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INDUSTRIAL ORGANIZATION AND PRODUCT QUALITY: EVIDENCE FROM SOUTH KOREAN AND TAIWANESE EXPORTS

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ABSTRACT

The central focus of this paper is on the relationship between domestic market structure and export performance. It evaluates the hypothesis that more concentrated industrial sectors can achieve more easily the transition from standardized, labor-intensive manufactures to sophisticated, skill-intensive products, as such industries are better able to cope with the inevitable reputational externalities involved in producing high-quality goods for foreign markets. South Korea and Taiwan provide a good test of the theory, as they have sharply different market structures. The results of the empirical analysis provide strong support for the hypothesis.

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I. Introduction

For developing countries, probably the predominant question of strategic trade policy is: how can entry be facilitated into markets for sophisticated manufactured goods characterized by imperfect competition and well-entrenched oligopolists? Pessimism regarding the prospects for successful entry into such markets underlies the widespread unease with outward-oriented trade strategies. Yet, as the experiences of Japan and the East Asian tigers folllowing on her heels have amply demonstrated, successful entrants can always create room for themselves. These countries have diversified into manufactured products of increasing sophistication, demonstrating that even the tightest international oligopolies can be shook up.

The broad reasons underlying the export success of the East Asian countries are now well known. My focus in this paper is on a narrow, but significant aspect of their performance: the transition from standardized, labor-intensive manufactures to sophisticated, skill-intensive products where quality plays an important role. While traditional factor-endowment considerations typically play the determinant role with the former group of products, the role of industrial organization comes into its own with the latter. Putting it somewhat crudely, the transition can be viewed as a shift form price to quality as the source of competitiveness. The higher-end products typically require not only a broader range of skills and

technological sophistication, but also investment in product quality, customer loyalty, and reputation.

The rate at which the transition takes place, if it does take place at all, is naturally influenced by a wide range of factors and country characteristics. Can industrial policy play a role here as well? As a first cut, I focus in this paper on broad patterns of industrial organization. We can identify two relevant models for policy here. In the first, policy would favor the formation of large firms and conglomerates and direct resources towards them, discriminating against small firms and potential entrants. In the second, policy would be neutral and a more fluid, diffuse industrial structure would result. Which is the more conducive pattern for making the transition to high-end products? In the next section, I will discuss a simple theory which suggests that the transition can be achieved more easily when domestic industry is highly concentrated. The basic argument is that such industries are better able to cope with the inevitable reputational externalities involved in producing high-quality goods for foreign markets.

Is there any empirical evidence in support of this proposition? Fortunately, South Korea and Taiwan provide as close a controlled experiment for testing the hypothesis as can be hoped for in economics. Starting from a tiny base, both countries have been phenomenally successful in expanding and diversifying their manufactured exports. Their trade and macroeconomic policies have been broadly similar, as are their income levels. Yet, the two countries are radically different in their patterns of industrial organization. Korean industry is dominated by a handful of large conglomerates, and firm-concentration ratios are uniformly high. In Taiwan, large conglomerates are the exception rather than the rule, and individual

industries are typically less concentrated than their Korean counterparts. Given this difference, it would be very surprising indeed if their respective trade patterns did not reflect it somehow. In light of the considerations discussed above, this paper looks for evidence of differential performance with respect to product quality. I find strong support for the hypothesis that industrial organization and product quality are related in the expected manner: the quality of Korean manufactured exports--with quality proxied by unit value--is systematically higher than that of Taiwanese exports.

The outline of the paper is as follows. The next section sketches out a simple theory which relates product quality to the number and size distribution of firms in an exporting industry. Section III compares briefly the industrial organization patterns in South Korea and Taiwan, and discusses some of the reasons behind the differences. Analyzing the two countries' exports to the U.S., section IV presents evidence on their divergent performance with respect to product quality. The paper ends with concluding comments in section V.

II. Product Quality and Industrial Organization: A Theoretical Sketch

New entrants into high-end product categories typically face an entry barrier altogether different from the usual obstacles. Perceived product quality is an important component of demand for such products; to be judged high-quality by consumers, entrants must invest in reputation or other means of communicating quality. The problem is even more serious for firms from developing countries, as they may have to surmount a reputation for shoddy quality frequently associated with developing-country goods.[1]

Such informational barriers to entry have been the subject of a number of theoretical papers. In the simplest framework, one could imagine that (foreign) consumers' familiarity with quality increases with cumulated exposure to the product in question. Provided the actual quality level of home exports exceeds the perceived level, there may then be a role for export subsidies to speed up the process of product familiarization (Mayer, 1984). When domestic firms are differentiated by quality, high-end firms can try to signal quality by selling at low prices initially (in anticipation of future profits); subsidies can facilitate such signalling strategies, at an overall welfare gains to the home economy (Bagwell and Staiger, 1986). But the problem is that subsidies may also encourage additional domestic firms to enter at the low-end of the quality spectrum, failing to improve the perceived quality of home exports, and increasing the cost to high-quality producers of distinguishing themselves from their low-quality counterparts (Grossman and Horn, 1987). In all these cases, the transition to higher-quality products is hampered by informational entry barriers.

These papers do not consider directly the importance of domestic market structure in determining the average level of product quality in exports. A recent article by Chiang and Masson (1988), motivated specifically by policy discussions in Taiwan, focuses on this issue in the context of a simple model of reputational externalities in product quality. Their basic point is that concentrated industries will do a better job of internalizing these, and that they will therefore tend to produce at the higher end of the quality spectrum.

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1. On country stereotyping with respect to product quality, see for example Khanna (1986).

In what follows, I will base my argument on the same point, and sketch out a similar model with a few additional twists.

Consider an industry which is a price-taker in world markets and which exports all of its output. Since my objective is to trace the effects of industry structure on product quality, I will take as given the overall size of the industry and the size distribution of firms within it. This is tantamount to assuming fixed capacities and full capacity utilization. Let the price received by each firm be a linear function of perceived quality, $p_i = \tilde{q}_i$, where i indexes firms. Marginal costs of production are linear in output, but increasing and convex in <u>actual</u> quality, q_i. For ease of exposition, I let these costs be quadratic. What is the relationship between perceived and actual quality? I assume that $\tilde{q}_i$ will generally lie somewhere in between the firm's actual quality (q_i) and the <u>average</u> quality ($\bar{q}$) of home exports:

$$(1) \quad \tilde{q}_i = \phi q_i + (1-\phi)\bar{q},$$

where ϕ is (for now) taken to be fixed. As a firm's perceived quality level (and hence price) will be based partly on other exporters' quality choices, this formulation introduces the externality which drives this section's results. The average quality level is simply

$$(2) \quad \bar{q} = \sum_j s_j q_j,$$

where s_j is firm j's (fixed) share in industry output.

Letting x_i denote the firm's (fixed) level of output, profits can be written as

(3) $\pi_i = [\tilde{q}_i - \frac{1}{2}q_i^2]x_i$,

which yields the first-order condition for quality:

(4) $q_i = \phi + (1-\phi)s_i$.

Notice that the social optimum would require the reputational externality to be eliminated by setting $\tilde{q}_i$ equal to q_i, in which case the equilibrium level of q_i would be unity, irrespective of the firm's market share. As can be seen from (4), this case can be recovered in this framework when $\phi=1$, i.e. when firms can costlessly and perfectly communicate their individual quality levels to foreign consumers. Notice that ϕ denotes the weight attached to own-quality level in foreigners' perceptions. As long as $\phi<1$, quality involves a positive externality, and firms' quality level will lie below unity. In the worst possible scenario, when firms are branded by the average quality level of the home industry ($\phi=0$), q_i will equal the firm's share in the industry. In general, larger firms will choose higher levels of quality.

We can now investigate the effects of industry structure on average product quality. Suppose that ϕ is identical across firms. In the present framework, average quality then turns out to be a simple linear function of the Herfindahl index of concentration. Using (2) and (4) in conjunction with $\sum_j s_j = 1$, we get

(5) $\bar{q} = \phi + (1-\phi)H$,

where $H = \sum_j s_j^2$ is the Herfindahl index. As $\bar{q}$ is increasing in H, more concentrated industries will operate at higher quality levels than less concentrated ones. For a given scale of industry output, the Herfindahl index

is influenced both by the number of firms and the size distribution of firms, so both factors will come into play in determining $\bar{q}$. Notice also that whether a firm operates below or above the industry-wide average will depend on the relationship between its market share and H:

$$(6) \quad q_i - \bar{q} = (1-\phi)[s_i - H].$$

Therefore, $q_i > \bar{q}$ whenever $s_i > H$.

As a tiny step towards added realism, consider now the case where firms can invest in advertising, marketing/distributional channels, brand names, and the like in order to differentiate their image from other firms' in the home industry. Let the amount of such investment be denoted by f_i. I assume that investment of this type serves to close the gap between actual and perceived quality. In the present framework, this amounts to letting ϕ be an increasing function of f_i. So we can write $\phi = \phi(f_i)$, with $\phi(0)=0$, $\phi(\infty)=1$, $\phi' = \partial\phi/\partial f_i > 0$, and $\phi'' = \partial^2\phi/\partial f_i^2 < 0$. Firm profits now become

$$(7) \quad \pi_i = [\tilde{q}_i - \tfrac{1}{2}q_i^2]x_i - f_i,$$

with $\tilde{q}_i$ defined as before in (1). Since it may not pay for a firm to invest in reputation-building, we associate the Lagrange multiplier λ with f_i and write the Lagrangean expression as

$$(8) \quad \mathcal{L} = [\tilde{q}_i - \tfrac{1}{2}q_i^2]x_i - f_i + \lambda f_i.$$

The first-order condition for q_i remains unchanged from (4)--except that ϕ is no longer a constant. With respect to f_i:

$$(9) \quad x_i\phi'(q_i - \bar{q}) - 1 + \lambda = 0.$$

Notice that for firms that operate at or below average quality ($q_i - \bar{q} \leq 0$), this equality requires that $\lambda > 0$, implying $f_i = \phi = 0$. For low-end firms, it simply does not pay to communicate their true quality levels, as this hampers their free ride on higher-quality firms.

As (9) shows, firms that choose to invest in "reputation" will be those with sufficiently high quality relative to the average.[2] From our earlier discussion, these will be the firms with larger market shares. For such firms $\lambda = 0$, and we have

(9') $x_i\phi'(q_i - \bar{q}) = 1.$

Since ϕ'' is negative by assumption, high levels of q_i will be associated with high levels of f_i.

To determine the effect on the average level of quality in the industry, let us divide firms into two groups, one for which $f = 0$, and the other for which $f > 0$. Denote the second set by T (for top-quality firms). Since $\phi(0) = 0$, we have

(10) $\bar{q} = \sum_{j \notin T} s_j^2 + \sum_{j \in T} [\phi_j s_j + (1-\phi_j)s_j^2],$

where ϕ_j denotes $\phi(f_j)$. This yields

(11) $\bar{q} = H + \sum_{j \in T} \phi_j(s_j - s_j^2),$

where H is once again the Herfindahl index. If firms were unable to

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2. What "sufficiently" means in this context depends on the magnitude of $\phi'(0)$. The larger is $\phi'(0)$ the smaller is the threshold above $\bar{q}$ for investing in reputation.

distinguish themselves from their competitors, $\bar{q}$ would equal H (as $\phi(0) = 0$). As (11) shows, the ability to communicate their true quality--as partial and costly it may be--raises the average quality level of exports.

The bottom-line of this discussion is that, everything else being the same, we would expect more concentrated industries to produce and export a higher quality range of products. When firms have the ability to build reputation and brand loyalty, the expectation is that the quality differential between concentrated and unconcentrated industries will be even larger: this is because the incentive to undertake such investments depends on how skewed the size distribution of firms (and hence the quality distribution) is in the first place.

To be sure, the model presented here is no more than a parable. It focusses on only one possible link between industry structure and product-quality choice. We should certainly not expect it to provide great explanatory power regardless of context. But I suspect that for many developing countries the considerations raised here are likely to be important ones. Therefore, it would be useful to see if there is evidence which supports the basic hypothesis. Before I go on to discuss the evidence from Korean and Taiwanese exports, however, I provide a brief overview of industrial organization in the two countries.

III. Industrial Organization in South Korea and Taiwan

Probably nothing better illustrates the difference in the industrial organization of the the two countries than the fact that South Korea has eleven firms in the Fortune International 500 compared to Taiwan's three.[3]

Some of the major Korean conglomerates are now becoming household names in the industrialized countries (Hyundai, Samsung), while even sophisticated consumers would be hard pressed to come up with the name of a single Taiwanese firm. This despite the facts that Korean GNP per capita is a quarter lower than Taiwan's and that the overall magnitude of the two countries' exports are similar.

The differences in the industrial structures of the two countries have received little attention to date, with few notable exceptions. In his comparative account of economic development in the two countries, Tibor Scitovsky (1986) focussed on these differences, and stressed that the Taiwanese economy is organized much more along free-market lines than is the Korean one, with much greater competition among firms in the former country.[4] In a series of papers based on case studies of Taiwanese and Korean firms, Brian Levy has investigated the implications of market structure on strategies and likely success of these firms in foreign markets (Levy 1987, Levy and Kuo 1987a and b). He finds that firm strategies are predictably influenced by size, but that small size has not adversely affected the ability of Taiwanese

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3. The Korean firms in the top 500, with their ranks in parentheses, are: Samsung (21), Lucky-Goldstar (37), Daewoo (39), Sunkyong (82), Ssangyong (152), Korea Explosives (182), Hyundai Heavy Industries (187), Hyosung (195), Pohang Iron & Steel (216), Hyundai Motor Company (261), and Doosan (431). The three Taiwanese companies are Chinese Petroleum (104), Nan Ya Plastics (467), and China Steel (489).

4. Scitovsky takes it on faith that more competitive industries will perform better. But he is forced to conclude: "Ironically [sic], in Korea there is no evidence that the large profits and fast accumulation of great fortunes that Korea's economic policies made possible had any unfavorable effects on the drive, stamina, and efficiency of Korea's businesses." He concludes, in what would easily give cultural explanations a bad name, by saying "[p]erhaps this is due to the Chinese cultural background" (1986, p. 151).

firms to break into high-technology markets, at least when investment requirements are no too large.

Direct, comparative evidence on industrial organization patterns in the two countries is hard to come by. Table 1 summarizes the broad size distribution of enterprises in manufacturing industry. Because the size distribution is not sufficiently disaggregated, the data here are not particularly meaningful. They show that large enterprises (300 or more employees) account for 64 percent of total value added in Korea compared with 59 percent in Taiwan. The share of small enterprises (5-19 employees) is 4 percent in Korea and 8 percent in Taiwan. These numbers do not point to a great discrepancy between the two economies, but this is highly misleading. For one thing, the table excludes the smallest firms (with less than five employees), as statistics are not compiled on such firms in Korea--which in itself is meaningful. These smallest firms account for almost half the total number of manufacturing firms in Taiwan. More importantly, the Korean industrial censuses collect data at the establishment (plant, factory, workshop, etc.) level rather than the firm or enterprise level (as in Taiwan). This naturally biases the Korean concentration figures downwards. Moreover, the preponderance in the Korean economy of the chaebul (conglomerates) spanning diverse activities across sub-sectors introduces another important source of downward bias. In 1985, the top five cahebul accounted for 27.0 percent of Korean manufactured exports, and the top thirty 41.3 percent (Lee, 1988, Table 20). There are few such giants in the Taiwanese economy. As a consequence, the figures in Table 1 greatly underestimate the degree of concentration in Korea.

There are other indicators that suggest that the extent of competition in

Taiwanese industries surpasses that in Korea. Scitovsky (1986, p. 146) draws the following interesting comparison: between 1966 and 1976 the number of manufacturing firms in Taiwan increased by 150 percent while the number of employees per firm increased by 29 percent; in Korea, the number of firms increased only by 10 percent, while average firm size (measured again by employees) increased by 176 percent. The relative ease of entry into Taiwanese industries is also corroborated by the high rate of bankruptcy in that country (Scitovsky, 1986, p. 151). In Korea, by contrast, bankruptcy is legally not even recognized, and business failure carries great moral stigma extending beyond the entrepreneur to his family (Michell, 1983, pp. 168-169).

The reasons behind these divergent patterns of industrial organization are due partly to historical circumstance and partly to policy. Among the former, possibly the key role in Taiwan was played by the immigration of overseas Chinese who brought substantial capital with them (30 percent of the total inflow of foreign capital) and used it to establish new enterprises (Scitovsky, p. 146). With respect to policy, the Taiwanese government's attitude has been much more benign towards small enterprises, and there has been little overt support for large firms. In Korea, the situation has been quite different. "Since 1961," writes Michell (1983, p. 168), "it has been the continual mission of the Ministry of Commerce and Industry [of Korea] to prevent what is termed 'reckless overcompetition'." Given the transactions cost of dealing with governmental bureaucracies, it is also likely that the more active role of the Korean government in industry (in credit allocation, for example) would have served to discriminate against small and medium firms, even when policy had no such objective (see Levy, 1986). Taking some license with terminology, it can be said that "industrial policy" favored industrial

consolidation in Korea and was indifferent to firm size in Taiwan.

IV. Evidence on Product Quality from U.S. Imports

I now turn to discuss the available evidence on product quality in Korean and Taiwanese exports. Note first that by most relevant criteria, Taiwan is the more developed of the two from an economic perspective (see Table 2). Most important from our perspective, Taiwan is comparatively rich in human skills and education by virtue of having been an early-starter compared to Korea. As Table 2 shows, Korea now appears to have caught up with Taiwan in terms of flow additions to the educated workforce, but the latter country is still endowed with a proportionately larger stock of skilled and educated workers. On these grounds, then, we would expect Taiwan to be further along the transition to high-end products than Korea. The industrial-organization effects discussed above go in the opposite direction.

To check for systematic differences in product-quality, I examine the unit values for the two countries' exports to the United States, disaggregated at an appropriate level. A critical maintained hypothesis is that unit values are a good proxy for quality. For manufactured exports of the type that will be the focus of the analysis, this seems to be a sensible working hypothesis.[5] The analysis is restricted to the U.S. market in order to obtain closely-comparable trade data for the two countries. The U.S. is by far the largest export market for both countries, accounting for roughly a half of total

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5. I have also computed unit values for Japanese exports to the U.S. These are almost without exception higher than those for the two countries. This is consistent with what we know regarding Japan's successful transition to products at the very high end of the quality spectrum.

sales. It is unlikely that substantial biases are introduced by restricting attention to the U.S.

Selecting the level of disaggregation at which the comparison of unit values is carried out requires care. At too aggregate a level, there is always the danger of comparing apples with oranges. At a too disaggregated level, on the other hand, the quality range of the product in question may be needlessly compressed, leaving out useful information about the upper and lower end of the range.[6] I have chosen an intermediate level of disaggregation, using the four-digit Schedule A classification for U.S. import statistics (FT 150). These import data are recorded on a "customs value" basis, defined as "the price actually paid or payable for merchandise when sold for exportation in the United States, excluding U.S. import duties, freight, insurance and other charges incurred in bringing the merchandise to the United States."[7] In order to focus on products which are important exports for the two countries, I restrict the analysis to categories in which at least one of the countries had exports to the U.S. exceeding $100 million. In 1986, there were forty-nine such product groups. Exports included in these groups amount to $9.6 billion for Korea and $14.5 billion for Taiwan, a substantial part of each country's total exports to the U.S.

Table 3 lists the respective unit values for each of these forty-nine

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6. For example, the highly detailed seven-digit TSUSA classification contains categories such as: "moccasins, soled, leather, for women, not over $2.50 pair" (emphasis added).

7. The description further adds, helpfully: "In the case of transactions between related parties, the relationship between buyer and seller should not influence the Customs value."

categories for the two countries. The product groups are ranked in ascending order of (proportional) difference between Korean and Taiwanese unit values. A quick glance at the table reveals clearly that Korean exports tend to have higher unit values than Taiwanese exports. Thirty of the forty-nine products exhibit higher unit values in Korean exports. Moreover, all of the larger discrepancies in unit values are in favor of Korea. The unweighted average differential between Korean and Taiwanese unit values is 27 percent. On the basis of weighted averages, Korean exports command a price premium of 19 percent (Korean export weights) to 22 percent (Taiwanese export weights) over Taiwanese exports.

Is the observed discrepancy in unit values statistically significant? An appropriate statistical test here is the Wilcoxon signed-ranks test, which takes into account both the frequency with which Korean unit values exceed Taiwanese ones and the relative magnitudes of the discrepancies.[8] Using this test, the null hypothesis that Taiwanese unit values are at least as high as Korean unit values is decisively rejected at the 5 percent confidence level, with a z-value of 2.75. Notice that this is a particularly stringent test of our hypothesis, as a priori we would expect Taiwanese products to be of higher quality than Korean ones on all grounds but industrial organization.

A related implication of the model is that Korean exporters would be more likely to specialize at the high-end of the quality spectrum across broad product categories, as they possess a comparative advantage there relative to Taiwan. Figure 1 shows that this is indeed the case. Ranking product groups by Japanese unit values to establish a rough quality hierarchy, we find that

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8. See DeGroot (1975), pp. 483-486.

the distribution of Korean exports is relatively skewed towards the top end. Twenty-nine percent of Korea's (included) exports are in the "top" quality range (unit values greater than $10,000), compared to twenty-one percent for Taiwan. Korea has fifty percent of its exports at the low end (unit values $5,000 or lower) and Taiwan sixty percent.

A further test of a different nature would be to see whether the differences in unit values are proportionately more pronounced in products for which quality plays an important role. Remember that, in terms of our model, industrial-organization becomes important only when quality is a predominant characteristic of the product group in question. Unfortunately, there is no clearcut way of determining the products for which this is likely to be true. A short-cut is to assume that higher unit values are associated with "quality-intensive" products. Using Japanese unit values to rank industries by this criterion, the following regression results are obtained:

$$\underset{}{PREM} = \underset{(0.06)}{-1.03 + 0.15\ \ln(JAP)} \qquad R2 = 0.11 \qquad N = 49$$

where PREM is the Korean unit-value premium over Taiwan (in percent) and JAP is the Japanese unit value for the corresponding product group. The standard error of the slope coefficient is in parentheses. This suggests that the Korean quality advantage over Taiwan increases as we move up from low-end to high-end products. A doubling of the average level of product quality--as measured by unit values of Japanese exports--is associated with an increase in the Korean price premium over Taiwan of 15 percent. This finding is consistent with the discussion in section II.

To sum up, these data reveal an interesting divergence in the export performance of the two countries.[9] It is of course entirely possible that these findings reflect some other unidentified statistical quirks. For example, Taiwanese exporters could be prone to under-invoicing. Or, the relatively greater downstream integration of the Korean exporters in the U.S. market may lead to high transfer prices being set on these exports, provided that it is viewed preferable to hold income in South Korea rather than in the U.S. In any case, the hypothesis that quality differentials in the exports of the two countries are systematically related to their industrial organization patterns would appear to be worth closer look.

V. Concluding Remarks

This paper has combined a simple--perhaps simplistic--theory with a simple test. The findings are two-fold: (i) Korean exports tend to be systematically of higher quality relative to Taiwanese exports, at least when quality is proxied by unit value; and (ii) this is consistent with a model of quality choice in which reputational externalities are less damaging in heavily concentrated industries.

A crucial final point concerns the normative aspect of the analysis. Nothing that has been said here should be construed as advocacy of an industrial policy that actively pursues concentration. Before we can go from the positive analysis to policy prescription, we will need a more complete

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9. Based on a quick look at 1975, it would appear that earlier years show the same pattern as that of 1986. Among included categories, the Korean premium in that year ranges from 20.1 percent (Taiwanese export weights) to 30.9 percent (Korean export weights).

welfare analysis and a more complete model in which to carry it out. There are at least two sets of reasons, besides policymakers' obvious concern about quality upgrading, to suspect that the findings here have normative significance. First, higher-quality products may carry price premia exceeding the additional cost of producing them, as excess profits serve as the carrot needed to sustain quality levels (Shapiro, 1983). Public policies in pursuit of such excess profits can potentially improve welfare. Secondly, there may be significant skills generated as countries move up the quality spectrum, and these may in turn create substantial positive externalities for the rest of the economy. Once again, policy may have a role to play. If domestic industrial structure and export performance are indeed linked, as the preliminary results presented here would indicate, these would be fruitful areas for further research.

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Table 1: Distribution of Value Added in Manufacturing Industry, by Size of Enterprise or Establishment[a] (percent)

Number of employees	S. Korea (1984)	Taiwan (1981)
5 - 19	4.3	7.8
20 - 299	32.0	33.2
300+	63.7	58.9

Sources: Biggs and Lorch (1988) and Economic Planning Board, Republic of Korea (1986).

Note: [a] Excludes enterprises/establishments with less than 5 employees.

Table 2: Basic Indicators of Development

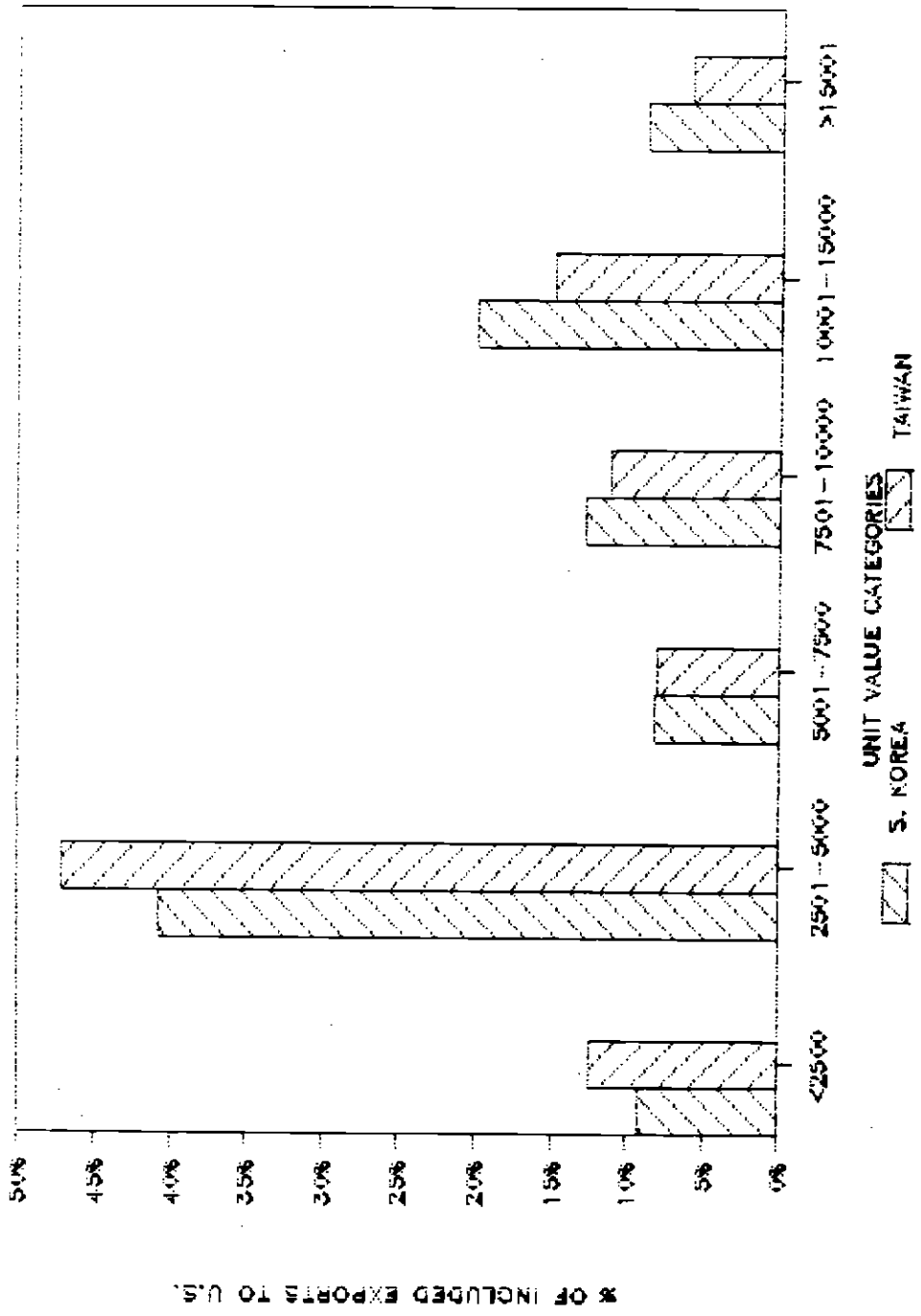
	S. Korea	Taiwan
GDP per capita, 1983 ($)	2,010	2,670
Electric power consumption per capita (KWH)	915	2,131
Life expectancy at birth (years)	65	72
Infant mortality per 1000 live births	37	25
Daily calorie intake per capita	2,785	2,805
Daily protein intake per capita (grams)	70	78
Households with running water (%)	55	67
Households with TV sets (%)	79	100
School enrollment rates (% of age group):		
primary	111	100
secondary	76	80
college and universities	12	10

Sources: UNIDO (1986), Table 1; Scitovsky (1986), Tables 2 and 4.

Table 3: Unit Values in Korean and Taiwanese Exports to the U.S., 1986

CODE	DESCRIPTION	UNIT VALUES ($/000lbs) S.KOREA	TAIWAN	PERCENT DIFF.
753.0	Automatic data processing machines	6347	6214	2.1%
891.0	Articles of rubber or plastics nspf	940	913	3.0%
658.9	Tapestries & made-up	3080	3212	-4.1%
781.0	Passanger motor veh	2410	2529	-4.7%
898.3	Sound etc recordings & blank media	3430	3603	-4.8%
846.8	U garments, inc shirts of tex nspf KT	4533	4763	-4.8%
845.5	Sweaters & o wear app textile KT	5587	6029	-7.3%
776.4	Integrated circuits	88333	82203	7.5%
764.8	Audio & video tape players & records	7038	6514	8.0%
764.9	Parts nspf of telecom & sound repr equ	6426	5932	8.3%
678.6	Pipes, tubes & blanks, iron or steel	194	177	9.6%
674.0	Plates & sheet, iron or steel	173	192	-9.9%
699.1	Locks, safes, etc of base metals	1204	1362	-11.6%
635.9	Articles mfg of wood, nspf	1201	1365	-12.0%
749.2	Taps, cocks, valves & parts	1235	1443	-14.4%
762.0	Radio receivers (AM/FM) & comb	4309	3759	14.6%
844.1	Shirts, cot, wool, manf, NT knit m&B	4860	5752	-15.5%
761.0	Television receivers & combinations	2983	3580	-16.7%
699.8	Arts nspf of cast iron, nspf	1006	842	19.5%
764.4	Elect telp & telegraph eq & pts	7756	6486	19.6%
851.0	Footwear, new, exc military or orthopedic	3724	3113	19.6%
785.2	Adult cycles	1151	1463	-21.3%
694.0	Nails, screws & other fasteners of base m	325	425	-23.5%
588.8	Profile shapes, rubber & plastic	703	567	24.0%
759.9	Parts of ADP & calculating off mach	2009	2703	-25.7%
788.0	Parts nspf of motor veh & handling equip	819	1113	-26.4%
879.2	Jewelry etc, costume & semi-precious	7530	5911	27.4%
763.8	Microphones, speakers & audio amp	2297	1758	30.7%
634.7	Plywood, incl wood veneer panels	220	326	-32.5%
842.3	Slacks etc, cot, wool, manf	6158	4517	36.3%
771.2	Non rot elect power wquip	6840	4999	36.8%
775.8	Electro-thermic appliances nspf & pts	1759	2803	-37.2%
812.4	Lighting fixtures & fittings	812	1373	-40.9%
773.1	Insulated electric conductors (cables)	1312	2263	-42.0%
821.8	Furniture & parts thereof nspf	1208	795	51.9%
894.2	Toys, games & christmas ornaments, etc	2705	1780	52.0%
697.4	Household & sanitary ware of iron or stee	1247	807	54.5%
848.1	Gloves, blts & ot wear app lea, nspf	9974	6140	62.4%
843.7	Garm for rainwr; ot wear nspf	10331	6347	62.8%
831.0	Luggage, handbags	2926	1763	66.0%
635.4	Wood mfrs, domestic & dec use	1946	1157	68.2%
884.2	Eyeglasses; eyeglass farmes & parts	10823	6250	73.2%
775.7	Elect-mech household appliances nspf & pt	2252	1296	73.8%
695.3	Hand tools, nspf of base metal	1807	1031	75.3%
894.7	Sporting goods etc nspf	2246	1228	82.9%
736.1	Metal-ctting machine tools	2338	1160	101.6%
881.1	Still cameras & parts; flash apparat	27436	12308	122.9%
778.8	Ferrites nspf; elect mach & eq nspf	10372	3745	177.0%
848.3	Fur clothing & ot art ex headwear	38801	10474	270.5%
	UNWEIGHTED AVERAGE	6431	4826	26.7%

Figure 1


DISTRIBUTION OF EXPORTS BY UNIT VALUE
% OF INCLUDED EXPORTS TO U.S.
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
<2500
2501 - 5000
5001 - 7500
7501 - 10000
10001 - 15000
>15001
UNIT VALUE CATEGORIES
S. KOREA
TAIWAN

Annex: Unit Values and Exports of Korea, Taiwan, and Japan, 1986

1986 DATA		unit values ($/'000 lbs):			Total exports ($ millions):		
Category	Description	KOREA	TAIWAN	JAPAN	KOREA	TAIWAN	JAPAN
588.8	Profile shapes, rubber & plastic	703	567	1349	28.8	100.6	165.5
634.7	Plywood, incl wood veneer panels	220	326	422	6.4	122.4	25.6
635.4	Wood mfrs, domestic & dec use	1946	1157	2517	2.2	164.5	5.9
635.9	Articles mfg of wood, nspf	1201	1365	1616	5.8	102.4	4.9
658.9	Tapestries & made-up	3080	3212	6226	40.5	156.8	14.9
674.0	Plates & sheet, iron or steel	173	192	233	258.95	23.35	1096.7
678.6	Pipes, tubes & blanks, iron or stee	194	177	280	169.7	52.97	397.1
694.0	Nails, screws & other fasteners of	325	425	748	111.3	207.2	384.4
695.3	Hand tools, nspf of base metal	1807	1031	2262	17.4	193	113.1
697.4	Household & sanitary ware of iron o	1247	807	1803	68.7	111.7	42.6
699.1	Locks, safes, etc of base metals	1204	1362	2364	18.97	175.9	127.1
699.8	Arts nspf of cast iron, nspf of cas	1006	842	1286	50.5	122.1	102.3
736.1	Metal-ctting machine tools	2338	1160	4161	10.8	106.9	745.6
749.2	Taps, cocks, valves & parts	1235	1443	3493	28.5	100.8	235.4
753.0	Automatic data proc mach & auxiliary	6347	6214	10223	362.9	713.96	2781.1
759.9	Parts of ADP & calculating off mach	2009	2703	2461	94.1	398.97	1957.2
761.0	Television receivers & combinations	2983	3580	6335	442.3	445.2	869
762.0	Radio receivers (AM/FM) & comb	4309	3759	12344	214	263.7	1785.4
763.8	Audio & video tape players & record	7038	6514	12009	352.2	187.6	5364.8
764.2	Microphones, speakers & audio amp	2297	1758	4204	45.2	133.2	500.4
764.4	Elect telp & telegraph eq & pts	7756	6486	21586	153.3	287.2	1095.4
764.4	Integrated Circuits	88333	82203	132704	442.3	240.4	929.5
764.9	Parts nspf of telecom & sound repr	6426	5932	12109	313.1	491.6	1734.5
771.2	Non rotating elect power equip	6840	4999	9815	19.2	125.3	237.7
773.1	Insulated electric conducts (cable)	1312	2263	5359	32.6	304.6	177.3
775.7	Elect-mech household appliances nsp	2252	1296	3888	38.9	117.1	71.8
775.8	Electro-thermic appliances nspf & p	1759	2803	2654	300.1	94.97	592.6
778.8	Ferrites nspf; elect mach & equ nsp	10372	3745	5734	96.5	236.1	750
781.0	Passenger motor veh (except publ. s	2410	2529	3321	798.7	2.4	2.2
785.2	Adult cycles	1151	1463	4057	13.7	199.5	68.4
788.0	Parts nspf of motor veh & handling	819	1113	2486	56.3	204.7	2972.3
812.4	Lighting fixtures & fittings	812	1373	3863	19	288.6	20.1
821.8	Furniture & parts thereof nspf	1208	795	3184	53.5	968	177.4
831.0	Luggage, handbags	2926	1763	4317	331.1	522.8	33.6
842.3	Slacks etc, cot, wool, manf	6158	4517	12532	65.6	157.8	16.2
843.7	Garm for rainwr; ot wear nspf	10331	6347	8517	328.4	401.1	174.1
844.1	Shirts, cot, wool, manf, NT knit m&B	4860	5752	14582	270.3	199.7	2.8
845.5	Sweaters & o wear app textile KT	5587	6029	8203	647.4	765.4	40
846.8	U garments, inc shirts of tex nspf	4533	4763	9146	237.9	336.6	28.7
848.1	Gloves, blts & ot wear app lea, nsp	9974	6140	11115	347.3	141.8	9.9
848.3	Fur clothing & ot art ex headwear	38801	10474	33778	120.4	5.6	0.3
851.0	Footwear, new, exc military or orth	3724	3113	4304	1489	2101.1	13.1
879.2	Jewelry etc, costume & semi-preciou	7530	5911	32946	79.4	106.6	63.5
881.1	Still cameras & parts; flash appara	27438	12308	47152	17.5	105.1	792.4
884.2	Eyeglasses, eyeglass frames & parts	10823	6250	39687	31.4	114	86
891.0	Articles of rubber or plastics nspf	940	913	3148	100	699	374.9
894.2	Toys, games christmas ornaments,etc	2705	1780	3789	519.5	787.1	346.2
894.7	Sporting goods etc nspf	2246	1228	4004	163	534.8	143.3
898.3	Sound etc recordings & blank media	3430	3603	5669	173.8	35.7	961.1