2 million pounds, and decreases Dutch shipments by 0.6 million pounds. While Dutch profits fall substantially, the subsidy brings the English a net gain of about 50 percent above profits in the 1622 equilibrium. As with the previous example, this assumes no retaliation on the part of the other government, an assumption that, given the contentious times of the period, is questionable and particularly implausible for the Dutch.

The English government also could have interdicted and confiscated Dutch shipping in transit from Asia to Europe. A tax on the profits of the English East India Company, for example, could finance the dispatch of an armed British vessel to intercept Dutch ships and confiscate and eventually sell the booty for the profit of the English crown. In a hypothetical case, a 26 percent tax on East India Company profits would yield enough funds to send one English man-of-war to interdict a single Dutch ship and take its contents back to England for reexport.[14] This action would force the Dutch to pay shipping costs on all its trade but receive revenue only from those ships that actually survived the journey back to the Netherlands. Such a policy would not change the market-clearing price and would depress the profits of both companies, but would garnish enough revenue for the English crown from the sale of the Dutch goods to increase 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 data used to calibrate the model—price, quantity, and costs—are fairly reliable. Information on the price elasticity of demand for pepper is notably lacking, and table 4 reports on the sensitivity of the model to different assumptions about the elasticity. The

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[14] This calculation assumes that shipping costs on the East India trade amounted to £15 per thousand lbs. and the average yield per ship for both the English and the Dutch was about 0.3 million lbs. of pepper per ship.

TABLE 4

SENSITIVITY ANALYSIS: PEPPER TRADE IN 1622

	ELASTICITY OF DEMAND		
	−1.0	−2.0	−3.0
Optimal subsidy (£)	47	83	120
Net English gain (£000's)	14.4	38.5	64.3
Price	69	65	64
English quantity	2.72	3.82	4.99
Dutch quantity	1.84	1.73	1.67
English profits	220	443	741
Dutch profits	62	53	47

NOTE. See note to table 3.

optimal English subsidy, for example, 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 demand is more elastic because then there is greater scope for expanding England's exports.

Aside from this sensitivity to demand, another caveat suggests that caution is required in interpreting these results. The conjectural variation framework presented above and used frequently in oligopoly models is an awkward and somewhat arbitrary method of dealing with the responses of firms to changes in rivals' actions. Each of the policy experiments described above was conducted under the assumption that the conjectural variations of the two firms remain 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.

IV.   Final Observations

This paper proposes a new interpretation of seventeenth-century mercantilism—based on recent theories of strategic trade policy—to enhance our understanding of the period's economic thought and commercial policies. The Anglo-Dutch rivalry for the East India trade, and perhaps other imperfectly competitive long-distance commerce of the period, illustrates a situation in which the profit-shifting opportunity for trade policy was clearly present. Dutch supremacy in the early East India trade was not achieved through government

subsidies but was facilitated by managerial incentives in the monopoly charter to increase shipping revenue.

This particular episode ends with an ironic twist that serves as a caution to advocates of strategic trade policies. By gradually acquiring territory on the spice islands of Indonesia, the Dutch succeeded in preempting rivals from the region but committed themselves to a trade that was to decline in importance in the second half of the century. Meanwhile, passive in their response to the Dutch commercial tactics and ousted from much of Southeast Asia, the English were forced to divert their trade toward India. Once established in India, the English were exceedingly—and unwittingly—well positioned to capitalize on what soon became the much more profitable and more rapidly growing cotton textile trade. In this trade they achieved preeminence toward the end of the seventeenth century and thereafter.

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