Hitotsubashi Journal of Economics 32 (1991) 39-48. © The Hitotsubashi Academy

MARKET STRUCTURE AND INCOME DISTRIBUTION IN THE DEPENDENT ECONOMY: EVIDENCE FROM TAIWAN

CHENG-CHUNG LAI

Abstract

The dependency theory that prevailed in the 1970s is often tested with South American economies, and limited to investigate the relationship between economic dependence, growth and income inequality. Asian cases are less well examined. This paper tries to go one step further, to emphasize the relationship between economic dependency and market monopoly. Tle following proposition is investigated: Whether higher degree of economic dependence will lead the dependent LDCs to stagnation, higher market monopoly and income inequality? This theory is proposed by Merhav (1969) but not yet empirically tested. We provide the historical evidence of Taiwan (1952–1986) as an illustration of this hypothesis.

I. *The Hypothesis*

The purpose of this article is to examine a theory proposed by Merhav (1969) on the relationship between economic dependence,[1] market structure and income inequality, and test it with Taiwan's historical evidence. A theoretical model is constructed in Section 1 to illustrate Merhav's theory. It is explained in Fig. 1 why the dependent less developed countries (LDCs) usually have higher incidence of market monopoly, more collusive market conduct, and higher X-inefficiency together with higher income inequality and social welfare losses than developed countries (DCs). Section 2 uses 1952–1986 data to describe the basic characteristics of Taiwan's industrial structure (Table 1), market structure (Table 2) and economic development process (Table 3). The final section concludes that Merhav's interesting theory does not fit Taiwan's historical evidence very well, yet it is still instructive to test his hypothesis with other dependent LDCs cases.

Merhav's main points can be summarized as follows.

1. *The smaller the size of the industrial product market, the higher the degree of industrial (market) concentration.*

A smaller industrial product market contains fewer firms, the greater the tendency will be

[1] By the dependent economy we mean an open developing country that depends largely on the market, technology and capital of industrialized countries. Taiwan, S. Korea and some South American countries are examples.

for firms to collude, Consequently, economic efficiency will not be increased through the process of competition among the existing firms. According to Merhav, this initial monopolistic market structure in LDCs perpetuates itself (Merhav 1969: 41, 65, 76).

2. The monopolistic market structure in the dependent LDCs is stable or worsening.
The monopoly and oligopoly existing in the conditions of underdevelopment are generally of stable structure and, once established, it will strongly resist change. For Merhav (1969: 53–55, 82, 101), the technological dependence of LDCs on DCs will reinforce the dominant position of the existing firms due to a small market size combined with high concentration. Technological dependence creates higher barriers to entry and strengthens the monopolistic structure, induces more monopolistic profits. In addition, it deprives the competitive sectors of capital resources by transferring them to the monopolistic sectors. The result is market structure becomes more and more monopolized.

3. The monopolistic market structure in the dependent LDCs impedes economic growth, and enlarges income disparity.
Schumpeterian theory asserts that monopoly in the industrialized economies provides environments for innovation (R&D) which is the motor of economic growth. However, monopoly in the dependent LDCs, for Merhav (1969 Chapter 2 & p. 66), will lead toward stagnation, because monopolists tend to charge higher prices with lower output level. Moreover, monopoly profits will aggravate income inequality (1969: 71–72).

The whole picture of this framework can be summarized as follows.

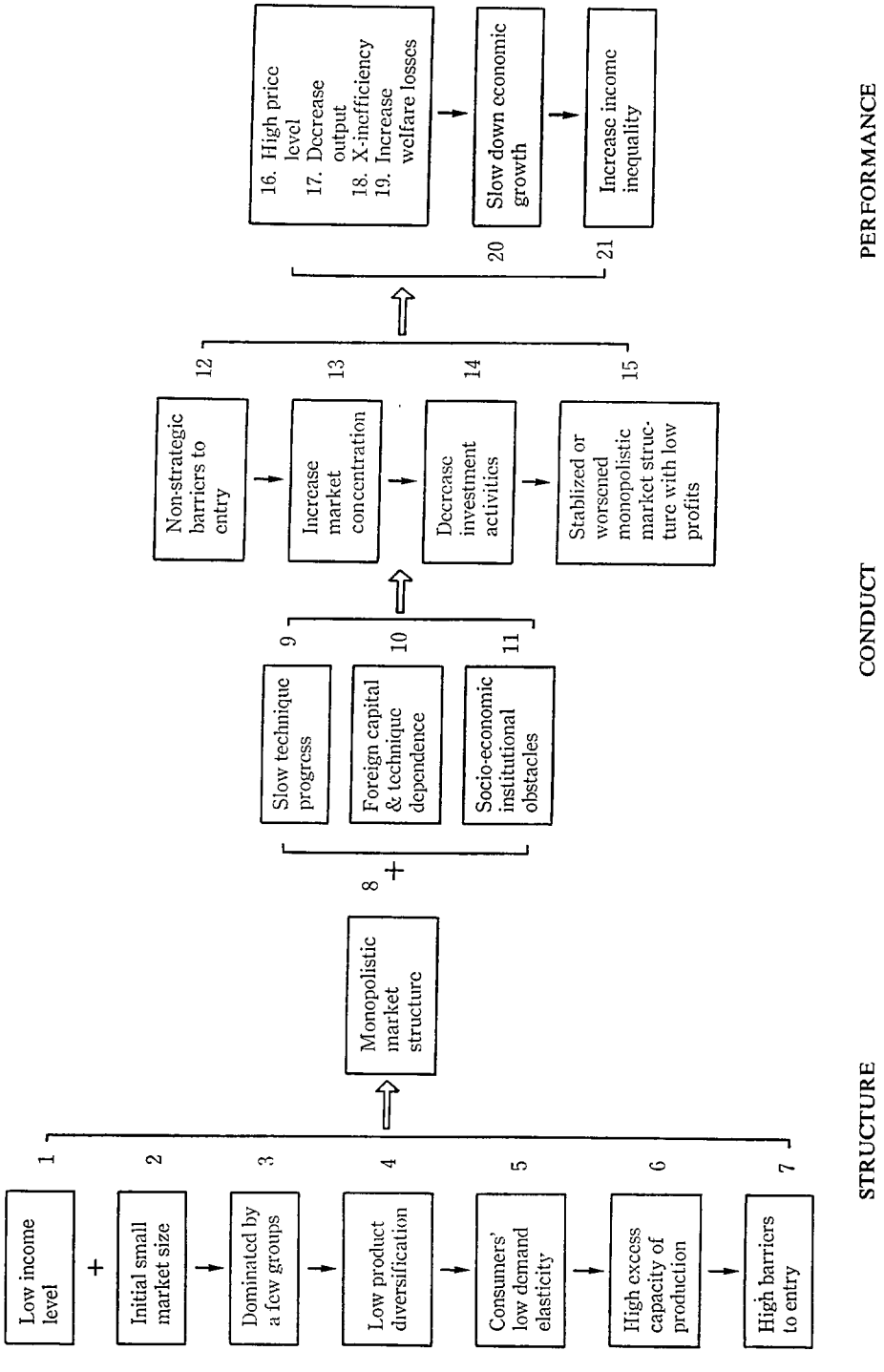
Small market size	⇨	High market concentration	+	Technology dependence on DCs	⇨	Reinforcing initial monopoly	⇨	Deterring growth & equality

In terms of style, Merhav's book is a descriptive one. It would be helpful to reorganize his basic ideas and develop it into an analytical and fuller version, as Fig. 1 shows. We now can use the numbers in Fig. 1 and discuss Merhav's thesis in our own version.

STRUCTURE. (1) Low income level is the main cause of (2) small industrial product market size. This small market is in general (3) dominated by a few groups (domestic and foreign). (1)+(2)+(3) leads to (4) low product diversification and to (5) low price demand elasticity in the domestic product market. In addition, due to small market size and insufficient effective demand, (6) excess capacity of production equipment in LDCs is generally high. This situation increases (7) barriers to entry. All these factors lead to (8) monopolistic market structure in LDCs from the outset.

CONDUCT. This monopolistic structure is reinforced by industry's conduct in the following way. A general low technological level in LDCs, together with weak market stimulation and low level of profitability (due to excess capacity and slow market expansion) will lead to (9) slow technological development. Most LDCs are not able to produce the required technology at home; this deficiency leads to (10) high technological depandence. Besides, (11) socio-institutional factors also favor the existing monopoly at both capital resources and entrepreneurial levels. All these reinforce (12) higher non-strategic barriers to entry and lead to (13) higher market concentrations. But this situation does not imply

Fig. 1. MARKET STRUCTURE, CONDUCT AND PERFORMANCE IN THE DEPENDENT LDCs



high profitability, because there exists high X-inefficiency, slow market expansion and so forth. It follows that (14) in such a business climate investment activities are discouraged. The process from (1) to (14) leads to (15) a stabilized or worsened monopolistic market structure.[2]

PERFORMANCE. This reinforced market monopoly tends to result in (16) higher prices and (17) lower output than in the competitive situations, as the conventional firm theory suggests. This situation increases (18) X-inefficiency due to sluggish competition. Consequently, from (16) to (18), there is an increase in (19) social welfare losses due to market monopoly. It follows that (20) economic growth stagnates, which is usually accompanied by (21) increasing income disparity; i.e. urban labor earns more, and the monopolistic sectors enjoy relatively higher profits than the traditional ones.

II. *The Case of Taiwan*

2.1 Industrial structure

Tables 1 and 2 describes the main features of the industrial sector and market structure in Taiwan. The structural change of the industrial sector can be measured by statistics such as the general production index (value produced), which are easily available from the published annual GNP statistics. What we propose here is to use the *Industrial and Commerce Census* data, which has been conducted every five years from 1954. This data is more reliable because it is derived from "field survey" rather than by "estimation." We select the units of enterprise and the number of employed persons as two indicators of Taiwan's industrial structure. Two remarks on Table 1 are in order.

(1) In terms of absolute volume, the number of enterprises more than quintupled between 1954–1986 (see "Total" of Table 1) being mainly concentrated in the manufacturing, commerce and the service sectors. The commerce sector had the highest percentage increase throughout the period, implying the commercialization of the economy.

(2) The density of firms is sufficiently high in this small economy. Taking 1986 as an example, when the total employment (5,213,634, see the second part of Table 1) is divided by total number of enterprises (627,012, see the first part of Table 1), one obtains an average of 8.31 persons per enterprise (firm), meaning that most enterprises are quite small and unlikely to have market power either at home or abroad. In this case it is easier for a few leading firms to dominate the market.[3]

---

[2] Another view is that technological dependency makes the monopolistic firms in LDCs more efficient than traditional ones, thus creating higher profits, higher investments and more dominant position in the industry. In other words, (10) higher technological dependence leads to (13) higher concentration and (15) reinforced monopolistic market structure.

[3] Chou (1988c) examines this problem in detail. He finds that market shares of the largest firms in the manufacturing sector are high, but the trend remains stable during the 1970s. He also finds that big enteresiprs in Taiwan prefer multi-companies groups rather than a single multi-divisional corporation.

TABLE 1. STRUCTURE OF ENTERPRISES AND EMPLOYMENT IN THE INDUSTRIAL SECTOR OF TAIWAN: 1954–1986

1. *Structure of Enterprises* (units of firm)

	1954	1966	1976	1986
Total	127,978	217,651	422,129	627,012
Mining & Quarrying	.20%	.36%	.25%	.15%
Manufacturing	31.11%	12.73%	16.47%	19.10%
Electricity, Gas & Water	.12%	.06%	.01%	.11%
Construction	2.07%	2.18%	2.04%	2.32%
Commerce	46.80%	56.91%	62.70%	57.16%
Transport, Storage & Communication	.83%	1.49%	1.88%	5.58%
Service	18.85%	26.26%	16.65%	15.58%

2. *Structure of Employment* (persons employed)

	1954	1966	1976	1986
Total	620,614	1,528,668	3,709,630	5,213,634
Mining & Quarrying	8.93%	5.55%	1.78%	.48%
Manufacturing	49.93%	38.20%	51.03%	53.50%
Electricity, Gas & Water	1.27%	1.16%	.66%	.77%
Construction	1.47%	1.20%	8.87%	6.80%
Commerce	19.02%	19.89%	22.02%	21.33%
Transport, Storage & Communication	5.09%	7.23%	6.57%	6.38%
Service	13.96%	16.00%	9.02%	10.53%

Source: Calculated from the *General Report on Industrial and Commercial Census*, 1976 (vol. 1, pp. 104–5), 1981 (vol. 1, pp. 6–10), 1986 (vol. 1, Table 2).

2.2 *Market structure*

Various indices are used in industrial economics to measure the degree of market concentration. The usual ones are CR4 (first four biggest firm market share), CR8, Herfindahl, Entropy, etc. Taiwan's *Industrial and Commerce Census* data are available for the calculation of these indices from 1976 onward, and these indices are available from the published sources cited in Table 2. Two remarks on Table 2 are offered as follows.

(1) The 1976 and 1981 indices are estimated with the data of overall sales volume. For a small and very open economy like Taiwan, this measurement certainly generate biased indices of domestic degree of market concentration. Unfortunately, the export/import data are not reported in the census data. With recent data, Chou (1988a) is able to calculate the degree of concentration with export adjustment. The results are reported in the first part of Table 2.

(2) To simplify the illustration, the second part of Table 2 shows the overall degree of competition between 1976–1986. A generally accepted criterion is that when the CR4 ratio is over 40%, the market is considered oligopolistic. This ratio is 47.3% in 1976: the summation of $41\% < CR4 < 100\%$ (24.4%+12.2%+10.7%), 42.3% in 1981, 69.8% in 1986, and 84% in 1986 (when adjusted for exports). This trend indicates that market concentration in Taiwan is considerably high, and increasing.

To conclude, in the long-run Taiwan's industrial sector tends to be commercialized

TABLE 2. AGGREGATE DEGREE OF MARKET CONCENTRATION (FIRST BIGGEST 4-FIRM: CR4), TAIWAN: 1976–1986

I

CR4 (%)	1976 (overall)	1981 (overall)	1986 (overall)	1986** (domestic market only)
Total	*131 (100%)	134 (100%)	162 (100%)	162 (100%)
> 90%#	10(7.6%)	9(6.7%)	32(19.8%)	41(25.3%)
80–89%	4(3.1%)	5(3.7%)	7(4.3%)	14(8.6%)
70–79%	5(3.8%)	6(4.5%)	15(9.3%)	21(13.0%)
60–69%	11(8.4%)	10(7.5%)	23(14.2%)	32(19.8%)
50–59%	13(9.9%)	11(8.2%)	19(11.7%)	16(9.9%)
40–49%	19(14.5%)	17(12.7%)	17(10.5%)	12(7.4%)
30–39%	20(15.3%)	15(11.2%)	25(15.4%)	15(9.3%)
20–29%	26(19.9%)	26(19.4%)	18(11.1%)	7(4.3%)
10–19%	18(13.7%)	28(20.7%)	4(2.5%)	2(1.2%)
0– 9%	5(3.8%)	7(5.2%)	2(1.2%)	2(1.2%)

Source: For 1976 (Hsiao, 1982); for 1981 (Chen, 1984); for 1986 (Chou, 1988a).

II

	0<CR4<20%	21<CR4<40%	41<CR4<60%	61<CR4<80%	81<CR4<100%
1976	*23(17.5%)	46(35.2%)	32(24.4%)	16(12.2%)	14(10.7%)
1981	35(26.1%)	41(30.6%)	28(20.9%)	16(11.0%)	14(10.4%)
1986	6(3.7%)	43(26.5%)	36(22.2%)	38(23.5%)	39(24.1%)
1986**	4(2.4%)	22(13.6%)	28(17.3%)	53(32.8%)	55(33.9%)

#: Degree of four-firm concentration ratio, in %.
*: Number of industries and their percentages.
**: Export volumes are excluded.
Source: Rearranged from I above.

during the process of development, and that the aggregate degree of market concentration shows a rising trend.

2.3 Economic dependence and income inequality

Table 3 provides the trends of economic growth, economic dependence and income inequality, in Taiwan during 1952–1986. For growth, both GNP index and per capita income index reveal remarkable growth rates: the sharply decreased agricultural share also reflects the speed of industrialization. Trends of these three variables indicate Taiwan's high economic growth during 1952–1986.

We turn next to the trend of economic dependence. First, the trend of foreign investment/GDCF (Gross Domestic Capital Formation) ratio increased constantly, reaching its peak in 1970, and decreased thereafter. Although this ratio decreased after 1974, the absolute figures were still increasing significantly (see Wu et al.: 1980 Table 2).

Second, technological dependence is an economic concept which is not easy to quantify. We use the share of imported capital goods (k/M) as a proxy of technological dependence. Similar to foreign investment, it increased significantly during the high growth period. The decreasing trend after 1976 reflects that Taiwan gradually started to produce capital goods, substituting the imported ones.

TABLE 3. ECONOMIC GROWTH, DEPENDENCE AND INEQUALITY OF TAIWAN: 1952–1986 (SELECTED YEARS)

	ECONOMIC GROWTH			ECONOMIC DEPENDENCE					INEQUALITY	
	GNP Index 1981=100	Per Capita GNP 1981=100	Agricul. Share in GNP (%)	Foreign Invest. in GDCF%	M/Y (%)	k/M (%)	X/Y (%)	I/X (%)	Gini Coeffic.	Richest 20% over Poorest 20%
1953	9.2	18.7	38.3	1.8	13.8	15.6	8.6	8.4	.5580	—
1959	14.1	23.5	30.4	.4	20.8	25.1	12.5	23.6	.4400	—
1964	21.2	30.4	28.2	4.1	18.7	22.1	19.5	42.5	.3208	5.33
1966	25.7	34.8	26.2	4.1	20.9	29.4	21.1	55.1	.3226	5.25
1968	31.0	40.0	22.0	8.4	26.7	32.5	23.9	68.4	.3260	5.28
1970	37.6	46.4	17.9	9.6	29.7	32.3	29.7	78.6	.2928	4.58
1972	48.1	57.1	14.1	6.2	35.5	31.1	41.8	83.3	.2897	4.49
1974	54.9	62.8	14.5	3.3	51.5	30.7	43.7	84.5	.2996	4.37
1976	65.0	71.5	13.4	2.5	45.1	29.1	47.3	87.6	.2940	4.18
1977	71.5	77.1	12.5	2.7	43.9	25.8	48.9	87.5	.2960	—
1978	81.4	86.2	11.2	2.8	45.9	24.7	52.4	89.2	.2960	4.34
1979	88.3	91.7	10.3	—	52.0	24.6	53.5	90.5	.2940	—
1980	94.6	96.4	9.2	3.4	54.1	23.4	52.9	90.8	.2870	4.17
1981	100.0	100.0	8.7	3.0	50.1	25.7	52.2	92.2	.2890	4.21
1982	103.3	101.5	9.2		45.4	24.8	50.6	92.4	.2920	4.29
1983	111.4	107.7	8.8		45.0	23.6	54.0	93.1	.2970	4.36
1984	123.2	117.3	7.6		46.0	23.7	57.6	93.9		4.40
1985	129.4	121.5	6.9		41.7	23.8	56.1	93.8		4.50
1986	114.5	134.1	6.5		39.8	26.9	60.6	93.5		4.60

Explanations:

1. GNP index, at 1981 constant price. Source: Taiwan Statistical Data Book, 1988 (p. 26).
2. Per capita GNP index, at 1981 constant price. Source: as for 1 (p. 29).
3. Share of agricultural in GNP. Source: as for 1 (p. 41).
4. Foreign private investments over Gross Domestic Capital Formation (GDCF). Source: Wu *et al.* (1980: 12–13).
5. M/Y: Imports/GNP. k/M: Share of imported capital goods. X/Y: Export/GNP. I/X: Industrial products export share. Source: as for 1 (pp. 43, 214, 43, 213).
6. Gini coefficients: household income inequality. Source: Lai (1988: 180).
7. Average richest 20% households income over poorest 20% households. Source: as for 1 (p. 62).

Third, foreign trade. In this small open economy foreign trade is the engine of growth. The trade dependence of Taiwan increased significantly over time (see M/Y and X/Y). The share of industrial product export (I/X) also increased remarkably, which indicates a high rate of industrialization. These three factors of economic dependence show that the degree of economic dependence in Taiwan increased significantly during the high growth rate period.

In terms of income inequality, two indices are used: the Gini coefficients and the ratios of the richest 20% households income to the poorest 20% households income. Both statistics reveal that income inequality also significantly improved during the 1950s–1970s. The growth-inequality pessimism is thus not applicable to the case of Taiwan. However, a grain of salt is needed when interpreting these statistics, especially for the period of the 1980s. Surveys of income distribution are sampled from 0.4% households (less than 20,000 families), from which the results are calculated. These surveys are on "income" instead of

"wealth."

Income equality in Taiwan is due, in a great part, to the institutional wage system: all public sector employees are paid under a uniform salary system, hence a very low "income" disparity among public sector employees. While the private sector is delighted to follow this wage standard so that they can pay lower wages to workers and higher salary to attract competent people from the public sector. It is believed that the "real" inequality should be calculated from the survey of households wealth. A first survey of this kind is started from 1989.

III. *Conclusions*

Is Merhav's hypothesis valid? The historical evidence of Taiwan reveals that: 1. The increasing dependence of the economy (Table 3) fostered economic growth, as Arthur Lewis (1980) emphasized, foreign trade is "the engine of growth" for many LDCs. Merhav's dependence-stagnation pessimism may be obtained from some Latin American economics, while this is not the case at least in Asian LDCs.

2. Regarding the monopoly, the 1976–86 data (Table 2) shows a trend of higher monopoly, as Merhav predicted. However, it should be cautioned to draw such a general conclusion because: (a) we do not have the evidence of 1952–70; (b) more LDCs case studies are required (Lee 1984).

3. Against Merhav's hypothesis, Taiwan's income inequality (Table 3) was improving. But recent evidence (from 1985 on) shows that the disparity of wealth is enlarging (Lai 1988, 1989a).

4. All in all, for the case of Taiwan, Merhav was right concerning market monopoly. Taiwan may be is a deviant case among LDCs as Barret and Whyte (1982) reported. Merhav proposed an interesting theory that calls further empirical investigations.[4]

NATIONAL TSING HUA UNIVERSITY, TAIWAN

APPEMDIX: *Market Structure in DCs, Taiwan and LDCs*

The term "market structure" comprises at least four elements: market concentration (measured by various indices), product differentiation, barriers to entry, and economies of scale (see e.g. Scherer 1980: 4). In fact, only the first one can be quantified in a general acceptable way for international comparison. In general, LDCs have relatively small industrial market size (compared to their population size) which are controlled by a few groups. Table A-1 provides further evidence on market concentration in DCs and LDCs. This

[4] As my conclusion is the that Merhav's theory does not fit Taiwan's historical evidence, then what would be a plausible explanation/rationale for the evidence? To answer this question, it requires a new theory (at least unknown to me) to present a model that can explain the relationship between market structure and income distribution in LDCs. What I have done in this paper is merely comparing various Taiwan's statistics concerning this issue. It is desirable to devise new methodology for the causality test between the Taiwanese (and LDCs') situation and Merhav's proposition.

TABLE A-1. INDUSTRIAL CONCENTRATION RATIOS: DCs AND LDCs COMPARED

Country		Sector	No. of industries	CR4 (%) *	CR8 (%)	Herfindahl index
US	1958	Manufactur.	292	40.8	53.6	—
	1970	//	292	41.5	54.3	—
UK	1951	//	42	29.3 (a)	—	—
	1963	//	42	37.4 (a)	—	—
	1970	//	102	43.7 (b)	—	—
	1973	//	102	45.3 (b)	—	—
Belgium	1973	//	115	43.0	—	.102
	1976	//	115	44.7	—	.110
	1981	//	115	50.6	—	.132
Canada	1979	//	140	52.6	—	.120
Taiwan	1976	//	131	48.3	57.4	.236
	1981	//	134	44.2	52.3	—
	1986	//	162	50.3	63.6	—
Chile	1967	//	41	43.3	—	—
	1979	//	41	58.4	—	—
Brazil	1972	//	68	72	—	—
India	1968	//	22	55	—	—
Mexico	1972	//	73	73	—	—
Pakistan	1968	//	51	66	—	—

*CR4: the market share of first biggest four firms in the sector.
(a): CR3; (b): CR5.
Sources:
US: Mueller and Hamm (1974: 512). UK: Hart and Clarke (1980: 25–27). Belgium: de Ghellinck *et al.* (1980: 599). Canada: Baldwin *et al.* (1984, Table 5). Taiwan: Chou (1988a: 124). Chile: de Melo and Urata (1984: 7). For other LDCs: Leff (1979: 720). See also the general survey of Lee (1984).

table indicates that market concentration is in general higher in LDCs. For other international comparison, see Shepherd (1979: 120–1, 212–4) and Scherer (1980: 68–73).

REFERENCES

Baldwin, J.R., P. Gorecki and J. McVey (1984), "International Trade, Secondary Output, and Concentration in Canadian Manufacturing Industries, 1979," Paper presented at the 11th European Association for Research in Industrial Economics, August 29–31, Fontainebleau, France.

Barret, R. and M. Whyte (1982), "Dependency Theory and Taiwan: an Analysis of a Deviant Case," *American Journal of Sociology* 87, pp. 1064–1089.

Chen, C. (1984), "The Industrial Structure of Taiwan," *Bank of Enterprises Quarterly* 8 (2), pp. 35–57 (in Chinese).

Chou, T. (1988a), "Industrial Concentration in the Open Economy: a Case Study of the Manufacturing Sector of Taiwan, *Academia Economic Papers* 16(1), pp. 113–140 (Academia Sinica, in Chinese).

Chou, T. (1988b), "Concentration and Profitability in a Dichotomous Economy: the Case of Taiwan," *International Journal of Industrial Organization* 6, pp. 409–428.

Chou, T. (1988c), "Aggregate Concentration Ratios and Business Groups: a Case Study of Taiwan," *Taiwan Economic Review* 16(1), pp. 79–94.

de Ghellinck, E., A. Jacquemin and M. Lauwers (1982), "Evolution de la Concentration Industrielle en Belgique," *Bulletin de Statistique* (nov.–dec.), pp. 597–601.

de Melo, J. and S. Urata (1984), "The Influence of Increase Foreign Competition on Industrial Concentration and Performance," *International Journal of Industrial Organization* 4, pp. 297–304.

Hart, P. and R. Clark (1980), *Concentration in British Industry*, Cambridge University Press.

Hsiao, F. (1982), "Industrial Concentration in Taiwan: Measurement and Analysis," *City Bank of Taipei Monthly* 13(5), pp. 43–56 (in Chinese).

Lai, C. (1988), "The Kuznets Effect Revisited," *South African Journal of Economics*, 56 (2–3), pp. 173–180.

Lai, C. (1989a), "Development Strategies and Growth with Equality: Re-evaluation of Taiwan's Experience: 1950's–1970's," *Rivista Internazionale di Scienze Economics the Commerciali* 36(2), pp. 177–191.

Lai, C. (1989b), "Market Structure and Inter-Industry Wage Differences: the Case of Taiwan," *Economics Letters* 31(2), pp. 199–204.

Lee, N. (1984): Business concentration in LDCs, in: Kirkpatrick C.H., N. Lee and F.I. Nixon (1984), *Industrial Structure and Policy in Less Developed Countries*, pp. 46–85, London, George Allen & Unwin.

Leff, N. (1979), "Monopoly Capitalism' and Public Policy in Developing Countries," *Kyklos*, 32, pp. 718–738.

Lewis, Arthur (1980), "The Slowdown of the Engine of Growth," *American Economic Review* 70(3), pp. 555–564.

Merhav, M. (1969), *Technological Dependence, Monopoly, and Growth*, Oxford, Pergamon Press.

Mueller, W. and L. Hamm (1974), "Trends in Industrial Market Concentration, 1947 to 1970," *Review of Ecomonics and Statistics* 56, pp. 511–520.

Scherer, F. (1980), *Industrial Market Structure and Economic Performance*, Chicago, Rand McNally & Co., 2nd ed.

Shepherd, W. (1979), *The Economics of Industrial Organization*, N.J.: Prentice-Hall.

Wu, R.I., C. Wang-Lien, T. Chou and C. Lee (1980), *The Impact of American Investment on the Economy of Taiwan*, Institute of American Culture, Academia Sinica (in Chinese.)