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# Kieler Arbeitspapiere Kiel Working Papers

Working Paper No. 63

INDUSTRIAL EMPLOYMENT EXPANSION UNDER ALTERNATIVE DEVELOPMENT STRATEGIES: SOME EMPIRICAL EVIDENCE

> by Ranadev Banerji and James Riedel

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#### INDUSTRIAL EMPLOYMENT EXPANSION UNDER ALTERNATIVE DEVELOPMENT

STRATEGIES: SOME EMPIRICAL EVIDENCE\*

The general consensus in recent literature on development economics is that outward-looking strategies are likely to create more employment opportunities in labour abundant countries than inward-looking strategies. The reasons generally given to support this contention are (i) that inward-looking strategy limits the scope for structural change into relatively labour-intensive branches and (ii) that policies associated with inward-looking strategy tend to distort factor prices thereby giving incentive to the adoption of relatively capital-intensive techniques of production.<sup>1</sup>

This paper develops an identity which delineates the components of industrial employment expansion into effects of: (i) productivity change, (ii) capital accumulation and (iii) change in the composition of manufacturing. Applying this identity to India and Taiwan, two countries that have taken very different paths towards economic development, provides some insight into the source of employment expansion and its stringent limitations under alternative development strategies.

#### I. The Identity

In their seminal study of development in labour surplus countries, Fei and Ranis (1963) derived a "labour absorption equation" which defined the rate of industrial employment expansion to be a function of (i) capital accumulation and (2) technological change. The Fei-Ranis equation, having been derived from a two sector model of development, ignored the implications of changes in the structure of the industrial sector. However, as it is generally believed that factor-intensity and substitutability differ significantly between industrial sectors,<sup>2</sup>

<sup>\*</sup> The authors acknowledge the helpful comments of J.B. Donges, J.S. Flemming, U. Hiemenz, R.W.T. Pomfret and J.P. Wogart.

<sup>&</sup>lt;sup>1</sup> See Morawetz (1974); Little, Scitovsky and Scott (1970).

<sup>&</sup>lt;sup>2</sup> See, for example, Nerlove (1967).

and since industrial structure is one of the principal targets of development policy, this is a factor which cannot be ignored.

The impact of technological change, capital accumulation and structural change on industrial employment expansion can be delineated by means of the following identity:<sup>1</sup>

$$L^{1} - L^{0} \equiv \Sigma \mathfrak{k}_{i}^{1} \mathfrak{x}_{i}^{1} - \Sigma \mathfrak{k}_{i}^{0} \mathfrak{x}_{i}^{0}$$

$$\equiv \Sigma \mathfrak{x}_{i}^{0} (\mathfrak{k}_{i}^{1} - \mathfrak{k}_{i}^{0}) + \Sigma \mathfrak{k}_{i}^{0} (\overline{\mathfrak{x}}_{i}^{1} - \mathfrak{x}_{i}^{0}) + \Sigma \mathfrak{k}_{i}^{0} (\mathfrak{x}_{i}^{1} - \overline{\mathfrak{x}}_{i}^{1})$$

$$+ \Sigma (\mathfrak{k}_{i}^{1} - \mathfrak{k}_{i}^{0}) (\mathfrak{x}_{i}^{1} - \mathfrak{x}_{i}^{0})$$

where

 $L^{j}$  = total industrial employment in year j, j = 1, 0

4.1

 $\begin{aligned} \mathfrak{k}_{i}^{j} &= L_{i}^{j} / \mathfrak{X}_{i}^{j} = \text{labour output ratio in the i}^{\text{th}} \text{ sector in year j} \\ \overline{\mathfrak{X}}_{i}^{l} &= \Sigma \mathfrak{X}_{i}^{l} \cdot \frac{\mathfrak{X}_{i}^{0}}{\Sigma \mathfrak{X}_{i}^{0}} = \text{output of the i}^{\text{th}} \text{ sector in year 1} \\ &\text{assuming the structure of production remains the same as} \\ &\text{in year 0.} \end{aligned}$ 

The first term on the right hand side of the above identity expresses the effect of productivity change on industrial employment expansion, holding the growth and structure of output constant. This component expresses the combined effects of (1) capital deepening (or shallowing) and (2) technological change. The second term expresses the effect of "pure growth", holding sectoral labour productivities and the structure constant. It is in other words the effect of

<sup>&</sup>lt;sup>2</sup> This identity was first used by one of the authors to estimate the employment implications of India's manufactured exports. See Banerji (1975).

capital widening and measures the change in employment associated with a change in the volume of output. The third term expresses the effect of change in the structure of production within the industrial sector, holding sectoral productivities and overall growth constant. The final term is the cross-effect term; it describes the combined effect of all three factors working simultaneously.<sup>1</sup>

#### II. Empirical Evidence

One can hardly think of two countries more dissimilar than India and Taiwan. India is a large country in which economic self-reliance is the cornerstone of development policy. Taiwan is a relatively small country, and accordingly relies heavily on international trade. In pursuit of self-reliance, India has laid particular stress on import-substitution in the industrial sector. The policies which underlie this goal are typical of those adopted elsewhere in promotion of import-substitution: overvalued exchange rate, foreign exchange control, import quotas and tariffs, investment steering and a general reliance on non-market allocation mechanisms. The devaluation of the rupee in 1966 and the subsequent liberalization of trade policies have increased India's exports noticeably, although without having any perceptible influence on the structure of output or industrial employment.<sup>2</sup> Taiwan also embarked on a policy of import-substitution in the early phase of industrialization after the second world war, but found the limits to this approach quickly reached in such a small economy. Beginning around 1960 a major revision of policy from an inward-

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<sup>&</sup>lt;sup>1</sup> Clearly, the cross-effect term will normally be large in an economy simultaneously experiencing changes in labour productivity, growth and structure of production, making it impossible to use the identity results as a basis for attributing the observed employment expansion to one factor or another. At the outset it is, therefore, important to note that attributing change in employment to one effect or another under ceteris paribus assumptions by means of the accounting identity is essentially an exercise in counterfactual hypothesizing. For this reason, the identity makes no claim to providing an explanation of employment growth; rather, it helps to isolate the likely areas of explanation.

<sup>&</sup>lt;sup>2</sup> See Banerji (1975).

towards an outward-oriented approach was undertaken. The foreign exchange rate was devalued, non-market controls in the external and domestic sectors were relaxed and direct incentives for export expansion were provided. Since 1966 the country has witnessed nothing short of a boom in manufactured exports.

The achievements of the two countries in alleviating unemployment and promoting expansion of industrial employment have been equally dissimilar. The rate of unemployment in India is high and rising; in Taiwan it is low by Indian standards and since 1963 has been falling (see Table I).<sup>1</sup> In Taiwan the rate of industrial employment growth has consistently exceeded the rate of growth of the labour force; however, only after 1966, the period of export boom, was the rate of expansion sufficient to absorb the bulk of unemployed.

The identity results presented in Tables II and III provide some clues as to why the experience of these two countries has been so different.<sup>2</sup>

Continued on next page

<sup>&</sup>lt;sup>1</sup> The unemployment statistics in India are notoriously hard to come by which is perhaps not surprising for a country of India's size where nearly three-fourths of the working population are directly or indirectly engaged in agriculture and related activities. The data presented in Table I are from the Employment Exchange Statistics. The employment figures relate to total employment in the organised sector (covering all establishments in the public sector and nonagricultural establishments employing 10 or more workers in the private sector) of the economy. The unemployed are work seekers registered at the Employment Exchanges. The rate of apparent unemployment is estimated by expressing the number of job seekers as a percentage of the sum total of employed and job seekers. Because of well known shortcomings involved in using the employment exchange data, the above figures provide only a gross indicator of the size and direction of unemployment.

<sup>&</sup>lt;sup>2</sup> It is necessary to outline briefly the limitations of the underlying data. In Taiwan's case, output and employment figures are taken from industrial censuses for all years; output values (labour productivity) have been expressed in constant terms using industrial branch price indexes as deflators. In the case of India, the results for the two periods are, strictly speaking, not comparable because of changes in

Table	I
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#### APPARENT UNEMPLOYMENT IN INDIA AND TAIWAN

	I	NDIA			ТА	IWAN	
Year	Employed	Unemployed	Unemploy- ment Rate	Year	Employed	Unemployed	Unemploy- ment Rate
	millions	millions	%		tho <b>usa</b> nds	thousands	%
1961	12.1	1.6	11.7	1963	3607	200	5.25
1066	15 0		14.0	1066	2647	117	2 1 1
1900	12.3	2.5	14.0	1966	3647	117	3.11
1971	17.4	4.2	19.5	1971	4739	81	1.68
1973	18.8	7.6	28.8	1973	5222	66	1.25

Sources: Employment Review, Government of India, New Delhi, various issues.

Quarterly Report on the Labour Force Survey, Taiwan Provincial Labour Force Survey and Research Institute, Taipei.

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#### DECOMPOSITION ANALYSIS OF INDUSTRIAL EMPLOYMENT EXPANSION IN TAIWAN

(man-years)

				1954 - 1961			1961 - 1966				1966 - 1971					
	ISIC SECTOR	Employment Due to		Employment	Employment Due to			Employment Due to								
		Expansion	Productivity Change	Structural Change	Pure Growth	Cross Effect	Expansion	Productivity Change	Structural Change	Pure Growth	Cross Effect	Expansion	Productivity Change	Structural Change	Pure Growth	Cross Effect
20	Food Products	28 501	-14 937	-11 584	69 422	-14 400	34 812	7 824	-40 671	65 467	2 192	7 979	-19 854	-186 976	220 151	-5 342
21	Beverages	4 997	323	-177	4 492	359	-5 878	B 014	-13 870	6 568	-6 591	970	-753	-3 057	5 358	-578
23	Textiles	18 291	-11 549	-22 247	60 540	-8 453	32 156	-18 474	16 333	52 235	-17 939	123 160	-52 628	176 711	183 514	-184 436
24	Clothing and Footwear	6 975	-3 989	-3 337	18 064	-3 763	-9 123	-11 527	-11 800	16 709	-2 504	62 871	2 108	28 498	24 038	8 227
25	Wood and Cork Products	8 526	-8639	12 677	20 627	-16 139	5 660	-8 321	939	19 495	-6 452	40 824	-8 778	11 187	57 154	-18 739
26	Furniture	5 472	-2 306	5 147	7 206	-4 575	-7 201	-2 197	-14 816	B 655	1 157	4 733	-3 087	16 874	8 032	-17 087
27	Paper and Paper Products	6 982	-2 425	7 353	7 580	-5 527	3 906	-6 002	7 794	10 011	-7 897	16 494	-676	-13 272	31 135	-693
28	Printing and Publications	2 591	-870	-8 392	12 166	-312	-132	-6 615	3 396	9 694	-6 607	4 950	-2 437	-13 994	23 097	-1 715
29	Leather and Leather Products	0	- 36 3	-1 208	1 692	-120	-300	-407	-933	1 082	-41	6 633	2 354	-660	2 075	2 865
30	Rubber Products	1 340	-2 942	3 216	6 227	-5 161	3 415	-2 121	3 117	4 973	-2 553	11 303	-4 798	12 476	18 098	-14 472
31	Chemicals	9 285	-8 264	3 040	25 223	-10 714	29 5 14	-10 306	36 575	22 994	-19 750	90 268	-7 644	3 858	108 188	-14 134
32	Petroleum and Coal Products	2 130	-719	-331	3 943	-762	5 581	95	1 297	4 097	92	4 693	-4 636	-3 850	19 851	-6 671
33	Other Non-metallic Mineral Products	9 422	-19 551	49 180	34 585	-54 792	6 884	-13 540	2 072	29 081	-10 730	17 042	-11 478	-44 526	82 476	-9 429
34	Basic Metals	4 524	-3 253	8 502	7 376	-8 101	6 443	-1 331	793	8 063	-1 082	· 12 793	-2 787	-12 399	30 961	-2 983
35	Fabricated Matal Products	5 839	-9 169	25 103	16 579	-26 673	2 463	-8 196	3 038	14 919	-7 298	18 568	-12 784	31 654	40 402	-40 704
36	Non-electrical Machinery	3 468	-4 699	-2 354	15 112	-4 590	14 336	-7 036	24 985	12 227	-15 840	34 157	-5 571	-6 625	55 103	-8 750
37	Electrical Machinery	7 868	-2 566	14 730	5 983	-10 279	19 485	-6 036	37 872	9 646	-21 997	94 924	-14 425	138 447	58 065	-87 162
38	Transport Equipment	9 709	-4 321	-2 855	21 213	-4 327	-4 484	-21 438	51 241	20 744	-55 032	11 563	~10 247	-3 459	42 059	-16 790
39	Miscellaneous	-633	-4 611	-8 677	14 879	-2 224	282	-4 440	-1 472	9 044	-2 750	45 008	-2 352	35 714	22 510	-10 863
a)	Total change	135 286	-104 850	67 786	352 909	-180 553	137 919	-112 054	105 890	325 704	-181 622	608 933	-160 475	166 600	1032 266	-429 458
b)	Average annual change .	19 327	-14 978	9 683	50 416	-25 793	27 583	-22 411	21 178	65 140	-36 324	121 787	-32 095	33 320	206 453	-85 892
c)	(b) as a 7 of average annual employment.	5,18	-4.02	2.59	13.52	-6,92	5.41	-4.39	4.15	12.79	-7.12	13.75	-3.68	3.77	23.39	-9.73

Sources: 1. General Report on Industry and Commerce Census of Taiwan 1954, The Executive Group of ICCT, May 1956, Taipei, Republic of China

- General Report 1961, Industry and Commerce of Taiwan, The Executive Group of ICCT, December 1962, Taipei, Republic of China
- General Report on the Third Industrial and Commercial Census of Taiwan: 1966, The Commission of ICCT, June 1968, Taipei, Republic of Chica
- The 1971 Industrial and Commercial Censuses of Taiwan and Fukien Area, The Committee on Industrial and Commercial Censuses, June 1973, Republic of China.

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#### DECOMPOSITION ANALYSIS OF INDUSTRIAL EMPLOYMENT EXPANSION IN INDIA<sup>1</sup>: 1950 - 1969

#### (Unit: 100 Han-years)

	1950 - 1958					1960 - 1969					
ISIC SECTOR	Employment	Due to				Employment	Employment Due to				
	Expansion	Productivity Change	Structural Change	Pure Growth	Cross Effect	Expansion	Productivity Change	Structural Change	Pure Growth	Cross Effect	
20 Food Products	111.18	- 691.82	- 366.18	1 477.94	- 308.76	506.02	-1 303.91	-1 413.91	4 173.82	- 949.98	
21 Beverages	1.73	- 24.55	21,47	29.85	- 25,04	73.65	- 35.22	241.49	60.67	- 193.29	
22 Tobacco						85.68	~ 533.02	177.68	1 121.37	- 680.35	
23 Textiles	164.33	-1 632.00	-3 574.06	5 735.26	- 364,87	29.99	~3 978.24	-6 814.06	12 888.09	-2 065.80	
24 Clothing and Footwear						59.02	- 24.70	70.10	68.64	- 55.02	
25 Wood and Cork Products	30.63	- 9.63	33.39	21.47	- 14.60	59.84	~ 44.05	- 45.98	186.43	- 36.56	
26 Furniture and Fixtures						31.77	- 45.75	- 34.46	150.88	- 38.90	
27 Paper and Paper Products	136.30	- 109.61	353.20	131,90	- 239.19	259.29	- 179.21	191.58	517.48	- 270.56	
28 Printing and Publications						367.81	~ 116.51	- 188.08	769.39	- 96.99	
29 Leather and Leather Products	-3.48	- 12.72	- 40.72	51.54	- 1.58	8.89	- 72.38	109.97	122.59	- 151.29	
30 Rubber and Rubber Products						238.31	- 71.64	27.96	366.94	- 84.95	
31 Chemicals	314.86	- 245.42	616.11	347.74	- 403.58	958.96	- 374.30	724.40	1 258.63	- 649.77	
32 Petroleum and Coal Products						123.86	- 19.73	133.57	72.06	- 62.04	
33 Non-metallic Mineral Products	, 225.10	- 277.77	639.99	338.90	- 476.02	389.79	- 611.03	- 9.93	1 680.07	- 669.26	
34 Basic Metals	140.94	- 460.39	461.20	617.34	- 477.21	1 717.97	~ 386.35	663.82	2 006,99	- 566.49	
35 Fabricated Metal Products						406.22	~ 80.97	- 28.38	600,57	- 85.00	
36 Non-electrical Machinery	33.44	- 13,26	115.43	12.39	- 81.12	1 128.70	- 442.50	1 886.40	1 049.06	-1 364.26	
37 Electrical Machinery	633.63	- 714.27	1 633.13	904.08	-1 189.31	968.56	~ 277.83	1 169.19	819.87	- 742.67	
38 Transport Equipment	91.92	- 12.75	169.31	17.23	- 81.87	1 452.95	~ 793.86	- 205.76	3 272.26	- 819.69	
39 Miscellaneous					,	280.34	- 153.73	441.41	366.20	- 373.54	
			<u></u>					· · · · · · · · · · · · · · · · · · ·			
a) Total change	1 880.60	-4 204.19	62.27	9 685.64	-3 663.12	9 147.60	-9.545.00	-2 903.00	31 552.00	-9 956.40	
b) Average annual change	235.10	- 525.00	7.80	1 210.70	- 457.90	1 016.40	-1 060.60	- 322.60	3 505.80	-1 106.30	
c) (b) as a % of average annual employment	1.37	- 3.04	0.05	7.01	- 2.65	3.10	- 3.20	- 1.00	10.60	- 3.30	
<sup>1</sup> Organised sector only.											

Sources: 1. Census of Indian Manufactures, Directorate of Industrial Statistics, Cabinet Secretariat, Calcutta, various issues

2. Annual Survey of Industries, Central Statistical Organisation, Cabinet Secretariat, Calcutta, various issues

3. Report on Currency and Finance, Reserve Bank of India, Bombay, various issues.

Table III

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A comparison of development in the two countries reveals that on an average annual basis industrial employment expansion in Taiwan has been faster than in India. It is clear from Table II that the elimination of unemployment as a serious economic problem in Taiwan was the consequence of the tremendous export boom which commenced in the mid-1960s. In neither the import substitution phase (1954-1961) nor the policy reorientation phase (1961-1966) was the rate of expansion sufficient to absorb the bulk of unemployed (approximately 10 per cent of the labour force). In both India and Taiwan, the primary source of employment expansion in the periods examined was capital accumulation. In both countries, as the pure growth effect suggests, the growth of industrial output in each period would have been associated with much faster expansion in employment than actually has been the case, if labour productivity had not changed. On the other hand, it is obvious that a rate of expansion of 27 per cent in Taiwan in the 1966-1972 period due to "pure growth" (under ceteris paribus assumption) would have been precluded by labour supply constraints. In India the rate of expansion due to pure growth, however, in neither period reached a rate sufficient to bring the labour supply constraint into force.

Second, it is observed that structural change, which as we have noted is a principal target of industrialization policy, can have a

#### Footnote continued from previous page

statistical coverage. Unlike Taiwan, the periods in India do not indicate different policy phases, but are chosen purely for reasons of statistical convenience. The 1950-1958 figures are from the Census of Manufactures covering about 46 per cent of the industries and only those factories which employed 20 or more workers and used power. The 1960-1969 figures are from the Annual Survey of Industries, covering all industries but only factories employing 50 or more workers with the aid of power or 100 and more workers without the aid of power. The relatively smaller units, in other words, are left out. This, however, is not a serious omission since nearly 85 per cent of India's total factory employment is nevertheless covered by these statistics. The output data have been deflated by the indexes of wholesale manufacturing prices. ("Index Numbers of Wholesale Prices in India", Office of the Economic Advisor, Government of India, New Delhi.)

very significant impact on industrial employment expansion. In the case of Taiwan we find that, had technology remained constant, changes in the structure of production alone would have increased employment by 4.15 per cent per annum in the 1961-1966 period. This was the phase of policy reorientation during which obstacles were removed and incentives were provided to entrepreneurs to exploit comparative advantages in world markets. The period of intensive comparative advantage exploitation (1966-71) witnessed an equally strong structural change effect, having favourable implications for Taiwan's employment. Interestingly, even during the import substitution phase in Taiwan (1954-1961) structural change was on the average in favour of relatively labour-intensive branches.<sup>1</sup>

One observes that during the early phase of import substitution in India (1950-1958) structural change was likewise in favour of relatively labour-intensive branches, although the relative magnitude of the shift was considerably less than in Taiwan. The extent of import substitution in Taiwan in the 1950s was of course less than in India. These results stand in contrast to the experience of India in the 1960s when structural change moved clearly in the direction of relatively capital-intensive (low L/X) branches. This reversal in the direction of structural change in India is perhaps explained by India's progression into a more advanced stage of import substitution during which emphasis shifted from the early targets of consumer goods

<sup>1</sup> It should be noted that

$$\Sigma (X_i^1 - \overline{X}_i^1) = 0.$$

Therefore, the structural change component,

 $\Sigma \mathfrak{k}_{i}^{0} (X_{i}^{1} - \overline{X}_{i}^{1}) \stackrel{\geq}{\leq} 0,$ 

if structural change <u>on average</u> is labour-intensive, neutral or capital-intensive.

to the relatively more capital-intensive intermediate and capital goods sectors.<sup>1</sup> The employment implications of neglecting principles of comparative advantage in pursuit of self-reliance are clearly revealed by these findings.

Strikingly disparate pattern of the capital intensity of exports from India and Taiwan provides some evidence in support of the conjecture that it is trade-development policy that has led to the differing contributions of structural change to employment creation

#### Table IV

### INDEX NUMBER OF THE WEIGHTED AVERAGE CAPITAL-INTENSITY OF MANUFACTURED EXPORTS<sup>1</sup>

From India and Taiwan: 1950-1970 selected years

	1950	1955	1960	1965	1970			
India (1950 = 100)	100.0	103.5	105.1	107.6	123.3			
Taiwan (1955 = 100)	-	100.0	100.9	95.8	84.0			
<u>Note</u> : <sup>1</sup> Defined as $\sum_{i} \left(\frac{K}{L}\right)_{i} \cdot e_{i}$ , where $\left(\frac{K}{L}\right)_{i}$ is the capital to								
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1								
in total manufacturing exports. The industries considered are								

Source: Computed from: R. Banerji, "Exports of Manufactures from India", op.cit.; J. Riedel, "Factor Proportions, Linkages and the Open Developing Economy", The Review of Economics and Statistics, No. 4, November 1975, pp. 487-94.

the same as those shown in Tables II and III.

<sup>&</sup>lt;sup>1</sup> Banerji (1975) presents evidence supporting this contention. Also see Bhagwati and Desai (1970), p. 108.

(see Table IV).<sup>1</sup>

In Taiwan, the average capital intensity (i.e. capital to labour ratio) of manufactured exports, weighted by the sectoral shares of total manufactured exports, declined over time, particularly with the beginning of the policy reorientation phase (1960). This implied an increase in the share of labour-intensive manufactures in Taiwan's exports to world markets. The opposite was the case in India; the weighted average capital intensity of manufactured exports from India continually increased during the period under consideration. That the industrial structure of India, influenced by government policy, displayed a distinct capital-intensive bias is further revealed by an examination of the shift in the country's composition of industries. The index of the weighted average capital intensity of manufacturing industries, taking as weights the share of sectoral value added in total manufacturing value added, increased from 100 in 1951, to 123.8 in 1960 to 134.2 in 1968.<sup>2</sup> The sign of the structural change effect already revealed the employment implications of this pattern of industrial development.

The third result concerns the impact of productivity change on industrial employment expansion. In both India and Taiwan productivity change has had a negative impact on employment expansion. This is hardly surprising; the apparent limits to technological change in the direction of more labour-intensive methods of production of a given commodity are widely known. What is interesting and perhaps surprising,

<sup>&</sup>lt;sup>1</sup> For Taiwan, the sectoral capital-intensity measures include direct and indirect capital to labour ratios in production and are computed from the 1969 Input-Output Tables. For India, the capital intensities are direct capital to labour ratios and are derived from the 1965 annual survey of industries. For details see, Riedel (1975) and Banerji (1975).

<sup>&</sup>lt;sup>2</sup> The sectoral value added shares were computed from the 1961, 1960 and 1968 censuses of Indian industries and refer only to the organised sector of the industrial economy.

however, is that the rate of labour-productivity change in both countries has remained remarkably constant over time. This has occurred despite contrasting experience in wage movements in the two countries (see Table V).

#### Table V

#### MANUFACTURING WAGE MOVEMENT IN INDIA AND TAIWAN (compound annual growth)

I	ndia		Та	iwan	
Period	Nominal Wage	Real Wage	Period	Nominal Wage	Real Wage
1950-1958 1961-1969	3.0 7.0	1.0 0.2	1954–1961 1961–1966 1966–1972	12.4 5.2 10.4	2.9 4.2 6.2

Sources: Indian Labour Statistics, Labour Bureau, Department of Labour and Employment, Government of India; various issues.

> Mo-huan Hsing, <u>Taiwan Industrialization and</u> <u>Trade Policies</u> (London: Oxford University Press, 1971), p. 293. <u>Report of Taiwan Labour Statistics</u>, Department of Reconstruction, Government of Republic of China, 1972.

In India while the growth of nominal wages accelerated over time that of real wages decelerated. In Taiwan, real wages have increased over time at a steadily increasing rate, although the course of nominal wages has been more erratic due to differences in inflation rates in different periods. In the light of these observations, a plausible explanation for the constant growth of labour productivity might be that (i) there is little allowance for technical substitutability between production factors and (ii) that technological change is exogenously determined. Both of these possibilities would imply that relative factor prices have little influence on choice of technique.<sup>1</sup> While production function investigations of aggregate industries have found a high degree of substitutability (Bruton, 1973, p. 7), studies of more narrowly defined products have generally found the scope for substitution to be extremely limited, existing primarily in peripheral or ancillary activities (Morawetz, 1974, p. 520). The implication of this evidence, circumstantial though it is, is that industrialization policies bearing on the choice of industry may have a greater influence on factor proportion problems in developing countries than those related to the choice of techniques per se.

#### III. Summary and Conclusions

The evidence presented in this paper supports in general the contention that outward-looking policies favour a faster expansion of industrial employment than do inward-looking policies. The primary source of employment expansion in both India and Taiwan was capital accumulation, which was offset in both countries by the negative effect of productivity change.

In Taiwan, the significant positive effect of structural change in favour of relatively labour-intensive branches was an additional impetus to employment expansion. In India, on the other hand, in pursuit of economic self-reliance, the structure shifted towards relatively capital-intensive industries thereby hampering employment expansion.

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<sup>&</sup>lt;sup>1</sup> Note, however, that relative prices may still affect the choice of industries. It may well be, for instance, that the artificial cheapening of capital relative to labour favours the choice of capital-intensive industries rather than the choice of capital-intensive techniques.

The experience of Taiwan does not, of course, readily lend itself to the solution of India's employment problems. Perhaps only in a small open economy which faces a very elastic demand in world markets is employment expansion at a rate such as occurred in Taiwan possible. In a closed economy an acceleration in the rate of growth must be accompanied pari passu by shifts in the structure of production into intermediate and capital goods branches. In an open economy no such domestic transformation in structure is required as the necessary intermediate and capital goods can be acquired with the proceeds from exports. In India, the share of manufacturing employment in the total being about 12 per cent, industrial output would have to increase by at least 25 per cent per annum just to absorb a three per cent annual increase in the labour force - assuming labour productivity remained constant. Such an expansion would entail a shift in industrial structure which is clearly in excess of anything feasible. Indeed, if, as evidence suggests, intermediate and capital goods branches tend to be relatively capital intensive (Riedel, 1975), the rate of expansion and the magnitude of structural change would have to be significantly greater than 25 per cent per annum in order to keep pace with the growth of the labour force. The upshot is that industrial employment expansion per se will not provide the solution to India's unemployment problem as was the case in Taiwan. Clearly the solution to the problem cannot be divorced from its magnitude.

This conclusion does not, however, mitigate the importance of adopting industrialization policies which at least work in the right direction. It is in this regard that the experience of Taiwan holds some relevance for the problems of India, and that a comparison of the process of industrial expansion in the two countries yields some lessons for other countries. Surely India's employment problem will not be solved by emulating the experience of Taiwan. But it is probably safe to conclude that unless Indian planners pay more heed to principles of comparative advantage in designing industrialization policy, the employment problem will only worsen in that country. Before closing we would like to re-emphasise the important point that the conclusions drawn above are based on an identity which in itself provides no explanations of employment growth. In fact, we know that the three "effects" we have attempted to isolate interact in many important ways. The presence of large cross-effect terms in particular implied that in both countries the changes in labour productivity, growth and industrial structure occurred simultaneously. Attempts to isolate them, as we did with the help of an identity, represented, therefore, no more than counterfactual hypothesizing. In this light the results presented here are perhaps of greatest value in pointing the direction for future research. In particular, our findings suggest that structural change within the industrial sector is an area which deserves much more attention than it has heretofore received in addressing the issues of employment in developing countries.

#### References

- Banerji, Ranadev: Exports of Manufactures from India: An Appraisal of the Emerging Pattern (Tübingen: J.C.B. Mohr (Paul Siebeck), 1975), 347 pp.
- Bhagwati, J.N. and P. Desai: <u>India: Planning for Industrialization</u> and Trade Policies Since 1951 (London: Oxford University Press, 1970).
- Bruton, Henry J.: "Economic Development and Labour Use: A Review", World Development, 1, No. 12 (December 1973), pp. 1-28.
- Fei, John C.H. and G. Ranis: "Innovation, Capital Accumulation and Economic Development", <u>American Economic Review</u>, 53, No. 3 (June 1963), pp. 283-313.
- Little, I.M.D., T. Scitovsky and M. Scott: <u>Industry and Trade in Some</u> <u>Developing Countries: A Comparative Study</u> (London: Oxford University Press, 1970).
- Morawetz, David: "Employment Implications of Industrialization in Developing Countries: A Survey", <u>Economic Journal</u>, 84, No. 335 (September 1974), pp. 491-542.
- Nerlove, Mark: "Recent Empirical Studies of the CES and Related Production Functions" in M. Brown (ed.), <u>The Theory and</u> <u>Empirical Analysis of Production</u> (New York: Columbia University Press, 1967), pp. 55-122.
- Riedel, James: "Factor Proportions, Linkages and the Open Developing Economy", <u>Review of Economics and Statistics</u>, LVII, No. 4, (November 1975), pp. 487-494.