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EXPORT INTERMEDIARIES AND INDUSTRIAL
EXPANSION:
A THEORETICAL PERSPECTIVE

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E.E.P.A. Discussion Paper No. 20

August, 1988

Prepared for
Employment and Enterprise Development Division
Office of Rural and Institutional Development
Bureau of Science and Technology
U.S. Agency for International Development
Washington, D.C. 20523
Grant No. DAN-5426-C-00-4098-0

The Employment and Enterprise Policy Analysis Project is composed of a consortium of the Harvard Institute for International Development (Prime Contractor), Development Alternatives, Inc., and Michigan State University (Subcontractors). E.E.P.A. provides technical assistance to USAID missions around the world on problems related to employment and small- and medium-scale enterprise development, and performs research on these issues for AID's Bureau of Science and Technology in Washington. For further information on E.E.P.A. contact:

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ABSTRACT

A model demonstrates how reciprocal market-completing externalities can progressively reduce the costs of market transactions among buyers, export intermediaries and manufacturers and thereby sustain endogenous industrial expansion subsequent to an initial exogenous stimulus. Transactions cost analysis accounts for the presence of intermediaries. Comparative static analysis reveals that endogenous expansion is greater if industrial firms are small, and if a nation is transactionally relatively efficient at the outset of industrialization. Reciprocal market-completing externalities emerge as the counterpart for small-firm industrial economies, such as Taiwan's, to dynamic internal economies in large-firm industrial economies, such as Korea's.

Analysis that places externalities at the center of the process of industrial expansion, pioneered by Scitovsky (1954) and Hirschman (1958), is enjoying something of a revival.¹ This paper combines externality analysis and transactions cost analysis² to explore the relation between the character and intensity of growth-promoting externalities and the nature of the institutions that dominate a country's industrial sector. More specifically, the paper presents a model that demonstrates how, in institutional settings in which markets are dominated on both sides by relatively small firms, 'market-completing dynamic externalities' -- externalities created reciprocally by the entry of participants on one side of a market for participants on the other-- can progressively reduce the costs of market transactions and thereby sustain endogenous expansion subsequent to some initial exogenous stimulus.

The impetus for the theory was a puzzle that emerged in the course of comparative field research on patterns of industrialization in Korea and Taiwan. For all of the similarities in pricing and macroeconomic policies,³ the institutional foundations of outward-oriented industrialization were quite

¹ For overviews of the implications of external economies for strategic trade policy in industrialized and less developed countries, see Krugman (1987) and Pack and Westphal (1986).

² For a landmark contribution, see Williamson (1985). For a synthesis of Williamson's and related perspectives, see Alston and Gillespie (1988).

³ For a useful summary of the most relevant similarities, see Paul W. Kuznets (1988)

different in the two countries: between 1966 and 1976, the number of manufacturing firms in Taiwan increased by 150 percent, while the average enterprise size, measured by number of employees, increased by only 29 percent; over the same period, the number of Korean manufacturing firms increased by only 10 percent, and the number of employees per enterprise by 176 percent.⁴ The process of industrial expansion based on large enterprises is by now quite well understood; the role in this process of learning economies within the firm appears to be particularly crucial.⁵ This paper highlights market-completing dynamic externalities as the counterpart of internal learning economies in industrial economies where small and medium enterprises play a central role.

Consistent with field observation of the disproportionately large roles played by export traders in Taiwan relative to Korea,⁶ the model is developed for markets in which intermediaries -- agents who use specialized skills and

⁴ Establishments with 500 or more employees accounted for 25.7 percent of Korean manufacturing employment in 1966, and 40.5 percent in 1981; 500-or-more employee establishments accounted for 34.7 percent of Taiwan's 1966 manufacturing employment, but for only 27.5 percent of the corresponding share in 1981. Estimates of shares in 1966 and 1981 are from Republic of Korea, Economic Planning Board, Mining and Manufacturing Surveys, and Republic of China, Directorate-General of Budget, Accounting and Statistics, Executive Yuan, The Reports on the Industrial and Commercial Census, Taiwan-Fukien Area; the data on patterns between 1966 and 1976 are from Scitovsky (1986).

⁵ For a useful synthesis, see Pack and Whalley (1986); see also Amsden (1988).

⁶ In 1973 there were 2,800 export traders active in Taiwan (with an average value of \$1.4 million industrial exports per trader) and 1,200 in Korea (with an average industrial export value of \$2.4 million per trader). By 1984, the number of export traders active in Taiwan had risen over seven-fold to 20,600 (with industrial exports per trader remaining steady at \$1.4 million per trader); the number active in Korea had risen somewhat more than four-fold to 5,300 (\$5.2 million industrial exports per trader). A comparative case study of the footwear industries in the two countries uncovered quite distinctive roles for national traders in particular: in Taiwan, export trading operations run by nationals accounted for 50 percent or more of the sales of over three-fourths of the firms; none of a sample of Korean firms channelled more than 50 percent of their exports through national traders. See Levy (1988) for further details.

information to match buyers and sellers of some specified product -- play a central role. In principle the analysis is more general, and has the potential to help explain, for example, how market-completing externalities can sustain endogenous expansion via a proliferation of vertically-related subcontracting among independent small and medium enterprises.⁷

The paper is organized as follows. The first section lays out from a transactions cost perspective the rationale for the presence of intermediaries. The second section takes as its starting point optimizing behavior on the part of individual buyers, traders and manufacturers, and develops a model that demonstrates how reciprocal market-completing externalities can set in motion a process of endogenous expansion subsequent to some initial exogenous stimulus. The third section analyzes the comparative statics of how the extent of endogenous expansion might vary with the size of firms, and with the specific economic conditions prevailing in individual countries. The final section explores some implications of the analysis for industrial policy.

THE ROLE OF TRADERS: A COMPARATIVE INSTITUTIONAL ASSESSMENT

From a transactions cost perspective the presence of traders signals that, in a world of bounded rationality and opportunism, they represent a privately efficient institutional mechanism for organizing some class of economic transactions. The task of analysis is to specify the character of that class of transactions, and to delineate the nature of the advantage enjoyed by traders.

⁷ For some evidence of a Korean propensity towards vertical integration, and a Taiwanese propensity towards subcontracting in similar product lines, see Levy (1988), Levy and Kuo (1987), and Amsden (1985, 1988).

Transactional Characteristics

The analysis focuses on market transactions for products as disparate as running shoes, custom-fashioned clothing, childrens toys, and standardized electronic components, transactions characterized by the following features. First, the products are well-defined and have attributes that are measurable at relatively low cost. Second, they are manufactured using general purpose technology, with no productive asset dedicated to fulfilling the particular order of some specific buyer. Third, although there exists the potential for recurrent exchange, both buyer and seller enter into a specific transaction solely on its expected merits. Fourth, each transaction involves a delay between the time when buyers specify the design of the product and place their orders, and the time of delivery. Fifth, the transactions are international: buyers in the importing country buy from manufacturers in the exporting nation, with the objective of earning a profit by reselling to final users in the importing country. Sixth, production from the exporting country is a small fraction of the total potential world market; thus expansion in export capacity is assumed to have no impact on the price paid by consumers. Finally, markets are competitive. Firms are not identical however, but differ in their earnings of efficiency rents.

Two implications follow straightforwardly from the above. First, the absence of specific, dedicated assets, the ready measurability of the product to be traded, and the absence of any presumption of recurrent, long-term exchange together imply that there is no incentive for any party to organize the transaction on a vertically integrated basis, or for the parties to engage in

complex bilateral or trilateral contracting.⁸ Second, the time delay implies a measure of risk for both buyer and seller but the ready measurability of output implies that participants can straightforwardly secure contractual protection. Typically, this contractual protection takes the form of a promissory note (a letter of credit) issued by a bank on the authority of the buyer, with the buyer obligated to pay only upon receipt of the goods in satisfactory condition; in some countries manufacturers are able to borrow against this letter of credit to cover the costs of their working capital.

It is important for what follows that, notwithstanding contractual protection, the parties are not indifferent as to whom they contract with, or as to whether contractual obligations are met. Parties on each side of a transaction are taken to differ both in the terms they offer, and in the reliability with which they meet these terms. Aside from differences in competence, suppliers in particular may have an incentive to behave opportunistically,⁹ for example taking on orders as a way of gaining access to rationed, relatively low-interest working capital for other purposes, with no interest of fulfilling the contracted terms.¹⁰ Correspondingly, each potential participant is taken to be boundedly rational: prior to a transaction, participants are assumed to have no information as to the capabilities of each

⁸ Insofar as use of intermediaries multiplies the number of relevant contracting relationships, their role is likely to be limited in transactions involving complex, long-term contracts. For the relationship of asset specificity and recurrent contracting to vertical integration, see Williamson (1985) pp. 42-63. For an analysis of complex bilateral or trilateral contracting, see Williamson (1985) pp. 74-77; 163-205. For the relationship of measurability to vertical integration, see Barzel (1982).

⁹ As defined by Williamson (1985) pp. 47-49.

¹⁰ For evidence of the disproportionately low-cost character of working capital in Korea and its impact on the behavior of manufacturers, see Park (1983); also Cole and Park (1983).

of their potential counterparts; but they can, at a cost, engage in search activities as a way of learning about these capabilities.

Buyers and sellers have different search tasks, given contractual protection of the form described above. Sellers (be they manufacturers selling either to intermediaries or final buyers, or intermediaries selling to final buyers) are assured of payment subsequent to the issuance of a letter of credit; thus their transactional task is to search among buyers for those offering favorable unit prices for a given set of quality requirements. Buyers (be they final buyers procuring directly from manufacturers or indirectly through intermediaries, or intermediaries procuring from manufacturers) also search for favorable price-quality offers; but they are concerned in addition with the reliability of suppliers. Notwithstanding contractual protection, nonperformance would lead buyers to lose any profit they stood to gain through resale of the purchased items. And plans for resale typically involve obligations to parties downstream, so buyers suffer costs of reputation loss if they do not meet the obligations.¹¹ Thus, buyers search for information on potential sellers' reliability as well as price and quality.

The Role of Traders

What institutional mechanism of search is likely to be most efficient for buyers? With vertical integration ruled out, buyers can either search directly among potential manufacturers, or they can procure through intermediaries. Reflection (and a review of the fragmented and, for the most part, anecdotal, literature) uncovers no shortage of reasons why procurement through

¹¹ Of course, in principle a purchase contract could include penalty clauses for nonperformance. But, unlike the self-enforcing protection afforded by a letter of credit, the enforcement of penalty clauses typically requires costly recourse to the legal system.

intermediaries is likely to be the more efficient choice in a wide variety of circumstances. Eight distinct propositions that point to the efficiency advantages of intermediaries (some more plausible than others) can be delineated.

Proposition 1. Insofar as procurement is international in character and from a supplying country with which the putative buyer has no prior experience, buyers need to learn about the formal and informal requirements associated with exporting from the supplying country. Such information is in the nature of an indivisible set-up cost borne by each firm that procures from the relevant exporting country. Given this indivisibility, it is likely to be more efficient for small volume buyers in particular to procure from traders able to spread their overhead costs among multiple purchasers than to seek to procure directly from manufacturers.¹²

Proposition 2. International procurement requires familiarity with the cultures, and proficiency in the languages, of both the importing and exporting nations. Insofar as these capabilities are in scarce supply, there might be substantial returns from employing them to maximum capacity. And insofar as these skills can be supplied most efficiently by individuals expert in trading in the relevant industry, there is a case (for all but the largest buyers) for concentrating these skills within a specialized trading operation.¹³

Proposition 3. Along with general trading information, international procurement requires specific information on the attributes of potential

¹² Caves (1974) uses a parallel argument to explain why multinational firms tend to be relatively large.

¹³ A number of scholars have suggested that the central role played by giant Japanese trading companies may in part have its origins in the initial scarcity of Japanese familiar with the institutions of foreign trade, and conversant in English. For one example, see Yoshino and Lifson (1986) p. 21..

manufacturers. This information, once collected, represents a quasi-public good within a firm insofar as there is little, if any, incremental cost to repeated use. Direct buyers by definition collect information solely for the purposes of their own procurement decisions. But intermediaries can sell information as to the characteristics of manufacturers to multiple buyers, thereby spreading the information costs among a larger number of transactions. Insofar as intermediaries serve multiple buyers, both marginal and average costs per purchaser of information will be below the cost associated with direct procurement.¹⁴

Proposition 4. Asymmetries in position and in the availability of information imply that information costs and the costs of securing contractual compliance are likely to be low for traders national to the exporting nation, relative to both direct buyers and traders headquartered in the importing (or some third) country. First, knowledge of their domestic business environment is nothing special to traders national to the exporting country, accumulated as a relatively costless joint product in the course of routine business activity. Second, being local may make it less costly for a national than for a foreign company to navigate the bureaucratic maze, and the maze of custom associated with trading. Third, a national is likely to tap more readily into channels that afford reliable, low cost information with respect to the attributes of individual suppliers. Fourth, by virtue of kinship and similar ties, traders national to the exporting country might be able to compel compliance from manufacturers, ensuring that they abjure opportunism and supply reliably as

¹⁴. At least implicitly, this proposition underlies the rationales for intermediation developed in the business literature on marketing channels. See Etgar and Zusman (1982); also Balderston (1958).

contracted, at lower cost than might foreign buyers or traders.¹⁵ Thus it will be efficient to procure through traders national to the exporting country, assuming that they can be identified at relatively low cost.

Proposition 5. Manufacturers and traders national to the exporting country (and manufacturers and traders headquartered elsewhere) may differ systematically in the reputations they enjoy with buyers. Insofar as intermediaries tend to have more established reputations than do manufacturers, buyers will find it less costly to learn about the attributes of intermediaries than about the attributes of manufacturers. An important corollary, highlighted by Akerlof (1970), is that the presence of intermediaries that both have established a reputation with buyers and have access to low cost channels of learning about manufacturers, adds to the opportunities for entry by new firms in the exporting nation.

Proposition 6. There may be scale economies in the acquisition of specific information as to the attributes of potential manufacturers insofar as the incremental costs of learning about one more supplier fall with the accumulation of industry-specific knowledge. Alternatively, insofar as a broad information base yields valuable system-related insights that cannot be captured by more narrowly focused knowledge (insofar, that is, as there exist informational externalities such that incremental information increases the value of existing knowledge), marginal returns might rise with the accumulation of additional information.¹⁶ The presence of economies of scale implies that

¹⁵ For discussion of the informational disabilities of foreigners relative to nationals in the context of the analysis of multinational firms, see Caves (1982) pp. 12-13. For a general discussion of the impact of kinship ties on contracting, see Ben-Porath (1980).

¹⁶ For the advantages of a broad information base, see Cho (1987) pp. 100; also Yoshino and Lifson (1986) pp. 53-4.

procurement through intermediaries will be efficient for all but the largest buyers.

Proposition 7. The indivisible assets described in propositions 1 and 2 are not specialized to trade in any specific commodity. Thus, insofar as the set-up costs associated with each are substantial and, as quasi-public goods they are available in unlimited capacity within the firm, trading companies might be able to realize economies of scope by dealing in more than one commodity.¹⁷

Proposition 8. Along with informational and bureaucratic tasks, international procurement involves financing, warehousing, and transportation. Insofar as economies of scope can be realized through the joint provision of information, procedural, finance, storage and transportation facilities by a single, functionally diversified trading company, direct procurement by a foreign buyer (and corresponding multiple, independent contracts for the requisite services) would be inefficient.¹⁸

Consistent with propositions 1-8, the model to be developed below takes purchase through intermediaries to represent the efficient institutional mechanism of procurement and explores how, subsequent to an initial exogenous stimulus, reciprocal, market-completing externalities among buyers, traders and manufacturers can sustain a virtuous spiral, a sequential, cumulative reinforcing process of expanded participation in a nation's industrial economy. Comparative static analysis of the model will show market-completing externalities to have a greater impact the smaller are the sizes of firms. And

¹⁷ For an analysis of the relationship between indivisibilities, quasi-public goods and economies of scope enjoyed by firms, see Teece (1980).

¹⁸ For the argument that there are 'synergies' associated with functional diversification by trading companies, see Cho (1987) pp. 93-107; also Yoshino and Lifson (1986) pp. 47-52.

propositions 1-8 help illuminate the circumstances in which firms will be small -- and the endogenous expansion via market-completing externalities correspondingly large -- in transactions involving intermediaries.

First, the propositions imply that intermediaries will receive orders disproportionately from small buyers, and will procure disproportionately from small manufacturers. Propositions 1, 2 and 6 highlight how indivisibilities and informational scale economies might induce small-volume buyers in particular to favor intermediaries; propositions 3-5, 7 and 8 highlight how, for both small and large buyers, the quasi-public good character of information, economies of scope, and informational asymmetries among buyers, traders and manufacturers give efficiency advantages to purchase via traders. But these latter propositions may be unimportant to buyers in large volume if search costs are very small relative to the total value of the order. Thus two submarkets can be distinguished for products where production scale economies (or diseconomies) do not wholly determine industry structure: a submarket for small volume orders, heterogenous in specification, and a submarket for large volume, standardized orders, with intermediaries more likely to participate in the small-volume submarket. Small manufacturers will be represented disproportionately in the small-volume submarket insofar as large manufacturers prefer the greater transactional efficiencies and learning opportunities associated with large orders, and small manufacturers are constrained to small orders. Such a pattern is consistent with observed disparities between Korea and Taiwan in firm size and in reliance on direct procurement relative to procurement through intermediaries.

Second, propositions 1-8 help clarify the determinants of the efficient size of intermediaries. The economies of scale and scope identified in propositions

3, 6 and 8 imply unambiguously that trading companies will be large, and will handle orders from multiple buyers. By contrast, propositions 1, 2, 4 and 7 point to variations across countries in the efficient size of trading companies. Propositions 1, 2 and 7 imply that trading companies will be larger in countries where set-up costs of procurement are relatively high; and proposition 4 implies that trading companies will be smaller in countries intensive in market transactions lubricated by goodwill and associated informal linkages. On both counts trading companies would be expected to be larger in Korea than in Taiwan, given lower levels of per capita income and education and less experience with market transactions in the former nation at the outset of the two countries' export-led industrial expansion.¹⁹

In all, propositions 1-8 identify the circumstances in which procurement through intermediaries represents the efficient institutional mechanism of procurement, and clarify the circumstances in which (as in Taiwan) markets involving intermediaries will be populated by relatively small firms. What remains is to model formally the relations among reciprocal market-completing externalities, endogenous expansion, and the size of firms in the context of markets in which intermediaries channel orders from buyers to manufacturers.

INTERACTIONS AMONG BUYERS, TRADERS AND MANUFACTURERS

This section develops a model that illustrates how reciprocal market-completing externalities among buyers, traders and manufacturers can help

¹⁹ Thus Taiwan's per capita GNP in 1955 was more than 70 percent above that of Korea; and in 1960 the percentage of Taiwanese above the age of six with twelve or more years of schooling was almost three times that of Korea. Back in the late 19th century, at a time when Korea's economy was not yet fully monetized, Taiwan was rapidly being settled by migrants from Fukien province, located between the major trading ports of Shanghai and Hong Kong. See Levy (1988) for additional institutional details and for analysis of their impact on the size of firms.

sustain endogenous expansion subsequent to an initial exogenous stimulus. The next section examines some comparative static determinants of the magnitude of any endogenous effect. Consistent with the central role given to search costs in the analysis of the efficiency advantages of traders, the model begins by depicting the search behavior of individual buyers, traders and manufacturers.

Individual Search Behavior

Given that buyers procure through intermediaries, the model involves three classes of economic agents, and four distinct problems of search: buyers must decide how intensively to sample for a reliable and favorable price-quality match among various intermediaries; traders must decide how intensively to search for profitable orders among potential buyers, and how intensively to search for capable and reliable manufacturers; and manufacturers must decide how intensively to canvass alternative traders in search of profitable orders.

The comparative static analysis in the next section explores the implications of alternative specifications of the efficient size of traders and of manufacturers. Assume for now that orders by buyers are heterogenous in character, and each for identical small volumes, and that each trader and manufacturer handles only a single order per period of time. Given an exogenous specification of the volume produced or traded by each agent, the only choice variable is the optimal level of search by individual buyers, traders and manufacturers. Equations (1) and (2) summarize in the simplest possible way²⁰,

²⁰ The assumption that prices can be stated directly as functions of search intensity characterizes only the most simple search models such as Stigler (1961). As Rothschild (1973) summarizes, more sophisticated effort would take as its starting point an optimal search rule based on sequential search and some reservation price. The rationale for the simplification here is, first, that the focus here is on the determinants of, and some comparative statics associated with, changes in search costs rather than the clarification of a rule for optimal search; and, second, that the comparative static results

an individual buyer's optimization problem for each order that she places.

$$\text{MAX } \Pi_{Bi} = \bar{Q}[\bar{P}_B - P_T(n_B)] - C_{Si}^B(A_T, n_B) \quad (1)$$

$$= R_B(n_B; \bar{Q}, \bar{P}_B) - C_{Si}^B(A_T, n_B) \quad (2)$$

where

\bar{Q} - volume per trader

\bar{P}_B - mean value of an exogenously specified distribution of prices at which buyers resell

P_T - price at which buyer purchases from trader

n_B - number of traders sampled by buyer

C_{Si}^B - costs of search for the i 'th buyer.

A_T - number of traders

Buyers are assumed to re-sell at a price equal to the mean value of the distribution of purchase prices offered by consumers.²¹ Purchase price is taken to be a decreasing function of search intensity; search costs are taken to increase with the intensity of search, and (for reasons to be explored below) to decrease as the number of traders rises.²² As the i subscripts signify, individual buyers are assumed to vary in the efficiency of their search

on the impact on search intensity of changes in search cost obtained from more general search rules tend to correspond to the results of the simplified rule adopted here (Rothschild 1974).

²¹ The model could straightforwardly be extended to include search behavior in buyers' resale markets. But such an extension would add to complexity of the model while affording no additional insights.

²² One other variable which might have been included as a determinant of search costs, but which I exclude for reasons of simplicity, is the intensity of search by traders (and also the corresponding intensities in equations (3) and (4) below): the more actively are traders searching for buyers, the lower might be the costs of buyer search. Mortensen (1982) explores in a multi-period model how the privately optimal intensity of search by a potential partner on one side of a match varies with changes in intensities of search by potential complementary partners.

efforts.

Traders' search is in all but one respect identical to that of buyers: traders search in two independent arenas; among buyers for the highest available selling price for given product quality, and among manufacturers for the lowest available purchase price for given quality. Thus the objective of each trader is to

$$\text{MAX } \Pi_{Ti} = \bar{Q}[P_T(n_{TB}) - P_M(n_{TM})] - C_{Si}^{TB}(n_{TB}, A_B) - C_{Si}^{TM}(n_{TM}, A_M) \quad (3)$$

$$- R_T(n_{TB}, n_{TM}, \bar{Q}) - C_{Si}^{TB}(n_{TB}, A_B, X_B) - C_{Si}^{TM}(n_{TM}, A_M, X_B) \quad (4)$$

where

P_M - purchase price of trader.

As for manufacturers, even though the quantity produced by each manufacturer is set exogenously, the optimizing equation includes a term reflecting manufacturing production costs; the term signals differences in efficiency among manufacturing firms. Thus

$$\text{MAX } \Pi_{Mi} = P_M(n_M) - C_i(\bar{Q}) - C_{Si}^M(n_M, A_T) \quad (5)$$

where

C_i - total costs of production.

Three features of these individual optimization problems are relevant for the present analysis. First, and for present purposes least interesting, first order conditions and corresponding optimal levels of search can readily be calculated from equations (2), (4) and (5):

$$\frac{\partial R_B}{\partial n_B} = \frac{\partial C_{Si}^b}{\partial n_B} \quad (6)$$

$$\frac{\partial R_T}{\partial n_{TB}} = \frac{\partial C_{Si}^{TB}}{\partial n_{TB}} \quad (7)$$

$$\frac{\partial R_T}{\partial n_{TM}} = \frac{\partial C_{Si}^{TM}}{\partial n_{TM}} \quad (8)$$

$$\frac{\partial R_M}{\partial n_M} = \frac{\partial C_{Si}^M}{\partial n_M} \quad (9)$$

Equations (6) - (9) imply that for each order individual economic agents will continue to search as long as the marginal benefits exceed the marginal costs of that search.

A second relevant feature of the individual optimization problems is the inclusion of an A_k term in the search cost expressions of each actor of type A_j ; these terms incorporate reciprocal market-completing externalities formally into the model. There are three reasons why the costs of search for a reliable partner by parties on one side of a market might be lower the greater is the number of parties on the other side of that same market and thus, other things equal, why traders are more likely to procure from a particular country the greater is the number of manufacturers producing the sought-for products, and prospective manufacturers are more likely to initiate production the greater is the number of traders seeking to procure the relevant product.

First, a market participant is less vulnerable to noncompetitive tactics the larger is the number of potential transacting parties. Second, competition among large numbers can spur reductions in transactions costs via the refinement of product and trading norms, and increases in the willingness of industry participants to abide by these norms. Third, an increase in the number of participants on one side of the market can create positive agglomeration externalities, and associated reductions in the costs of search, for

participants on the other side.²³ The source of these agglomeration externalities is the increased social and physical proximity among buyers and sellers that results from ongoing entry. Assume a random distribution among manufacturers in the attributes of reliability and of social (or physical) proximity to some intermediary, with the two attributes entirely uncorrelated with one another. Assume further that these distributions remain unchanged with the entry of additional manufacturers. Since the ratio of reliable to unreliable manufacturers does not change, the costs of search to an intermediary who probed randomly across the sample would be unaffected by the addition of new entrants. However, consistent with the efficiency advantages of trading among familiar associates highlighted in propositions 4 and 5 earlier, search costs would be lower the more readily can participants on one side of a market tap at low cost into channels that afford reliable information on the attributes of some prospective trading partner on the other. Thus, intermediaries would not probe randomly across the sample: search costs would be minimized if intermediaries targeted their efforts at nearby manufacturers. So continuing entry permits traders to concentrate their search efforts on progressively more nearby manufacturers, thereby reducing the costs of search.

A third feature of equations (2), (4) and (5) is that they point to a second set of equilibrium conditions along with first order conditions (6) - (9). Given the assumptions of no obstacles to entry, and of variation in efficiency among firms, the number of firms of each type is determined implicitly by the following three conditions for the marginal firms in each class -- the $A_{B_2}th$

²³ The discussion that follows is a straightforward application of the economies of agglomeration argument used to account for the growth of cities. See, for example, Rabenau (1979), summarized in Miyao (1987) pp. 884-886; Richardson (1979) pp. 419-424; also Sveikauskus (1975).

buyer, the A_{Tz} th trader, and the A_{mz} th manufacturer.

$$\Pi_{Bz} = D_B(\bar{Q}[\bar{P}_B - P_T(n_B)]) - C_{SZ}^B(A_T, r_B) = 0 \quad (10)$$

$$\Pi_{Tz} = D_T(\bar{Q}[P_T(n_{TB}) - P_M(n_{TM})]) - C_{SZ}^{TB}(n_{TB}, A_B, X_B) - C_{SZ}^{TM}(n_{TM}, A_M, X_B) = 0 \quad (11)$$

$$\Pi_{Mz} = D_M(P_M(n_M)) - C_Z(Q) - C_{SZ}^M(n_M, A_T) = 0 \quad (12)$$

where

D_k = number of orders per firm of type k (assumed, except where stated explicitly, to equal one).

Equations (10), (11) and (12) implicitly define response functions which depict the number of buyers, traders and manufacturers respectively desirous of participating in trade:

$$A_B = A_B[A_T, P_T; P_B, D_B, Q] \quad \partial A_B / \partial A_T, \partial A_B / \partial P_B > 0; \partial A_B / \partial P_T < 0 \quad (13)$$

$$A_T = A_T[A_M, A_B, P_T, P_M; X_B, X_M, D_T, Q] \quad \partial A_T / \partial A_M, \partial A_T / \partial A_B, \partial A_T / \partial P_T > 0 \\ \partial A_T / \partial P_M < 0 \quad (14)$$

$$A_M = A_M[A_T, P_M] \quad \partial A_M / \partial A_T, \partial A_M / \partial P_M > 0 \quad (15)$$

The partial effects summarized in equations (13) - (15) follow directly from the discussion thus far. An added restriction is that $\partial^2 A_j / \partial A_k^2 < 0$, that the magnitude of incremental transactions cost reductions by participants of type A_j as a result of entry by participants of type A_k declines with increases in the number of participants of type A_k . Discussion of the partial effects of changes in D_j and Q is postponed to the next section.

With the addition of equilibrium conditions for the buyer-trader and trader-manufacturer markets the model is complete. Thus,

$$A_B D_B = A_T D_T \quad (16)$$

$$A_T D_T = A_M D_M \quad (17).$$

Endogenous Expansion

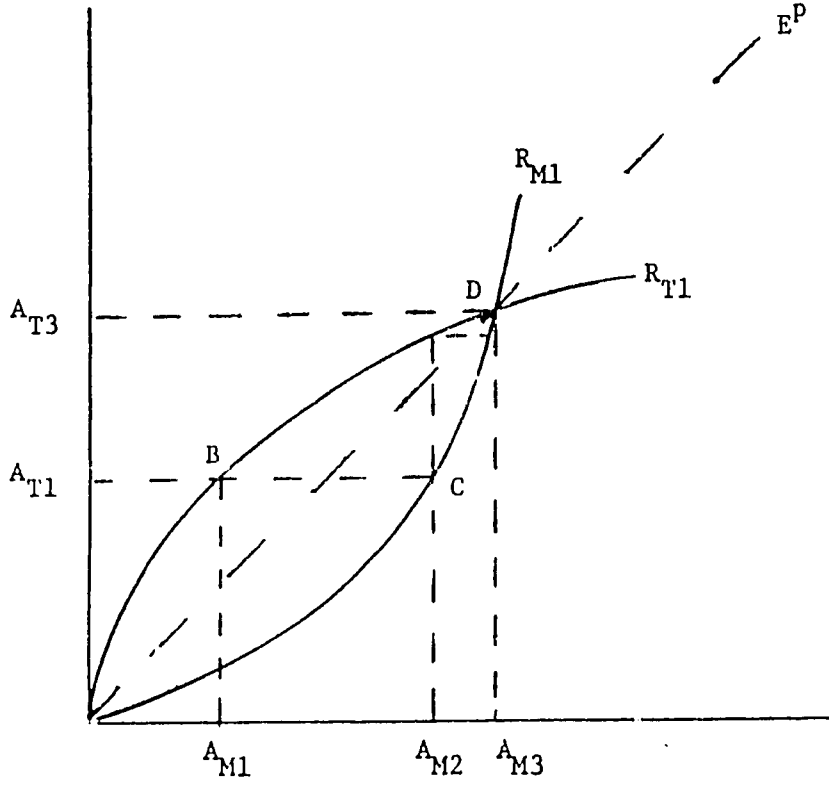
Equations (13) - (17) and the associated restrictions define a system of five equations in five unknowns. Two stationary points are consistent with these equations: zero-participation, with no markets, and no prices; and, for any given set of values of the exogenous variables, a unique set of positive equilibrium values (A_B^* , A_T^* , A_M^* , P_T^* , P_M^*). Underlying the transition from zero-participation to the positive-value equilibrium is a process of endogenous expansion subsequent to an initial exogenous stimulus, a process driven by cumulative declines in the costs of market transactions via the impact of reciprocal market-completing externalities.

Figure 1 illustrates the implied interactions among traders and manufacturers, assuming for the moment that the number of potential buyers from the exporting country, and the price (or, more precisely, distribution of prices) at which traders sell to buyers, remains fixed. Consistent with equation (14), R_T depicts the trader response function: the number of intermediaries desirous of trading, given the number of manufacturers in the exporting nation. R_M depicts the corresponding response function for manufacturers. Thus, the intersection of R_M and R_T represents the point at which (for a given distribution of price centering around mean, P_M) preferences among potential traders and manufacturers as to the number of participants are consistent with one another.

Full equilibrium in the trader-manufacturer market requires, not only that desired demand equals desired supply, but that actual demand equals actual supply. So, given the assumption that traders and manufacturers each handle a single order of quantity Q , full equilibrium must necessarily lie on the 45 degree line, EP . Any price distribution with mean above some equilibrium price,

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FIGURE 1



P_M^* , shifts both R_M and R_T to the right, inducing excess actual supply (even at the intersection of the shifted R_M and R_T schedules, where desired demand equals desired supply at the new, higher, price); and any price distribution with mean below P_M^* shifts R_M and R_T to the left, inducing excess demand. Thus, for a given set of values of the exogenous variables P_B and A_B there exists a unique distribution of prices with mean P_M^* at which equilibrium point C is sustained. For expositional convenience, both R_M and R_T are drawn on the assumption that P_M (and P_T) equal this equilibrium level. What is the process whereby this equilibrium is obtained?

Assume an exogenous increase in the number of manufacturers in the first period of the analysis, to A_{M1} in Figure 1, disrupting an initial zero-participation equilibrium. (In the Taiwanese footwear industry, this exogenous increase was the result of a decision on the part of Japanese trading companies to relocate production for export to the United States from Japan to Taiwan.) Entry by manufacturers generates positive market-completing external economies, reducing the costs of trader search and thereby inducing A_{T1} traders to enter in the subsequent period,²⁴ (point B in Figure 1). Entry of traders creates, in turn, positive external economies and lower search costs for manufacturers, spurring additional entry in the next period of $A_{M2}-A_{M1}$ of these firms (moving to point C in the figure). The process of ongoing, sequential declines in transactions costs, and corresponding increases in the number of market

²⁴ An assumption here is that the initial manufacturing entrants do not reserve their capacity exclusively for the buyer that induced them to enter in the first place. Again, this assumption is consistent with the experience in Taiwan, where manufacturers continually are on the look-out to diversify risk by broadening their base of customers.

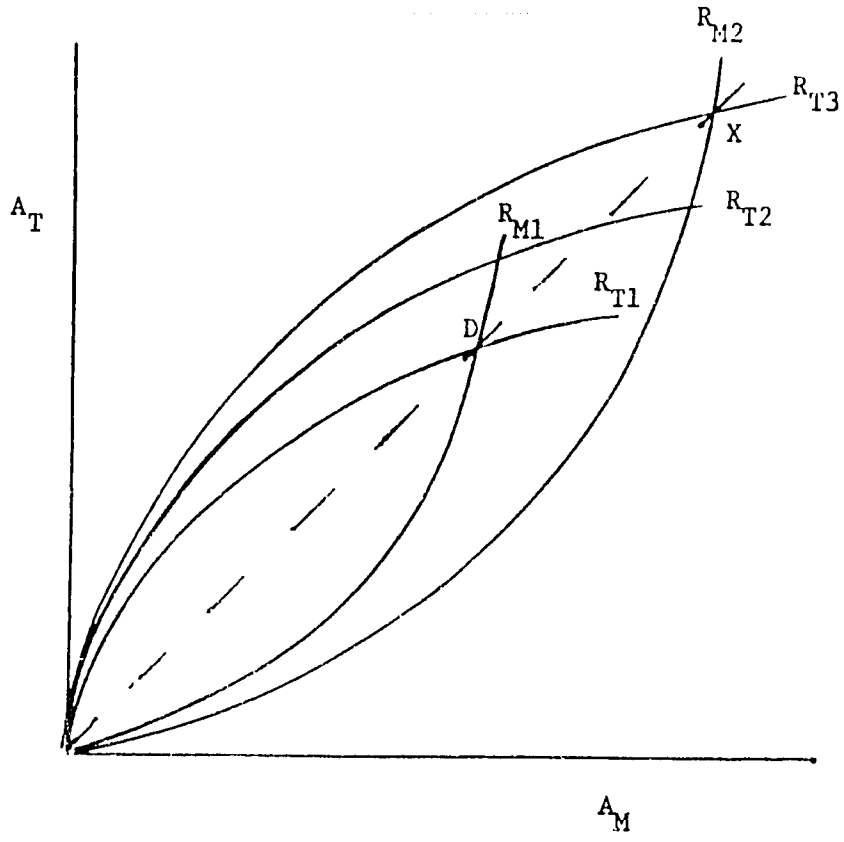
participants continues, spurred by ongoing reciprocal imbalances²⁵ between actual and desired numbers of traders and manufacturers, and associated imbalances between the quantities supplied and demanded, until equilibrium is reached at point D in Figure 1, with A_{M3} manufacturers and A_{T3} traders.

The number of buyers does not, of course, remain constant with variations in the number of traders. Rather, paralleling the interaction illustrated in Figure 1, a rise in the number of traders reduces the costs of search and thereby (assuming -- consistent with the requirement that the exporting country supplies only a small fraction of total demand -- that consumer prices remain constant) increases the profitability of all buyers, thus inducing additional buyer entry; and an increase in the number of buyers induces additional entry by traders. Thus, as Figure 2 illustrates, the trader response function in trader-manufacturer space shifts outward with each increase in the number of buyers; the shifts in R_T in turn put upward pressure on P_M . The process of progressive increases in A_B , shifts in R_T , increases in P_M and associated shifts in R_T and R_M , reaches full equilibrium in the number of buyers, traders and manufacturers at a point such as X in Figure 2, associated with a higher price (and thus a rightward shift in R_M to R_{M2}) than was point D in Figure 1.

One final feature of the model: endogenous expansion is a two-way process,

²⁵ At point B in Figure 1, for example, there will be an excess demand on the part of traders for production by manufacturers; and at point C an excess supply of productive capacity. These successive disequilibria will be associated with ongoing fluctuations in price around the equilibrium price that clears the market at point D. Analysis of adjustment with prices endogenous reveals the process to be rather more complex than is implied by Figure 1: the magnitude of each increase in A_k in response to prior increases in A_j is damped by offsetting price changes which shift R_M and R_T . But, under all plausible assumptions as to the magnitude of the shifts in the response schedules to price changes, demand and supply curves (drawn as functions of P_M) shift continually to the right with each successive iteration, until the eventual equilibrium is attained.

FIGURE 2



dependent upon the reciprocal character of the agglomeration externalities. Figures 3a and b illustrate. Unlike Figures 1 and 2, Figure 3a takes the price sustaining R_{M1} and R_{T1} to be, not the eventual equilibrium price P_M^* , but some arbitrary P_{M1} at which demand is in excess of supply. As before, the exogenous entry of A_{M1} manufacturers induces A_{T1} traders to enter; but now, as can be seen in Figure 3b, the resultant excess demand puts upward pressure on prices. Given reciprocal externalities any upward pressure on prices would be offset by induced entry of manufacturers in response to the entry of A_{T1} traders, and the associated shift in the manufacturer supply schedule from \hat{A}_{M1} to \hat{A}_{M2} in Figure 3b.²⁶ However, with no reciprocity the manufacturer supply curve does not shift, and price necessarily rises above P_{M1} , shifting the trader response function in Figure 3a inward to R_{T2} . The higher price induces entry on the part of manufacturers (to A_{M2} in Figures 3 a and b), but the magnitude of this induced entry -- and thus the associated rightward shift of \hat{A}_T in Figure 3b and increase to A_{T3} in the desired number of traders in Figures 3 a and b -- is smaller than it would have been with reciprocity. As drawn in Figure 3 the eventual equilibrium price will be above P_{M2} , and the equilibrium number of manufacturers (and thus traders) above A_{M2} . More generally, the degree to which the number of manufacturers exceeds A_{M1} in equilibrium will be smaller the more price inelastic is manufacturer supply, the more price elastic is trader demand, and the less responsive is trader entry to the number of manufacturers. Whatever the assumptions, Figure 3 reveals that, absent reciprocity, price increases choke off the endogenous response to an exogenous stimulus at a level well below D in Figure 1 (or X in Figure 2).

²⁶ Shifting A_M such that P_{M1} becomes an 'equilibrium' price (as long as $A_M = A_{M1}$ and $A_T = A_{T1}$) is an arbitrary simplification that aids exposition but is not required to make the central point in the text.

FIGURE 3a

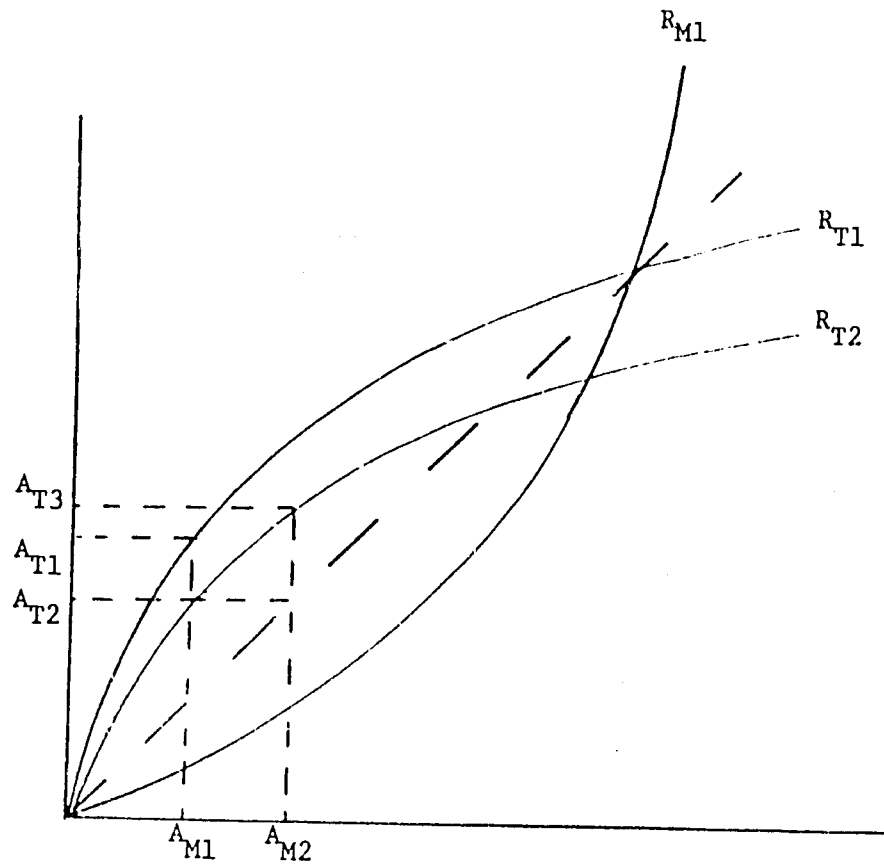
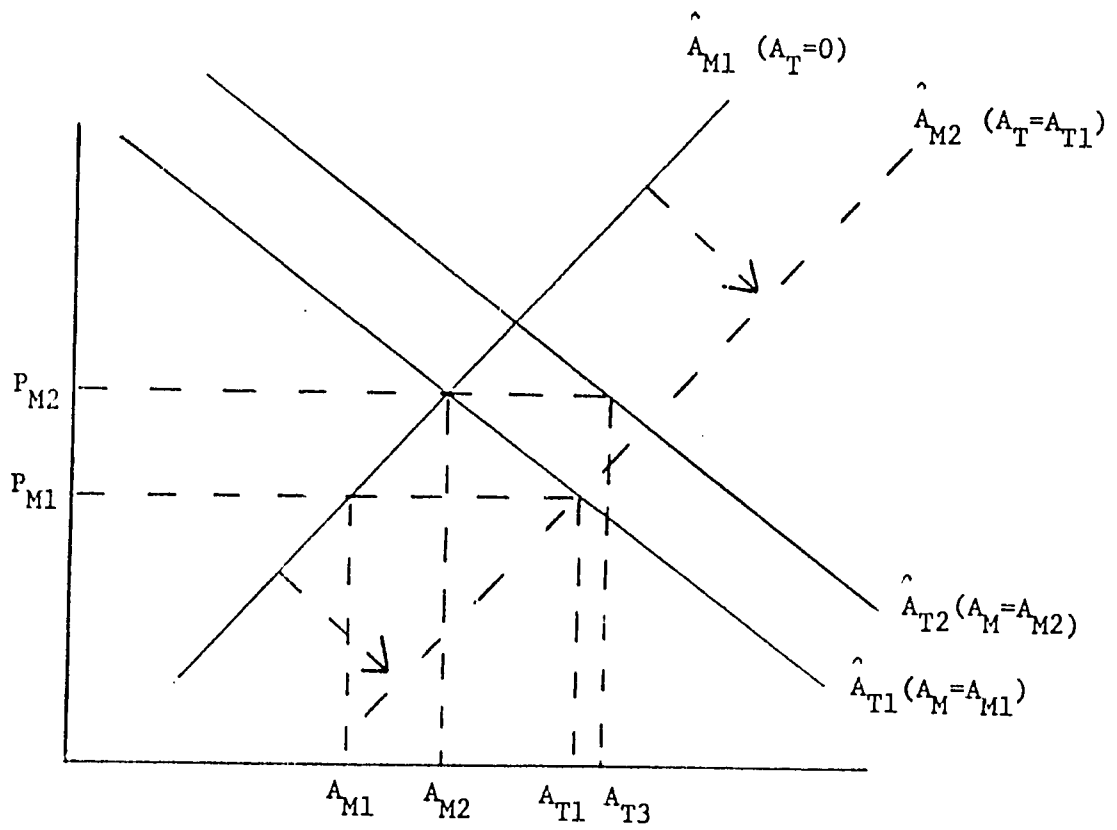


FIGURE 3b



Manufacturers may enjoy agglomeration economies only if buyers handle their procurement through offices located within the exporting country. And intermediaries may be more likely to establish such offices than are direct buyers. Given these last propositions, the degree of reciprocity, and thus the magnitude of endogenous expansion, will be greater with procurement through intermediaries than with direct procurement.

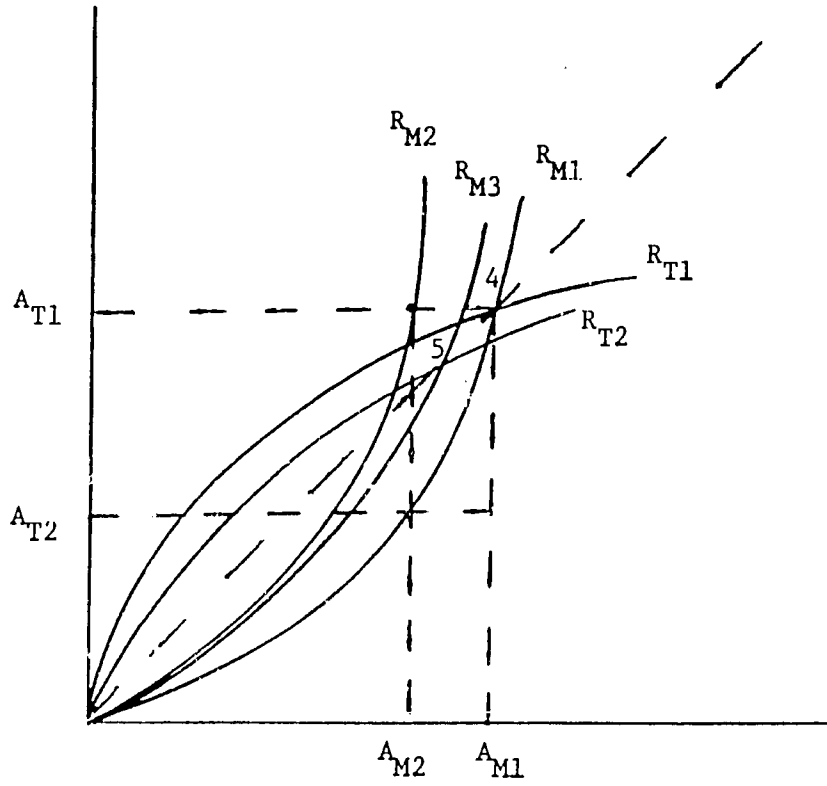
INITIAL ENDOWMENTS, THE SIZE OF FIRMS, AND ENDOGENOUS EXPANSION

A central proposition of this paper is that endogenous expansion sustained by market-completing externalities will be greater in economies in which small and medium enterprises play a central role than in economies dominated by large firms. The comparative static results presented in this section support this central proposition, and offer some added insights into the circumstances under which a nation might fruitfully pursue growth via small and medium enterprises.

Endogenous expansion and the Size of Firms

There are two potential sources of variation in the sizes of traders and of manufacturers: variations in the number of orders handled by each firm; and variations in the volume of individual orders. The impact of variation in the number of orders per firm emerges most straightforwardly if A_k is reinterpreted to signify the number of orders rather than the number of firms, even though the number of traders or manufacturers -- and not their size -- still is presumed to generate external economies. As long as each firm handles only one order, altering the definitions of the axes makes no difference to the interpretation of Figure 4. Thus A_{M1} - A_{T1} in Figure 4 characterizes the equilibrium number of both firms and orders given only one order per firm. Now double the number of orders per trader. With A_{T1} orders, the number of traders

FIGURE 4



is cut in half, to what would have been A_{T2} in Figure 4 had the axes measured numbers of firms. The manufacturer response function R_{M1} in Figure 4 implies that only A_{M2} manufacturers would be induced to enter, given A_{T2} traders. Thus, with A_k signifying the number of orders, doubling the number of orders per firm shifts the manufacturer response function left, from R_{M1} to R_{M2} .²⁷ Subsequent to the resultant price increases -- and corresponding shifts in R_T and R_M -- equilibrium is re-established at point 5, with a smaller volume of trade than prevailed at point 4.

Formally, let D_T equal the number of orders per trader, and D_M equal the corresponding number for manufacturers, and (with A_M and A_T now signifying the desired number of orders placed by all manufacturers and traders respectively), and adjust the independent variables A_T and A_M in the manufacturer and trader response functions (equations (14) and (15)) to read A_T/D_T and A_M/D_M . Consistent with earlier propositions, and the proposition that the number of firms -- and not their size -- determines the magnitude of market completing externalities, $\partial A_T/\partial (A_M/D_M)$ and $\partial A_M/\partial (A_T/D_T)$ are taken to be positive. Totally differentiating equations (14), (15) and (17), reorganizing, and using Cramer's rule to calculate the impact of variations in, say, D_T on the equilibrium number of orders yields:

$$\frac{dA_M}{dD_T} = \frac{A_T(1/D_T^2)(\partial A_T/\partial P_M)(\partial A_M/\partial (A_T/D_T))}{\partial A_T/\partial P_M((1/D_T)(\partial A_M/\partial (A_T/D_T)) - 1) + \partial A_M/\partial P_M(1 - (1/D_M)(\partial A_T/\partial (A_M/D_M)))} \quad (18)$$

²⁷ Note that the volume decline implied in the text would be offset to the degree that the value of reciprocal externalities created per trader rose with the number of orders per trader. Insofar as the source of reciprocal externalities lies, however, in the density with which traders are distributed among the population, there is no reason to expect such changes in the value of reciprocal externalities, especially for putative entrants -- manufacturers that have not yet established a trading relationship with any intermediary.

which will be less than zero as long as $(1/D_T)(\partial A_M/\partial [A_T/D_T])$ and $(1/D_M)(\partial A_T/\partial [A_M/D_M])$ are less than one. The two terms are nothing other than the slopes of the response functions with D_T and D_M greater than one, and the axes measuring total number of orders. The earlier assumptions as to the first and second order partial derivatives of equations (14) and (15) guarantee stability and thus that -- as is evident in Figures 1-3 -- at equilibrium $\partial A_M/\partial A_T$ and $\partial A_T/\partial A_M < 1$; so the required conditions will necessarily be satisfied. The comparative statics of dA_M/dD_M yields an exactly parallel result. Note that, as would readily be apparent from a straightforward extension of the graphical analysis in Figure 4, parallel increases in D_T and D_M do not serve as reciprocal offsets, but rather reinforce each other in their trade-reducing effects. In all, Figure 4 and equation (18) together imply that the absolute magnitude of external economies of agglomeration, and thus the potential for cumulative endogenous expansion, falls with increases in the number of orders handled by individual firms.

Increases in firm size via increases in the volume of individual orders also reduce the potential for endogenous expansion; but the mechanism through which this reduction is effected differs from that associated with increases in the number of orders per firm. Contrary to the analysis of the impact of variations in the number of orders per firm, return to the earlier assumption that A_k measures the number of firms of each type, with each firm producing only one order per period of time. But assume now that the ratio of profits to revenues, not the absolute level of profits, determines the magnitude of entry in response to changes in the profits of the incremental firm; a focus on the ratio appears plausible insofar as large firms are likely to be less sensitive

to small absolute changes in profitability than are small.²⁸ When order size is held constant, the distinction between absolute profits and the ratio of profits to revenues per order is irrelevant. However, once order size is permitted to vary, a given change in absolute profits per order could be associated with a range of changes in total profits as a proportion of revenues. It follows straightforwardly that $\partial A_k / \partial Q < 0$, that small absolute profit changes per order of the kind induced by reciprocal market-completing externalities would have less impact on entry the larger is the magnitude of each individual order.²⁹ Or, to put the point differently, the role of search costs in shaping entry decisions, and thus the potential for endogenous expansion, is likely to fall as order size increases.

Initial Endowments and Endogenous Expansion

In a separate paper I have explored how, as a result of deep-rooted historical differences,³⁰ the cost of market transactions was likely to have been higher at the outset of outward-oriented industrialization in Korea than in Taiwan. The objective here is to explore theoretically, assuming no cross-country variations in the size of firms, the impact of cross-country differences in the cost of market transactions costs on the magnitude of the endogenous expansion subsequent to an initial exogenous stimulus.

²⁸ Some term of the form dA_k/dl_{kz} is implicit in the transition from the individual profit functions (10)-(12) to the response function (13)-(15). A focus on the ratio of profits to revenue implies that the relevant term is $dA_k/d(l_{kz}/P_kQ)$.

²⁹ Note that a mechanism of the kind just described accounts only for the impact of an increase in the size of individual orders, and not the impact of an increase in the number of orders per manufacturer insofar as search costs are an increasing function of the number of orders.

³⁰ Footnote 19 summarizes some of the differences explored in Levy (1988).

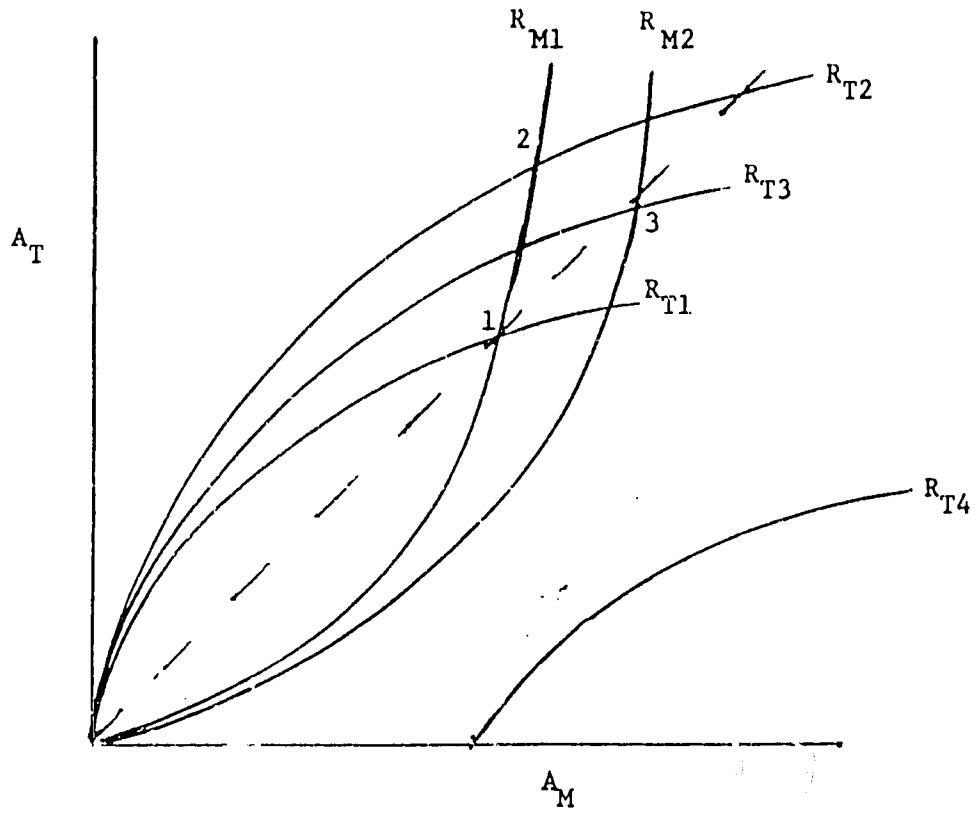
Augmenting equation (14) with an additional variable, X_M , a country-specific proxy for the efficiency with which traders³¹ engage in market transactions in some exporting country, aids in analyzing the impact of cross-country differences in transactions costs. A high value of X_M signals that, independent of the identity of traders procuring from a given supplying nation, that nation is relatively efficient in its execution of market transactions.

There are two different channels through which variations in X_M might affect the magnitude of endogenous expansion subsequent to an initial exogenous stimulus. First, a larger endogenous stimulus will be needed to set in motion an endogenous response the higher are the costs of market transactions. As Figure 5 illustrates, an unusually low value of X_M might shift the trader response function so far to the right (to, say R_{T4}) that exogenous entry of A_{M1} manufacturers is insufficient to induce any endogenous entry by traders. Second, higher values of X_M -- signifying a greater facility in, say, bilingual communication -- might increase the value of market completing externalities created for traders by the entry of manufacturers, and thereby increase the number of traders desirous of entry for any given number of manufacturers. Formally, $\partial^2 C_S^T / \partial A_M \partial X_M > 0$. In this second channel, an increase in X_M shifts the trader response function from R_{T1} to R_{T2} in Figure 5. R_{T2} now intersects R_{M1} at position 2. At that position however, desired demand by traders is in excess of manufacturer supply. Prices rise, inducing shifts right (to R_{M2} and R_{T3}) in both trader and manufacturer response functions. Equilibrium is restored at position 3, with values of A_M and A_T above those that prevailed at position 1.

This last result can readily be derived formally. Total differentiation of

³¹ In principle the augmenting variable could as readily be included in equation (15), the manufacturer response function.

FIGURE 5



equations (14), (15) and (17) and solution of the resulting three equation simultaneous system yields

$$\frac{dA_T}{dX_B} = \frac{(\partial A_M / \partial P_M)(\partial A_T / \partial X_B - \partial A_T / \partial P_M)}{(\partial A_T / \partial P_M)(\partial A_M / \partial A_T - 1) + (\partial A_M / \partial P_M)(1 - \partial A_T / \partial A_M)}$$

which will be greater than zero as long as the values at equilibrium of $\partial A_M / \partial A_T$ and $\partial A_T / \partial A_M$ are less than one. Since equilibrium in Figures 1-3 can be achieved only along the 45 degree line (where $A_T = A_M$) the required conditions will necessarily be met as long as the system converges stably to equilibrium. Variations in the transactional efficiency of manufacturers can be shown to have the exactly parallel effect. To state these results in a less technical way, the more efficient are firms from a country in managing market transactions, the larger will be the magnitude of the endogenous expansion induced by some initial exogenous stimulus. It follows that countries with transactionally inefficient markets, such as Korea at the outset of its export-oriented industrialization, will enjoy relatively little endogenous expansion via market completing externalities and might do well to consider alternatives to industrialization based on small and medium enterprises.

SOME IMPLICATIONS

The paper concludes by laying out some implications of the analysis concerning the relationship between industrial structure and appropriate policies to promote industrialization. Four points are highlighted.

First, reciprocal market-completing externalities and the associated endogenous expansion emerge in the analysis as the small enterprise counterpart of economies of learning by large firms. As numerous students of Korean

industrialization have emphasized,³² the ability of large firms to reap economies of learning from large volume production has been central to that nation's continuing industrial success. Ongoing in-house technical learning is, to be sure, important also for smaller manufacturers in Taiwan and elsewhere.³³ However, insofar as industrialization based on small and medium enterprises involves an ongoing expansion in the number of firms, market-completing external economies would appear to be important in promoting entry and thereby sustaining expansion.

Second, the model has highlighted the central role of traders in sustaining industrial expansion in which small and medium enterprises produce for export. Absent traders and, from a static perspective, a nation will lack access to the small volume orders on which smaller manufacturers depend. From a dynamic perspective, if procurement is direct and externalities as a result are enjoyed largely on one side of the market, price changes will rapidly choke off any endogenous response to an initial exogenous stimulus. Endogenous expansion via reciprocal market-completing externalities is necessarily a two-way process, a process that in final export markets will be set in motion only weakly, if at all, in the absence of traders. To put the point somewhat differently, a proliferation of small traders can reverse the process whereby "the presence of people who wish to pawn bad wares as good wares tends to drive out the legitimate business".³⁴ Rather, the promotion of small traders can help set in motion a virtuous spiral, a sequential, cumulative reinforcing process of

³² See for example Pack and Westphal (1986), Amsden (1988).

³³ For an analysis of the role of technical learning in one Taiwanese industry, see Amsden (1985).

³⁴ Akerlof (1970) p. 495.

expanded participation in a nation's manufactures export activity on the part of traders, manufacturers and foreign buyers.

Third, the comparative static results suggest that the promotion (as in Korea) of large trading companies that specialize in the export of products manufactured by small and medium enterprises is likely to be a poor substitute for the promotion of multiple, independent smaller trading companies. Large trading companies that are specifically mandated to serve small manufacturers can, to be sure, provide access to small volume orders. However, this access would generate fewer reciprocal market-completing externalities, and weaker endogenous expansion, insofar as a single large organization is more centralized organizationally and more concentrated geographically than would be a large number of smaller intermediaries handling a similar overall volume of trade.³⁵

Fourth, the comparative static results imply that the promotion of large firms might usefully be viewed as an efficient institutional substitute in societies where the costs of market transactions are high. The analysis has shown that, where markets are transactionally relatively efficient, an initial exogenous stimulus can set in motion a spontaneous process of cumulative, sequential unbalanced process of industrial growth through the proliferation of small manufacturers and traders; the data summarized in the introduction suggest that something of this kind occurred in Taiwan. By contrast, where the costs of market transactions are high, an exogenous stimulus will yield little endogenous response; so societies where markets in general operate poorly, or where the cost of external transactions in particular is unusually high, might

³⁵ But Yoshino and Lifson (1985) pp. 49-51 argue that Japan's large trading companies provided extensive opportunities for direct and indirect export by small Japanese manufactures.

do well to pursue industrialization via the promotion of large firms.³⁶ This hypothesis of large firms as institutional substitutes for poorly functioning markets is consistent with the Korean experience in the light of both that country's large firm bias, and of historical evidence that markets were less well developed at the outset of export-led industrialization in Korea than they were in Taiwan.³⁷

³⁶ Given, that is, confidence in the ability of a nation's government to withstand the unusually abundant opportunities for socially inefficient rent-seeking associated with policies to promote large firms.

³⁷ For further details, see Levy (1988).

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