

**Export Processing Zones:  
A Review in Need of Update**

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## 1. Introduction

In the last three decades, the effects of export-oriented industrialization have called into question the once popular import substitution strategies. This change has been parallel to the development of Export Processing Zones (EPZs). Though initially found in a small number of countries, mainly ASEAN ones, such as Hong Kong (China), Republic of Korea, and Singapore, EPZs are now found in more than 90 countries.

EPZs role is typically seen as an instrument for expanding and modernizing the host economy through additional investment/capital formation, technology transfer and employment generation. In addition to these direct effects, EPZs are expected to create rippled effects upon the rest of the economy. EPZs have been often described as the “engine of outward-oriented economic growth” which, though debatable as a general proposition, has been nevertheless associated with the significant industrial development in some countries, especially smaller ones such as Singapore, Republic of Korea, Taiwan (China), Hong Kong (China), Panama, Dominican Republic, and Mauritius.

The experiences of EPZs mainly in East and Southeast Asia, Latin America and African regions have been evaluated over the wide range of issues such as the level of employment creation, technology up-grading and foreign exchange earnings at the macro level, and firm and industrial performance, wages and working conditions and industrial relations at the micro level. These evaluations have taken place in the context of macroeconomic modeling during liberalization (Young, 1987; Miyagiwa, 1986), cost-benefit analyses (Warr, 1983, 1987a,b, 1989) industrial relations and labor market functioning (ILO/UNCTC, 1988), and gender (Elson & Pearson, 1981; Elson, 1990; Joekes, 1987; Pearson, 1990). A warning here is that many of these studies are unavoidably dated in a literature that is updated quickly due to the surge of EPZs across the world. However, a valid observation is that EPZs are not a static phenomenon, in the sense that the economic conditions in which they operate change over time and this affects their characteristics. For example, though EPZs are initially dominated by female employment, the share of women subsequently declines, and the wage advantage or disadvantage of workers in some of EPZs (compared to wages outside them) can disappear or even be reversed over time.

More generally, many findings are country and time specific as is often the case in the economic literature. The way forward seems to be for specific country research to use a multi-disciplinary approach. For example, some studies identify poor employment conditions in EPZs but omit comparisons with conditions outside the EPZs or, carried by labor economists and human resources specialists, fail to appreciate other effects of EPZs (such as macro and industrial ones). Other studies focus on precisely the latter, that is, the effects on industrial performance and exports and the macroeconomy at large without paying due respect to efficiency gains that would arise from more sensible use of labor in EPZs. Therefore, a clear research agenda lies ahead that needs to be policy focused: what are the lessons from the experiences of EPZs that policy makers can utilize to reduce the apparently chaotic labor conditions that globalization has set in force so that economic growth in some sectors or countries can be associated with gains for workers within and outside of EPZs.

The objective of this paper is to update some issues and studies on EPZs. It first provides a brief overview of trends in EPZs and then discusses a series of issues such as investment and types of industry in EPZs (incentive scheme, foreign ownership, types of

industry and labor composition), technology transfer (backward linkages and skill formation), and workers in EPZs (wages, working conditions and trade unions). Lastly, we will discuss lessons from different EPZ experiences and future agenda in the section.

## **2. Definition and Broad Trends of EPZs**

### **2-1. Definition**

Though phenomena similar to EPZs have been known to exist in various forms for a century or so, it was only since the 1970s that they gained momentum. This has been accompanied by the use of different terms over time and space, and there are at least 19 different terms related to EPZs. Among the most popular ones are Free Trade Zone, Export Processing Free Zone, Free Export Zone, Industrial Free Zone, Special Economic Zone (China) and *Maquiladora* (Mexico) (See Annex 1 for the evolution of terminology over time).

In this paper, we define an EPZ as a clearly delineated industrial estate which constitutes a free trade enclave in the customs and trade regime of a country, and where foreign manufacturing firms producing mainly for export, benefit from a certain number of fiscal and financial incentives (ILO/UNCTC, 1988).

Other definitions abound though all retain the main characteristics outlined above. For example, according to UNIDO (1980), EPZs are relatively small, geographically separated areas within a country, the purpose of which is to attract export-oriented industries by offering them favorable investment and trade conditions as compared to other parts of the host country (See Annex 2 for other definitions currently in use).

### **2-2. Broad Trends**

Only two dozen countries had some form of EPZ(s) in 1975. On the latest count, such countries number 93 of the 173 for which information exists (WEPZA, 1997). These trends are mirrored in employment creation. There were 800,000 workers in EPZs in 1975 and 1.9 million in 1986. The latest available information (*ibid.*) suggests an employment figure of nearly 4.5 million (Table 1). In addition, there are 14 to 40 million Chinese employed in “special economic zones.” The robustness of the employment growth in EPZs can be better put in context by focusing on 14 countries (Bangladesh, India, Indonesia, Malaysia, Pakistan, Philippines, Republic of Korea, Sri Lanka, Taiwan, Thailand, Togo, Dominican Republic, Mauritius and Mexico) that have been more active with EPZs than average. EPZ employment in these countries increased fivefold in just 15 years from 209,629 in 1975 to 567,434 in 1986 and 985,700 in 1990 (Amirahmadi and Wu, 1995: 837).

EPZs are quite concentrated geographically with most of them located in just two continents. Latin America and the Caribbean is the home of 48 percent of worldwide EPZs while Asia boasts another 42 percent. In terms of employment, the former employ 1.2 million workers while the latter 3 million. Africa has another 250,000 workers (ICFTU, 1997).

	1975 <sup>a</sup>	1986 <sup>a</sup>	1995 <sup>b</sup>	1997 <sup>c</sup>
No. of Countries with EPZs	25	47	73	93
No. of EPZs	79	176	500	n.a.
Employment (millions)	0.8	1.9	n.a.	4.5
Notes and Sources: See Appendix				

Most EPZs have been established along very similar characteristics such as high share of MNCs in value added, dominance of a few industries in employment and production, limited worker representation, minimal use of local raw materials and low share of sales in the domestic economy. However, few of these characteristics perpetuate at least, after some critical point in time. The changing nature of EPZs was noted early in the literature (for example, ILO/UNCTC, 1988) and is also confirmed in the next sections.

### **3. Issue 1: Investment and Types of Industry in EPZs**

#### **3-1. Incentive Scheme**

Developing countries set up various kinds of incentive packages to attract MNCs from developed and/or middle-income countries. These incentives are usually divided into “hard” and “soft” ones. Hard incentives include the provision of physical infrastructure and services necessary for manufacturing: roads, power supplies, transport facilities, and so on. Soft incentives include tax allowances and special trade concessions. Table 2 summarizes the incentives for investors in EPZs, ranging from duty free imports of raw material and capital equipment, tax holidays, infrastructure facilities, reducing red tape and so on. The picture is rather uniform: all countries listed in the table offer tax exemptions for certain numbers of years after investment in EPZs. With the exception of China, at least 4 years of tax holidays are offered, and investors in Jamaica can enjoy unlimited duration of tax holidays. Several countries simplify also the administrative procedures governing EPZs and set up a one-stop shop to streamline licensing and customs procedures.

<b>Table 2: Major Fiscal, Physical and Administrative Incentives Offered by EPZs</b>									
	Malaysia <sup>1,2</sup>	Korea <sup>1,3</sup>	Philippines <sup>1,4</sup>	Sri Lanka <sup>1,5</sup>	Jamaica <sup>6</sup>	Trinidad Tobago <sup>7</sup>	Dominican Republic <sup>8</sup>	China <sup>1,9,10</sup>	Mauritius <sup>11</sup>
Tax Exemption	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes <sup>c</sup>	No <sup>d</sup>
Tax Holiday Period	8-10 years	5 years	4-6 years	5-15 years	Indefinite		15-20 years	1-5 years	20 years
Duty Free on Imports									
Equipment	Yes	Yes <sup>a</sup>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Machinery	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parts/Spares	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Raw Materials	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Duty Free on Exports	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Unrestricted Repatriation of Profits	-	-	Yes	Yes	Yes	-	Yes	Yes	Yes
Reducing red tape									
Simple procedure	Yes	-	Yes	-	Yes	-	-	Yes	-
One-stop shop	-	Yes	-	-	-	-	-	-	Yes
Others			VAT exemption <sup>b</sup>			Training subsidy			

(Notes and Sources: See Appendix)

### 3-2. Foreign Ownership

Investors in EPZs come from relative few, albeit diverse, countries as evidenced from the share of investment by country of origin (Table 3). In the three Asian countries listed in the table, investors from Japan and US are dominant. Interestingly, NICs' share is not negligible. This suggests that, during the course of economic growth, NICs transform their own domestic industrial structure into more capital intensive and move labor-intensive production to other developing countries (Malaysia, Thailand, and Philippines). In the case of Mauritius, NICs' share, 38%, represents mostly investment from Hong Kong, which has been a unique feature in the Mauritian development of EPZs since 1970. Another rather unique feature of Mauritius is the high share of local ownership in EPZs.

Origin of Investor	Malaysia 1990 <sup>1</sup>	Republic of Korea 1991 <sup>2</sup>	Philippines 1996 <sup>3</sup>	Mauritius 1984 <sup>4</sup>
Local	14.2	27.2	12.6	43.0
Japan	36.6	68.9	22.2	-
US	17.7	0.7	35.6	2.3
Other Western Economies	12.6	-	5.5	11.2
NICs	15.8	-	18.3	38.0
Others	3.1	3.1	5.8	5.5
Total	100.0	100.0	100.0	100.0
Notes and Sources: See Appendix.				

Though not shown in the table, MNCs from different countries invest in different sectors in host countries. Japanese MNCs invest heavily in electronics and textiles industries in Malaysia and the Republic of Korea. However, their US counterparts invest in electronics in Malaysia but very little in the Republic of Korea.

### 3-3. Types of Industry: Labor-intensive Industry?

EPZs usually consist of labor-intensive industries (Table 4). If electronics, textiles, handbag, and jewelry are counted as assembly-line/labor-intensive operations, the ratio of investment made in labor intensive industries to the total investment in EPZs comes to 66-68% in Masan (Korea), Kaohsiung (Taiwan (China)), Lat Krabang (Thailand) and 56% in Shenzhen.

Although the majority of EPZs are in labor-intensive industry, there have been some changes in the industrial composition of and investment in EPZs over time. Following the same definition of the labor intensive industry above, the ratio of labor intensive industry in employment declined in many countries: from 70% to 65% in Korea, from 67% to 47% in China, from 89% to 76% in Malaysia, and from 92% to 62% in Sri Lanka. Indeed, Zhu (1992: 298) examined the level of labor-intensity, the number of employees divided by US\$1,000 capital, and calculated that the ratio fell from 0.26 (1973) to 0.18 (1988) in Masan and from 0.64 (1969) to 0.13 (1990) in Kaohsiung.

Industry	Rep. of Korea: Masan 1990	Taiwan (China): Kaohsiung 1990	China: Shenzhen 1989	Thailand: Lat Krabang 1991
Chemical		3.6	11.5	11.1
Electronics	65.7	56.0	47.0	17.7
Food			5.2	6.7
Footwear	3.0			
Textiles/Garments	2.6	12.3	9.1	17.7
Handbag				15.6
Jewelry				15.6
Machinery	1.6	8.8	7.7	
Metals	11.0	9.6	4.2	
Non-metal	0.4	4.3	2.9	
Precision	12.3	2.1	0.3	
Others	3.4	3.3	12.1	15.6

Notes and Sources: See Appendix.

### 3-4. Composition of Labor in EPZs

#### Share of Female Workers

Employment creation is regarded as one of the primary goals for the host country. Pursuing this goal has proven particularly beneficial to women's employment. Table 5 shows the proportion of women in the work force in EPZs. Across the countries listed in the table, women's share to total employment in EPZs is substantially higher than both the economy as a whole and the manufacturing sector outside the EPZs.

		All economy	EPZ	Non-EPZ Manufacturing
Malaysia <sup>1,2</sup>	1980	33.4	75.0	35.6
	1990	35.5	53.5	47.2
Korea <sup>1,3</sup>	1987	40.4	77.0	41.7
	1990	40.8	70.1	42.1
Philippines <sup>1,4</sup>	1980	37.1	74.0	N.A.
	1994	36.5	73.9	45.2
Sri Lanka <sup>1,5</sup>	1981	36.0	86.3	29.8
	1992	46.4	84.8	46.0
Mauritius <sup>1,6</sup>	1984	30.7	78.9	N.A.
	1987	34.4	66.2	N.A.

Notes and Sources: See Appendix.

However, an obvious trend in the table is that the proportion of women in EPZs has declined over time. This might be related to changes in technology and the industrial composition of firms (labor-intensive to capital-intensive; light- to heavy-industry) and also in wages. As wages rise, more men are attracted to EPZ employment. In addition, as production requirements increase, there are job openings in more attractive employment types (such as supervisors or skilled workers), and men's resistance to work in EPZs declines. This explanation seems *prima facie* relevant to Malaysia. The share of women workers in EPZs dropped from 75% in 1980 to 54% in 1990 as did also the share of semi-skilled and unskilled workers from 81% to 67% in Table 6. The share of factory operators to the total workers in EPZs declined as production changed from being labor-intensive to capital-intensive.

	EPZs		Manufacturing Sector
	1977	1990	1990
Managerial & Professional	1.0	4.7	4.0
Clerical	5.4	8.1	7.0
Supervisory & Skilled	12.6	20.3	37.0
Semi-Skilled & Unskilled	81.0	66.9	52.0
Notes and Sources: See Appendix.			

Information on previous work experience is limited but most women who join EPZs have no prior work experience. In local surveys, four out of five workers in Sri Lanka and also in China are first-time job seekers. These patterns follow more or less directly from the fact that the majority of women workers in EPZs are in their high teens and twenties. This is slightly higher than previous findings (16-21 years old; ILO 1987) and reiterates the finding that the characteristics of EPZs and their workers are changing over time. In this respect, some countries (such as Mauritius) have seen the number of married women working in EPZs rising over time.

The dominance of women workers in EPZs has led to concern about gender segregation. Though this creates inefficiency to the extent that it arises from employment discrimination, the short-run effects on women's wages may be more complex (Sayed and Tzannatos, 1997). For example, in Puerto Rico, segregation patterns have been found to be consistent with median annual earnings of women that are quite close to those of men (Presser and Kishor, 1991). An explanation for this is that women are offered more opportunities for upward mobility when production is organized around strictly segregated occupations than when women and men work together. Under such an arrangement, women will be required to supervise other women and get better jobs than they would otherwise have.

#### Changes in Employment Structure

In the same vein, Table 7 shows the distribution of employment and changes in its industrial composition in five different EPZs/countries over time. Interestingly, electronics were big players in Masan (Korea), Shenzhen (China) and Malaysia (overall) but not in Sri Lanka or Mauritius. In the last two countries, textiles seems to have been the leading sector.

Though the ranking of industries has hardly change, there have been significant changes over time. One way to summarize the overall change in the industrial distribution of employment is through the Duncan index of dissimilarity. In our case, the index,  $D$ , can be defined as

$$D = \frac{1}{2} \sum_{i=1}^N |L_i^{t0} - L_i^{t1}|$$

where  $i = 1,2,\dots,N$  is the total number of industries of interest,  $L^{t0}$  and  $L^{t1}$  are shares of individual industries to total employment in the first and the last year respectively, and the summation refers to the absolute differences in the industrial employment shares between the two years (the sum of the differences, if conventionally calculated, will be zero: this also explains why the resulting sum is divided by two as the formula double counts differences). The minimum value of the index is zero; when the employment distributions are the same across industries in the two years. The maximum value, unity, occurs when there is complete dissimilarity (that is, industries that employed workers in year  $t0$  do not employ any workers in year  $t1$ , and all industries in year  $t1$  are new). Since the index varies from 0 to 1, it is often expressed as a percentage and is at times wrongly assumed to show the percentage of workers who would have to be reallocated across sectors to achieve the same employment distributions in the two years. The index is, however, something like the correlation coefficient and does not have an immediate quantitative meaning (Tzannatos, 1990).

Sector	Korea (Masan) <sup>1</sup>		China (Shenzhen) <sup>1</sup>		Malaysia (All) <sup>2,3</sup>		Sri Lanka (All) <sup>2,4</sup>		Mauritius (All) <sup>5,6</sup>		
	1973	1985	1984	1989	1979 <sub>2</sub>	1990 <sup>3</sup>	1981 <sub>2</sub>	1992 <sub>4</sub>	1984 <sup>5</sup>	1991 <sub>5</sub>	1994 <sup>6</sup>
Chemical			3.3	6.9		0.5					
Electronics	59.1	61.9	57.1	31.0	74.8	64.8	2.0	3.0			0.5
Food			4.9	2.6	0.4	0.8	4.5	2.5	0.0	1.4	1.7
Footwear	9.7	12.4						2.9	1.1	1.4	1.5
Textiles	10.6	2.7	9.9	15.6	14.3	11.0	90.0	55.6	82.8	84.1	88.9
Jewelry								2.9	2.1	1.6	1.5
Machinery	4.0	1.6	6.2	6.1	1.8	1.5					
Metals	4.0	3.3	1.9	4.3		0.2		1.4			
Non-metal	9.0	0.7	3.9	2.0		0.1		3.9			
Precision	0.0	13.7	0.0	1.2	3.7	9.4			1.2	0.8	0.5
Rubber/Leather					2.6	1.3	1.3	8.9			
Others	3.6	3.7	12.8	30.3	2.4	10.4	2.2	18.9	12.8	10.7	5.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Duncan Index	0.193		0.304		0.149		0.364		0.030		0.087

Notes and Sources: See Appendix

The value of the index (last row, Table 7) suggests that changes in the industrial composition of employment are generally significant over time (save in Mauritius during the 1984 and 1991 period). This confirms that EPZs are transforming relatively quickly over time despite the apparent dominance of particular sectors (such as electronics or textiles).

#### 4. Issue 2: Technology Transfer

##### 4-1. Backward Linkages

The activities of EPZs are expected to create at least some linkages between them and the rest of the economy and accelerate industrialization growth in the host country. There are two main types of such linkages: utilization of domestic raw material inputs and subcontracting arrangements with domestic firms.

Host countries vary with respect to local sourcing (the share of domestic raw materials to total raw materials used by firms in EPZs). Some have high level of local sourcing, such as, the Republic of Korea, Taiwan (China) and Malaysia, while others have low, such as, Sri Lanka, China, and Mexico (Table 8). Interestingly, the countries with higher ratio of local content experienced a leap from low level of local sourcing to high level over a short period. This happened over four years (3.3% in 1971 to 24.4% in 1975) in the Republic of Korea and over 5 years (2.7% in 1982 to 17.7% in 1987) in Malaysia. Where local sourcing is limited, such as in the case of *Maquiladoras* in Mexico, slow delivery, high prices and poor quality have been cited as the main reasons (Brannon, James and Lucker, 1994).

Subcontracting has been rather limited across the countries listed in Table 8 except for the Republic of Korea. Korea set up “outzone processing scheme,” which allows the enterprises in EPZs to use non-EPZ firms for their production of exported goods. The limit was initially set at no more than 30% of the total production value but is now raised to 60%. Since firms in Korea can secure imported inputs for exported products free of duty, irrespective of status (EPZ, non-EPZ), the firms in EPZs can competitively produce their products under this scheme. This scheme also creates some incentives for local forms to upgrade their products to meet world standards (Healey and Lutkenhorsts, 1989: 28-32).

Country	EPZ	Industry	Local Sourcing of Inputs				Subcontracting
			Year	%	Year	%	
Malaysia <sup>1</sup>	Penang	All	1976	0.2	1987	17.7	Very Limited
		Electronics	1976	2.8	1987	17.9	Very Limited
Rep. of Korea <sup>2</sup>	Masan	All	1971	3.3	1985	32.3	Very active; Outzone Scheme <sup>b</sup>
Taiwan (China) <sup>3</sup>	Total	All	1967	2.1	1979	28.3	
Sri Lanka <sup>4</sup>	Total	All	1979	0.0	1991	3.8	Non-existent
China <sup>4</sup>	Buji	All	Limited				
Mauritius <sup>5</sup>	Total	Garment	1982	41.0	N.A.	N.A.	

Notes and Sources: See Appendix

#### 4-2. Human Resources Development (Education and Training)

One of the objectives for the host country to set up EPZs is technology transfer. This could be realized through new capital equipment but also through up-grading/refining the educational system (which can then supply more adaptable workers to particular production requirements) and additional training on- and off-the job. It is not easy to evaluate the effectiveness of the local educational system on technology transfer but, as the previous discussion on educational upgrading of the labor force in EPZs suggests, better educated women are prime candidates for employment in EPZs. The educational attainment of workers in EPZs has changed dramatically over time, which is associated with the improvement of school enrollment in the host countries. In the case of the Republic of Korea, 95% of the women workers have now completed high school compared to only 20% in the 1970s. Taiwan shows the same trend following the introduction of Nine Years Free Education System in the 1970s. In the case of Sri Lanka, 54% of women workers in EPZs have completed GCE (General Certificate of Education: grade 10), while only 40% of male workers in EPZs attained the same levels of education. This might imply the local labor market is limited to women with higher educational background (Table 9).

<b>Table 9: Women's Age and Education in EPZs</b>		
<b>Country</b>	<b>Age</b>	<b>Education</b>
Sri Lanka	In 1985, 76 % of women below 25 years (48% outside EPZs). <sup>1</sup>	In 1989, 54 % of females had General Certificate of Education (GCE) <sup>2</sup>
Malaysia	In the late 1980s, the majority of women were 16-25 years old <sup>4</sup>	In the late 1980s, most had 6-11 years education (Primary to Form 5) <sup>4</sup>
China <sup>5</sup>	In 1986, 97 % of below 23 years old (78% of men) <sup>5</sup>	In 1986, 74 % of the women had completed secondary school. <sup>5</sup>
Korea	In 1990, 85 % of women below 30 years old (45% of men) <sup>6</sup>	80% of the work force (overall) completed the middle school in 1970s and 95% in 1990. <sup>7</sup>
Taiwan <sup>8</sup>	In 1990, average age of overall work force 27 years.	In 1968, 57 % had only elementary school. In 1990, 86% had more than elementary education.
Dominican Republic <sup>9</sup>	71 % of women below 30 years (58% economy wide)	
Mauritius	40% of women below 25 years old, (60% of men)	
Notes and Sources: See Appendix.		

Also, some enterprise training does take place in EPZs. As is shown in Table 10, training for factory operators is mainly on-the-job and lasts from a few weeks to usually no more than three months. The training is mostly task-specific and geared to enhancing productivity and efficiency in the firm's operation. The specificity of training is

understandable as is also its short duration: workers in EPZs have usually short tenures, and training is negatively associated with higher turnover.

<b>Table 10: Training for Workers in EPZs</b>	
Country	Training provided
China (Shenzhen) <sup>1</sup>	3-month on-the-job training for operators (1 month for class and 2 months for production practice); Over 80 adult education institutes (1990) but with weak linkages between the needs in the enterprises in the EPZ and the skills provided in the institutes.
Republic of Korea (Masan) <sup>1</sup>	3-month on-the-job training for operators; Overseas training for skilled workers (mainly in Japan)
Malaysia <sup>2</sup>	3-month on-the-job training for operators; QCCs (Quality Control Circles): giving monetary and other incentives (gifts, medals and commendation letters, etc.) for identifying problems and suggesting ways of solving them); Little training for computer programming, technical engineering and design work.
Mauritius <sup>3</sup>	3-month on-the-job training for operators (trainee status: 75% minimum salary; Lack of trained intermediate workers
Philippines <sup>4</sup>	1 day to a few weeks on-the-job training for operators; Some enterprises (Japanese) rotate operators to make them familiar with between 10 and 18 interrelated tasks (3-month rotation)
Sri Lanka <sup>5</sup>	1-3 months on-the-job training for operators
Taiwan (Kaohsiung) <sup>1</sup>	3-month on-the-job training for operators; Cooperative training programs between school/college and the enterprise in the EPZ. School/college provide general education; and the enterprises provide special technology training; Some overseas training
Thailand (Lat Krabang) <sup>1</sup>	3-month on-the-job training for operators; Off-the-job training: study and experiment in the classroom and laboratory for some workers; Overseas training (at parent company) for core employees in management and technology
Notes and Sources: See Appendix.	

In some cases, workers in EPZs receive more substantial training but this is typically restricted to the higher end of skills. For example, MNCs may send local employees to their headquarters or elsewhere for middle and, more often, higher management training and advanced technician training. But this tends to be at a small scale. In Taiwan, only 1,500 workers received overseas training between 1968 and 1986 - hardly more than 80 on average in a single year.

In other cases, training may spread broader than enterprise programs. In the Shenzhen SEZ (China), adult education institutes were established to improve technical and vocational skills for workers in the zone but the linkage between the skills taught at the institutes and the skills demanded at the factories has yet to be established. In Taiwan (China), some cooperative training programs between school/college and the enterprises in the EPZs are being developed. These programs leave technical training to be provided at the factory rather than at the institution.

## **Box 1**

### **Foreign Investment and Skills**

#### **Foreign investment helps growth...**

The emergence and expansion of growth triangles in East Asia (such as the Singapore-Batam-Johore, the already agreed Penang-Sumatra-South Thailand and the planned Sabah/Sarawak-Sulawesi-Sulu) offer benefits to participating countries without loss of economic sovereignty. The triangles are more dynamic than national EPZs because they can exploit greater economies of scale and the comparative advantages of more than one country. Capital, technology and managerial skills usually come from investing countries. Land, infrastructure and labor comes from the host countries. The driving force for triangles comes from newly industrialized countries that want to relocate labor-intensive production to lower wage economies. The benefits to host countries are job creation, skills development, technology transfer and industrial discipline with spill over effects on the national economies.

For Indonesia (as much as for the Philippines, Thailand and Vietnam in the future) growth triangles can prove instrumental for job expansion in the short run and technology transfer in the longer run. Positive effects of FDI upon TFP and overall growth are well documented in Indonesia.

#### **...but it does not always require specialized skills**

Young female senior secondary school graduates who intend to work for two years in the island of Batam enter into a 6-month apprenticeship contract with the recruiting company before they are offered a regular contract by their employer. Prior to this apprenticeship, the perspective workers must receive training by the Ministry of Manpower. An initial condition for getting employment in Batam is that the worker should be unmarried.

The recruiting company places workers in an “apprenticeship training location”, in most cases the site of the eventual employer. During the apprenticeship period the worker is paid reduced wages (Rp 99-105,000 per month instead of Rp 120-135,000 per month for regular employees). No formal test is administered at the expiration of the initial 6-month contract. In fact, it is unlikely that workers qualified at the senior secondary education level are unable to perform satisfactorily in routine assembly-type work. If the worker wants to terminate her employment, she has to pay compensation to the recruiting company equal to the wages already received. She will also be responsible for her return air fares.

At the end of the two-year employment, most workers are discharged or leave. No certificate is awarded for the training they received first, by the Ministry of Manpower and second, during their six-month apprenticeship with the firm. In fact, they have acquired no skills other than those than any worker would get during the ordinary course of employment.

Company provided apprenticeships do not always impart skills -- at times they can be a way of paying lower wages.

A study examining training programs of enterprises in *Maquiladoras* of Tijuana, Mexico, found that enterprises engage in various forms of training including management skills, production processes, quality control, product design, equipment maintenance and use and would even take place at universities (Raafat et al., 1992). The study further examined training given to Mexican employees according to the nationality of the parental companies that was Japanese, American (US) or Mexican. It found that Japanese companies provide on- and off-the-job training more than American and Mexican companies. It also found that Mexican companies provide most formal training to technical workers (55% of technical workers received the training) unlike the Japanese companies (17%) and the American ones (32%).

Irrespective of the reasons that give rise to such differences, this case study suggests that training practices and the course of technology transfer within factories in EPZs is not uniform and can lead to little upgrading. Though the logic behind short, focused, employer-driven and -provided training is understandable, some point out that this type of training does not help the workers to develop the skills needed to pursue better career prospects after they stop working in EPZs (Abeywardene et al, 1994; Sivalingam, 1994). This phenomenon is highlighted in Box 1. This adds to the description of “footloose” industries in EPZs, and raises the issue of employment insecurity since most EPZs provide mainly assembly-type jobs. In some cases, factories in EPZs close down after the lapse of tax holiday periods which indicates that this factor is more important than the loss of the skills they imparted upon their workers.

## **5. Issue 3: Workers in EPZs**

### **5-1. Wages**

Wages and other employment conditions tend to be inferior in EPZs to those adopted by the same firms or in industries in countries where the headquarters of MNCs are located. For example, with respect to wages the evidence confirms the common sense expectation that indeed wages are lower in countries where per capita incomes are lower. Table 11 presents such a comparison in electronics and textiles, which are two major industries in EPZs, between some developing countries in East Asia and USA and Japan. The location of EPZs in countries where relatively cheap labor exists is not unexpected, though this fact alone is not usually sufficient to attract MNCs in developing countries. In general, there is no single factor that explains the location of EPZs in one country or region rather than another, though labor costs should be a consideration to international investors. Other factors include the existence of physical infrastructure (such as electricity, water supply and transportation including seaports and airports) and political stability.

<b>Table 11: International Wage Comparison (Index of Average Hourly Earnings: US=100)</b>		
Country	Electronics	Garments
Hong Kong	14	23
Republic of Korea	13	13
Malaysia	6	n.a.
Philippines	4	4
Japan	86	78
USA	100	100
Notes and Sources: See Appendix		

More interestingly, wages also vary between EPZs and non-EPZs in the same country. For example, in the indicated years (Table 12), wages in EPZs in Taiwan (China) and Mauritius were lower than outside. However, this finding is far from universal as in China, Thailand and Sri Lanka, wages in EPZs are higher than outside the EPZs on average. Interestingly, in the cases of Republic of Korea and Malaysia, wages in EPZs were initially lower than in non-EPZs but became higher after some point in time.

<b>Table 12: Wage Comparison: EPZs vs. Non-EPZs Industries (Year)</b>		
EPZs > Non-EPZs	EPZs < Non-EPZs	Reversals
China (1989) <sup>a,1</sup> Thailand (1990) <sup>a,1</sup> Sri Lanka (1992) <sup>c,2</sup>	Taiwan (China) (1988) <sup>a,1</sup> Mauritius (1986) <sup>d,3</sup>	Republic of Korea (lower before/higher after 1987) <sup>b,4</sup> Malaysia (lower in 1979 <sup>b,5</sup> vs. higher in 1990 <sup>b,6</sup> )
Notes and Sources: See Appendix		

An examination of wage differences within a country (Malaysia: Table 13) produces an even more complex picture: EPZ wages in textiles and electronics are higher than outside but lower in food, beverage and tobacco and plastic products. The Malaysian case shows also that wages in textiles are lower than in electronics suggesting that differences also exist between different industries within EPZs.

<b>Table 13: Wage Comparison: EPZs vs. Non-EPZs<sup>a</sup> Across Industries (Malaysia 1990<sup>1</sup>; Monthly wage in RM<sup>b</sup>)</b>		
	EPZs	Non-EPZs
Food, beverage and tobacco	644	706
Electrical & electronics	920	709
Plastic products	425	551
Textiles	821	726
Notes and Sources: See Appendix		

These comparisons are hampered by the fact that differences in wages have not been standardized for differences in working conditions, level of skills and sophistication of production and, most importantly, local labor market conditions. This applies also to

comparisons between other aspects of employment such as hours of work that are examined next.

## 5-2. Working Conditions

### Hours of Work

Table 14 shows the length of work in EPZs in different countries. Although it lists only four country cases, long hours of work seem to be common at first sight but what is also interesting is that they tend to become shorter over time. However, as mentioned in the previous section, information on the length of the work week of workers outside the EPZs is not known.

<b>Table 14: Working Hours in EPZs</b>	
Country	Working Hours
Malaysia	23% of employees worked more than 48 hours. Night shift for women are common among operators. <sup>1</sup>
China	Average working hours vary from 54 to 77 hours per week. <sup>2</sup>
Philippines	In the early 1980s, 50% of the work force worked longer than the standard 48 hours per week, almost one-quarter more than 60 hours per week and 5% more than 70 hours per week.. Average hours came to 53.9 hours per week (national average in industry 43.7 hours). Night shift for women permitted. <sup>3</sup>
Republic of Korea	In 1977, 50% of the workers worked more than 8 hours and 30.1% more than 15 hours per day. <sup>3</sup> Until the 1980s, overtime work and the three-shift system were common. Overtime work has been since gradually reduced and many enterprises moved to two-shift system. Now, average hours range between 8 to 10 hours per day.
Mauritius	Legal normal working hours in EPZs is 45 hours per week. Compulsory overtime weekly is limited to ten hours per week since 1987. Beyond ten hours, the consent of the workers is required. <sup>5</sup>
Notes and Sources: See Appendix	

### Health and Safety

Another indicator of labor conditions in EPZs is measurable health problems among factory workers in EPZs. Table 15 lists the types of health problems and their cause in different countries. There seem three types of problems. First, those that are associated with the organizational arrangements in EPZs and their social repercussions (such as incidences of mass hysteria). Second, those that could more accurately be described as occupational and industrial diseases (for example, eyesight problems in electronics industry or back pain in many assembly type works). Third, those that relate to the health and safety standards in the establishment. But, as in the case of wages and hours of work, there are no comparative statistics for similar work undertaken outside the EPZs.

Table 15: Health Issues in EPZs	
Country	Issue
Malaysia	Mass hysteria. Eyesight of electronics workers affected overexposure to light rays. <sup>1</sup> Conditions in the textile industry worse than in electrical and electronics. <sup>2</sup>
Republic of Korea	In the early 1980s in electronics factories, 88% of workers had chronic conjunctivitis because of toxic fumes and dust; 47% were shortsighted and 19% had astigmatism because of microscopic work. <sup>1</sup>
Philippines	Workers complained of fatigue, inadequate ventilation, dust, fumes and unpleasant odors. <sup>3</sup> But recently the situation has improved, the main complaint being lack of air-conditioning. <sup>4</sup>
Sri Lanka	No governmental hospital/dispensary in EPZs. Though 60% of firms had a first aid box, only 13% had medical units. Workers in EPZs had more health problems than those outside EPZs. Causes include short rest periods due to overtime and night shift, lack of air-conditioning and excessive heat generated from machines. <sup>5</sup>
Mauritius	Asthma caused by dust and poor ventilation in garment factories, and noise problems in spinning factories. Medical facilities vary firm by firm. <sup>6</sup>
Notes and Sources: See Appendix.	

### 5-3. Workers' Voice

Moving from wages and employment conditions to unionization, Table 16 presents information on trade unions in selected countries. Though the "intensity" of unionization is hard to measure, most of the ten countries listed in the table do allow some form of trade unions to operate in EPZs. The Republic of Korea prohibited trade unions or even labor disputes in EPZs before 1987 but subsequently relaxed these restrictions, and union membership rose. Malaysia's firm stance toward workers in electronics industry is very unique though, the argument goes, the wage level in the industry is much higher than other industries and electronics provide much better working conditions than other industries (Rajah: 1996:33). Sri Lanka and Jamaica stand rather closer to the Malaysian government with regards to attitudes toward unions in EPZs. On the other hand, the Philippines and Taiwan (China) have allowed trade unions in EPZs without constraints on their activities.

An interesting finding is that there are no significant differences between a country's attitude towards labor standards and its decision to establish an EPZ. Annex 3 presents a list of 173 countries and whether they are signatories of ILO's international conventions and EPZs hosts. Of the nearly 50 tests presented in Annex 4, only one is significant at the 5 percent level and another two at the 10 percent level. In short, it is not countries that show disrespect for labor standards that host EPZs (though some may apply double standards between the enclave and outside establishments). This may suggest that factors other than labor (such as incentives, infrastructure, administrative arrangements, political stability and so on) are more important for the location of EPZs in one country or another compared to totally free use of labor by employers and MNCs.

Table 16: Trade Unions in Selected Countries EPZs			
Country	Status	Unionization rate	Comments
Republic of Korea <sup>1</sup>	Permitted	74% for all workers	Since 1987. Higher unionization rates for women (83%) than men (55%)
Malaysia <sup>2</sup>	Permitted		Unions not allowed in electronics
Philippines <sup>3</sup>	Permitted		
Taiwan (China) <sup>4</sup>	Permitted	85% of workers <sup>a</sup> (1990)	Collective agreement
Thailand <sup>4</sup>	Discouraged		
Sri Lanka <sup>5</sup>	Permitted	Low	There are also company-based “joint consultative councils”.
Jamaica <sup>6</sup>	Permitted		Resistance of employers
Mauritius <sup>7</sup>	Permitted	12% of workers in EPZs	57% outside EPZs (1989) <sup>b</sup>
Dominican Republic <sup>8</sup>	Permitted		Resistance of employers to the establishment of unions
El Salvador	Permitted		Employers do not hire union members
Notes and Sources: See Appendix.			

## 6. Issue 4: Overall Economic Impacts of EPZs

Evaluating the impact of EPZs in the host country is a daunting task. In addition to data problems, the discussion in the previous sections suggests that EPZs can be better viewed *as a process than an end-product*. Nevertheless, with some modifications to the conventional benefits-costs analysis, some interesting empirical results emerge (Warr 1989).

The approach consists of comparing economic performance of an economy with EPZs against the hypothetical performance of the economy without EPZs. Warr assumes that EPZs are enclaves within each host country, and that there is a transfer of funds and resources between these enclave EPZs and the economy of the host country. The analysis is more macro than micro, in the sense that it does not address income distribution issues. The net estimated benefits include the net gain to the host country with respect to employment generation, foreign exchange earnings, greater utilization of local materials, additional capital equipment and additional tax revenues collected from the MNCs (when applicable). The costs include administrative and maintenance costs of the EPZs, and the required additional physical and administrative infrastructure.

The following equation summarizes the net benefit as defined by Warr (1990:151):

$$N_t = (L_t w + M_t P_M + E_t P_E + R_t + T_t) S_F^* - (L_t w^* + M_t P_M^* + E_t P_E^* + B_t S_K^*) - A_t - K_t$$

where: N = Net benefit

$L_t$  = employment in year t;

w = wage paid;

$M_t$  = domestic raw material used in year t;

$P_M$  = price paid for this raw material;

$E_t$  = utilities (e.g. electricity) used in year t;

$P_E$  = price paid for these utilities;

$R_t$  = interest and principal repayments of domestic loans in year t;

$T_t$  = taxes paid in year t;

$S_F^*$  = ratio of the social value of foreign exchange to the official exchange rate;

$w^*$  = shadow price of labor;

$P_M^*$  = shadow price of domestic raw material;

$P_E^*$  = shadow price of utilities;

$B_t$  = domestic borrowing in year t;

$S_K^*$  = ratio of the shadow price of capital to its market price;

$A_t$  = the administrative costs of the zone in year t;

$K_t$  = capital cost (including maintenance) of EPZ physical infrastructure in year t.

Table 17 shows the results of Warr's benefits-costs analysis of three EPZs in East and Southeast Asia, Bataan (Philippines), Masan (Korea), and Penang (Malaysia) for the 1972 to 1982 period.

	Bataan (Philippines)	Masan (Republic of Korea)	Penang (Malaysia)
Overall Net Benefit	Negative	Positive	Positive
Infrastructure costs	High	Moderate	Low
Foreign Exchange Earnings	Steadily increase	Substantial	Substantial
Tax Revenue	Low	Low	Limited
Domestic Suppliers	Very Limited	Increase	Very Limited
Employment Creation	Substantial	Moderate	Substantial
Notes and Sources: See Appendix.			

The main conclusion of this exercise was that overall net benefits were positive for Masan and Penang but those for Bataan EPZ were found to be negative. With respect to specific findings, the comparison across the three EPZs indicated the following:

(1) Infrastructure costs were a major determinant of outcomes. In the Philippines, infrastructure costs in the Bataan EPZ were very high, because the government chose an isolated area that required operations from grounding all the way up to buildings and provision of utilities. On the other hand, Masan (Korea) and Penang (Malaysia) used existing infrastructure or selected the locations near pre-existing industrial areas and kept these costs at a minimum.

(2) Foreign exchange earnings steadily increased and employment creation was substantial. All three zones were projected to further contribute to foreign exchange earnings and employment creation.

(3) Use of domestic raw material was very limited. The local suppliers to Bataan and Penang did not appear to have or expected to increase their linkages with the MNCs operations in the EPZs. In the case of Masan, local suppliers were projected to increase over time.

Though useful in many respects, the analysis has limitations arising from the quality of data and also from the fact that price distortions affect the calculations of shadow prices. Also, for the simplicity, the calculations were based on the total employment in EPZs but didn't clarify types of employment and their wage levels. Nevertheless, this exercise provided results that were largely in accordance with expectations both in terms of direction and also in terms of variation between the three zones.

## **7. Conclusions**

EPZs are a relatively new phenomenon but becoming more important over time as a vehicle of attracting foreign investment in light manufacturing. In doing so, host countries expect to benefit from employment creation, additional foreign earnings and technology transfer.

For countries in early stage of industrialization, EPZs provide an efficient and productive way of absorbing surplus labor. In fact, this seems to be one of the clearer conclusions in the literature, that is, the employment impact of EPZs. But during the course of industrial development and economic growth, the resulting ability of the economy to absorb surplus labor in more general ways reduces the effects of EPZs. The gradual decline in the interest of Korea and Taiwan (China) in this type of enclave development attests to this. Thus, whether the creation or expansion of an EPZ would lead to substantial employment gains would depend on the stage of economic development of the host country. Nevertheless, our conclusion here is that EPZs have contributed significantly to the employment of the less skilled workers though their potential to solve the massive employment problems in many developing countries is rather limited.

In creating new employment, host countries increase their foreign earnings in the form of wage payments to their workers. In some sense, EPZ workers are indirectly paid in foreign currency and, from an economic perspective, this is similar to the direct export of labor. Under certain conditions, EPZs can be preferable to emigration given the social effects in the host country and in the country of origin of MNCs that often accompany this dislocation of labor.

Where effects are less encouraging is with respect to technology transfer. Though EPZs expose domestic producers to practices of international enterprises, the direct link between the presence of EPZs and significant technology upgrading is yet to be established in a firm way. The limited role of such externalities is corroborated by the fact that backward linkages from the zones to the domestic economy are often weak, and the use of domestic raw materials by EPZs has not been significant. Indirectly, though, EPZs may have a role to play through some demonstration effects. For example, Governments may come closer to realizing the benefits of a more liberal environment that reductions in red tape and removal of restrictions to trade create. If this is the case, then the most significant contribution of EPZs would not be in the form of their direct

effects within the enclaves and trickle down effects on domestic manufacturing outside the zones, but from the creation in the host country of a more open and internationally competitive economy.

A final issue is labor conditions in EPZs. It is understandable that to attract foreign investments, governments of developing countries would offer various incentives including the waiver of import tariffs, favorable tax treatment, and exceptions to firms located within the EPZs from certain industrial production regulations that apply to their counterparts outside the zones. But when such regulations apply to labor outside EPZs, it is not obvious from a social perspective that such regulations should be relaxed in the factories operating within the EPZs. It has been particularly in relation to labor standards in the EPZs that the arguments for deregulation have been contested - such arguments are often based on the simplistic assumption that labor legislation is distortive and detrimental to efficiency. In a more realistic setting, policy makers need to know more about which particular types of legislation (the right to organize, minimum wage fixing, employment security rules, anti-discrimination and equality provisions, health and safety regulation, maternity or other social benefits) are detrimental to efficiency and equity considerations. A question that has not been addressed so far is whether labor market regulations have helped or hindered the maturing process of EPZs, including for instance whether they have encouraged higher value added export production, technology upgrading, and closer integration with other sectors of the economy. Another question is whether the short-term benefits of workers in EPZs outweigh the longer-term costs upon their health. When this is an issue, then the efficiency of individually contracting between employers and workers is reduced due to myopia (of workers), and this can be corrected through some form of intervention. In considering the impact and implications of labor legislation, it is important to analyze both the cost aspects of interventions as well as the benefits to be derived.

## Appendix : Data Sources and Notes

Table 1:	Sources:	<sup>a</sup> Kreye et al. (1987: 10-11) <sup>b</sup> OECD (1996) <sup>c</sup> WEPZA (1997)
Table 2:	Notes:	<sup>a</sup> All firms in Korea engaged in exporting are able to secure their imported inputs free of duty. This includes firms by supplying intermediate products to EPZ firms for production of their exported products (Healey and Lutkenhorst 1989:9). <sup>b</sup> Value-added tax exemption for purchases of raw materials supplies and semi-manufactured products from local suppliers. <sup>c</sup> Vary with the types of the enterprises in the zones. For foreign-invested manufacturing enterprises are exempt from taxes for the first two profit making years and pay tax at a 50 percent reduced rate for a further three (World Bank, 1994:249). <sup>d</sup> The enterprises in the EPZs have to pay 15% corporate income tax as long as they stay there.
	Sources:	<sup>1</sup> ESCAP/UNCTC (1985: 22-23) <sup>2</sup> Anazawa (1985: 103-104) <sup>3</sup> Oh (1993: 5-10) <sup>4</sup> Remedio (1996: 6) <sup>5</sup> Abeywardene (1994: 6) <sup>6</sup> World Bank (1988: 4-5) <sup>7</sup> Long (1986: 17-18) <sup>8</sup> Kaplinsky (1993: 1855) <sup>9</sup> Chen (1993: 262) <sup>10</sup> World Bank (1994: 249) <sup>11</sup> WTO (1995: 65)

Table 3:	Sources:	<sup>1</sup> Calculated from Sivalingam (1994:11) <sup>2</sup> Calculated from Oh (1993:20) <sup>3</sup> Calculated from Remedio (1996:15) <sup>4</sup> Calculated from Hein (1988:21)
Table 4:	Notes: Sources:	The data relate to specific zones All data are from Zhu (1992: 223)
Table 5:	Sources:	<sup>1</sup> ILO Yearbook of Labour Statistics (1989, 1995) <sup>2</sup> Sivalingam (1994:21) <sup>3</sup> Oh (1993:23) <sup>4</sup> Remedio (1996:13) <sup>5</sup> Abeywardene et al. (1994:15) <sup>6</sup> Annual digest of statistics (CSO, 1991)
Table 6:	Sources:	Sivalingam (1994: 20-21)
Table 7:	Sources:	<sup>1</sup> Zhu (1992: 297) <sup>2</sup> Maex (1985: 35) <sup>3</sup> Sivalingam (1994: 19) <sup>4</sup> Abeywardene et al (1994: 14) <sup>5</sup> The World Bank (1992: 75) <sup>6</sup> Kothari and Nababsing (1996: 56)
Table 8:	Notes:	<sup>a</sup> Raw materials include paper, paperboard, printing, cloth, thread, trimmings, chemicals, plastic products, services (transport, communications, etc.). Break-down of these data are not available. <sup>b</sup> The government of the republic of Korea allow subcontracting arrangements between the enterprises in EPZs and those outside the EPZs. The partial processing outside the EPZs did not exceed 60 % (used to be 30%) of the total manufacturing process, calculated in terms of production cost. The goods processed or produced by the outzone activity were components or intermediate products for production processes finalized in the EPZs (Healey and Lutkenhorst, 1989: 28). <sup>c</sup> The Board of Investment introduced a system of selectively targeting industries and activities which are expected to create linkage in 1991. Those include: textiles, to form linkages with the garment industry and agriculture, to foster linkages with agroindustrial units (Abeywardene et al., 1994 (19)).
	Sources:	<sup>1</sup> Rajah Rasiah (1991: 104) <sup>2</sup> Healey and Lutkenhorst (1989:24-32) <sup>3</sup> Anazawa (1985-86:125) <sup>4</sup> Abeywardene et al. (1994: 17-19) <sup>5</sup> Willmore (1994)
Table 9:	Sources:	<sup>1</sup> Goonatilake and Goonesekere (1988: 190) <sup>2</sup> Abeywardene et al (1994:33) <sup>3</sup> Lee (1984:221) <sup>4</sup> Sivalingam (1994: 49)

- <sup>5</sup> This is based on the data collected in Buji SEZ (Yonghong, 1989:358-60)
- <sup>6</sup> Calculation based on the data from Oh (1993: 24)
- <sup>7</sup> This is based on the data collected in Masan EPZ (Zhu, 1992: 284)
- <sup>8</sup> This is based on the data collected in Kaohsiung EPZ (Zhu, 1992: 285-6)
- <sup>9</sup> Castro (1993: 34-35)
- <sup>10</sup> Kothari and Nababsing (1996: 60-61)

Table 10:	Sources:	<sup>1</sup> Zhu (1992:284-290) <sup>2</sup> Sivalingam (1994:50) <sup>3</sup> Hein (1988:53-54) <sup>4</sup> Remedio (1996:28) <sup>5</sup> Abeywardene et al (1994:36)
Table 11:	Sources:	<sup>1</sup> Lee (1984: 38)
Table 12:	Notes:	<sup>a</sup> Comparisons are based on average national manufacturing wage level. <sup>b</sup> Comparisons are based on average wage level outside EPZs. <sup>c</sup> Comparisons are based on average industrial wage level outside EPZs. <sup>d</sup> Comparisons are based on average wage level in some industries (Garment, Gardener and Mason) outside EPZs.
	Sources:	<sup>1</sup> Zhu (1992: 301-316); Shenzhen EPZ for China, Lat Krabang for Thailand and Kaohsiung for Taiwan (China). <sup>2</sup> Abeywardene et al (1994: 20) <sup>3</sup> Hein (1988: 47) <sup>4</sup> Oh (1993: 28) <sup>5</sup> Lee (1984: 82-83) <sup>6</sup> Sivalingam (1994: 41)
Table 13:	Notes:	<sup>a</sup> Non-EPZs mean average wage of workers in the same industry outside the EPZs <sup>b</sup> 1 RM (Malaysian Ringgit) is approximately equal to US\$0.4
	Sources:	<sup>1</sup> Sivalingam (1994: 41)
Table 14:	Sources:	<sup>1</sup> Sivalingam (1994: 40-42) <sup>2</sup> Yonghong (1989: 361) <sup>3</sup> Maex (1985: 57) <sup>4</sup> Oh (1993: 28-29) <sup>5</sup> Hein (1988: 49-50)
Table 15:	Sources:	<sup>1</sup> Lee (1984: 39) <sup>2</sup> Sivalingam (1994: 42-43) <sup>3</sup> 1984 study conducted by the Ministry of Labor and Employment

- <sup>4</sup> Remedio (1996: 29)  
<sup>5</sup> Goonatilake and Goonesekere (1988: 201-203)  
<sup>6</sup> Hein (1988: 52-53)

Table 16: Notes: <sup>a</sup> This data is from Kaohsiung EPZ.  
<sup>b</sup> Unionized ratio are calculated from the data in Martens et al. (1994: 79-80).

- Sources: <sup>1</sup> Oh (1993: 30-31)  
<sup>2</sup> Sivalingam (1994:43-45)  
<sup>3</sup> Lee (1984:41)  
<sup>4</sup> Zhu (1992: 332-338)  
<sup>5</sup> Abeywardene et al (1994: 23)  
<sup>6</sup> Long (1986: 57)  
<sup>7</sup> Martens et al. (1994: 79-80)  
<sup>8</sup> Romero (1995: 272-73)

Table 17: Sources: Warr (1984, 1987a, 1987b)

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### Annex 1: The Evolution of Terminology

Term	Main users and date of first use
Free trade zone	Traditional term since nineteenth century; ILO (1982)
Foreign trade zone	Individual authors (R.S.Toman, 1956; W.Dymsza, 1964), India (1983)
Industrial free zone	Ireland (pre-1970), UNIDO (1971), Liberia (1975)
Free zone	UNCTAD (1973), USAID (1982), United Arab Emirates (1983)
Maquiladoras	Mexico (early 1970s)
Export free zone	Ireland (1975), UNIDO (1976)
Duty free export processing zone	Republic of Korea (1975)
Export processing free zone	UNIDO (1976), UNCTAD (1983)
Free production zone	Starnberg Institute (1977)
Export processing zone	Philippines (1977), Harvard University (1977), APO (1977), WEPZA (1978), UNIDO (1979), Malaysia (1980), Pakistan (1980), Singapore (1982), UNCTC (1982), ILO (1983), The Economist (1979)
Special economic zone	China (1979)
Tax free zone	Individual authors (W.H. and D.B. Diamond, 1980)
Tax free trade zone	Individual author (D.B. Diamond, 1980)
Investment promotion zone	Sri Lanka (1981)
Free economic zone	Individual author (H.Grubel, 1982)
Free export zone	Republic of Korea (1983)
Free export processing zone	OECD (1984)
Privileged export zone	Individual author (N.N. Sachitanand, 1984)
Industrial export processing zone	Individual author (P.Ryan, 1985)

APO	Asian Productivity Organization
ILO	International Labour Office
OECD	Organization for Economic Co-operation and Development
UNCTAD	United Nations Conference on Trade and Development
UNCTC	United Nations Centre on Transnational Corporations
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
WEPZA	World Export Processing Zone Association

Source: ILO/UNCTC (1988: 5)

## **Annex 2: Internationally Used Definitions**

### **UNIDO (United Nations Industrial Development Organization)**

an EPZ is a relatively small, geographically separated area within a country, the purpose of which is to attract export-oriented industries, by offering them especially favorable investment and trade conditions as compared with the remainder of the host country. In particular, the EPZs provide for the importation of goods to be used in the production of exports on a bonded duty free basis (UNIDO, 1980).

### **UNCTAD (United Nations Conference on Trade and Development)**

EPZs are industrial estates which form enclaves within the national customs territory and are usually situated near an international port and/or airport. The entire production of such zones is normally exported. Imports of raw materials, intermediate products, equipment and machinery required for export production are not subject to customs duty (UNCTAD, 1985: 10).

### **ILO (International Labour Office) /UNCTC (United Nations Centre on Transnational Corporations)**

an EPZ could be defined here as a clearly delineated industrial estate which constitutes a free trade enclave in the customs and trade regime of a country, and where foreign manufacturing firms producing mainly for export benefit from a certain number of fiscal and financial incentives (ILO/UNCTC, 1988: 4).

### **The World Bank**

an *export processing zone* is an industrial estate, usually a fenced-in area of 10 to 300 hectares, that specializes in manufacturing for export. It offers firms free trade conditions and a liberal regulatory environment (World Bank 1992: 7).

### **WEPZA (World Export Processing Zone Association)**

EPZs are all government authorized areas such as free ports, free trade zones, custom free zones, industrial free zones or foreign trade or any other type of zone, as the Council may from time to time decide to include (Statutes of the WEPZA, ID/W.6/266/6, 28th February 1978).

**Annex 3: Ratification of Selected ILO Conventions by Country EPZ Status**

Convention/Year	Forced Labour		Freedom of Association		Equal Treatment		Minimum Age	Minimum Wage		Work Hours	Night Work	Labour Inspection	Safety Health	EPZ Status *
	29/1930	105/1957	87/1948	98/1949	100/1951	111/1950	138/1973	26/1928	131/1970	1/1919	89/1948	81/1947	155/1981	Yes/No
Afghanistan		x			x	x								N
Albania	x	x	x	x	x	x								N
Algeria	x	x	x	x	x	x	x				x	x		N
Angola	x	x		x	x	x		x			x	x		Y
Antigua and Barbuda	x	x	x	x		x	x					x		Y
Argentina	x	x	x	x	x	x		x				x		N
Armenia					x	x								N
Australia	x	x	x	x	x	x		x	x	x		x		Y
Austria	x	x	x	x	x	x		x			x	x		Y
Azerbaijan	x		x	x	x	x	x		x	x				N
Bahamas	x	x		x				x				x		Y
Bahrain	x										x	x		N
Bangladesh	x	x	x	x		x					x	x		Y
Barbados	x	x	x	x	x	x		x				x		N
Belarus	x	x	x	x	x	x	x	x				x		N
Belgium	x	x	x	x	x	x	x	x			x	x		N
Belize	x	x	x	x				x			x	x		Y
Benin	x	x	x	x	x	x		x						N
Bolivia		x	x	x	x	x		x	x	x	x	x		Y
Bosnia and Herzegovina	x		x	x	x	x	x		x	x	x	x	x	N
Botswana														N
Brazil	x	x		x	x	x		x	x	x	x	x	x	Y
Bulgaria	x		x	x	x	x	x	x				x		Y
Burkina Faso	x		x	x	x	x		x	x	x		x		N
Burundi	x	x	x		x	x		x			x	x		Y

Cambodia	x													N
Cameroon	x	x	x	x	x	x		x	x	x	x	x		N
Canada		x	x		x	x		x						N
Cape Verde	x	x		x	x	x						x		Y
Central African Republic	x	x	x	x	x	x		x				x		N
Chad	x	x	x	x	x	x		x				x		N
	Forced Labour		Freedom of Association		Equal Treatment		Minimum Age	Minimum Wage		Work Hours	Night Work	Labour Inspection	Safety Health	EPZ Status *
Convention/Year	29/1930	105/1957	87/1948	98/1949	100/1951	111/1950	138/1973	26/1928	131/1970	1/1919	89/1948	81/1947	155/1981	Yes/No
Chile	x				x	x		x						Y
China					x			x						Y
Colombia	x	x	x	x	x	x		x				x		Y
Comoros	x	x	x	x	x			x			x	x		N
Congo	x		x					x			x			N
Costa Rica	x	x	x	x	x	x	x	x	x	x	x	x		Y
Côte d'Ivoire	x	x	x	x	x	x		x				x		N
Croatia	x	x	x	x	x	x	x					x	x	Y
Cuba	x	x	x	x	x	x	x	x	x	x	x	x	x	Y
Cyprus	x	x	x	x	x	x					x	x	x	Y
Czech Republic	x	x	x	x	x	x		x		x	x		x	N
Denmark	x	x	x	x	x	x						x	x	Y
Djibouti	x	x	x	x	x			x		x	x	x		Y
Dominica	x	x	x	x	x	x	x	x				x		N
Dominican Republic	x	x	x	x	x	x		x		x	x	x		Y
Ecuador	x	x	x	x	x	x		x	x			x		Y
Egypt	x	x	x	x	x	x		x	x	x	x	x		Y
El Salvador	x	x				x	x		x			x		Y
Equatorial Guinea					x		x			x				N
Eritrea														N
Estonia	x	x	x	x	x									N
Ethiopia			x	x		x							x	N

Fiji	x	x		x				x						N
Finland	x	x	x	x	x	x	x					x	x	Y
France	x	x	x	x	x	x	x	x	x	x	x	x		Y
Gabon	x	x	x	x	x	x		x				x		N
Gambia														N
Georgia	x	x		x	x	x	x							N
Germany	x	x	x	x	x	x	x	x				x		Y
Ghana	x	x	x	x	x	x		x		x	x	x		N
Greece	x	x	x	x	x	x	x			x	x	x		Y
Grenada	x	x	x	x	x			x				x		N
Guatemala	x	x	x	x	x	x	x	x	x	x	x	x		Y
Guinea	x	x	x	x	x	x		x			x	x		N
Guinea-Bissau	x	x		x	x	x		x		x	x	x		N
	Forced Labour		Freedom of Association		Equal Treatment		Minimum Age	Minimum Wage		Work Hours	Night Work	Labour Inspection	Safety Health	EPZ Status *
Convention/Year	29/1930	105/1957	87/1948	98/1949	100/1951	111/1950	138/1973	26/1928	131/1970	1/1919	89/1948	81/1947	155/1981	Yes/No
Guyana	x	x	x	x	x	x		x	x			x		N
Haiti	x	x	x	x	x	x				x		x		Y
Honduras	x	x	x	x	x	x	x					x		Y
Hungary	x	x	x	x	x	x		x				x	x	Y
Iceland	x	x	x	x	x	x							x	Y
India	x				x	x		x		x	x	x		Y
Indonesia	x			x	x									Y
Iran, Islamic Republic of	x	x			x	x								Y
Iraq	x	x		x	x	x	x	x	x	x	x	x		N
Ireland	x	x	x	x	x		x	x			x	x	x	Y
Israel	x	x	x	x	x	x	x			x		x		Y
Italy	x	x	x	x	x	x	x	x		x	x	x		Y
Jamaica	x	x	x	x	x	x		x				x		Y
Japan	x		x	x	x			x	x			x		Y
Jordan	x	x		x	x	x						x		Y

Kazakhstan													x	Y
Kenya	x	x		x			x	x	x		x	x		Y
Korea, Republic of												x		Y
Kuwait	x	x	x			x				x	x	x		Y
Krgyzstan	x		x	x	x	x	x							N
Lao People's Democratic Republic	x													N
Latvia		x	x	x	x	x			x	x		x	x	Y
Lebanon	x	x		x	x	x		x	x	x	x	x		Y
Lesotho	x		x	x				x						N
Liberia	x	x	x	x		x								Y
Libyan Arab Jamahiriya	x	x		x	x	x	x	x	x	x	x	x		Y
Lithuania	x	x	x	x	x	x			x	x		x		N
Luxembourg	x	x	x	x	x		x	x		x	x	x		N
Madagascar	x		x		x	x		x				x		N
Malawi				x	x	x		x			x	x		N
Malaysia	x			x								x		Y
Mali	x	x	x	x	x	x		x				x		N
Malta	x	x	x	x	x	x	x	x	x	x	x	x		Y
Mauritania	x		x			x		x			x	x		N
Mauritius	x	x		x			x	x				x		Y
	Forced Labour		Freedom of Association		Equal Treatment		Minimum Age	Minimum Wage		Work Hours	Night Work	Labour Inspection	Safety Health	EPZ Status *
Convention/Year	29/1930	105/1957	87/1948	98/1949	100/1951	111/1950	138/1973	26/1928	131/1970	1/1919	89/1948	81/1947	155/1981	Yes/No
Mexico	x	x	x		x	x		x	x				x	Y
Moldova, Republic of		x	x	x		x						x		Y
Mongolia			x	x	x	x								N
Morocco	x	x		x	x	x		x				x		Y
Mozambique		x	x	x	x	x				x		x		Y
Myanmar	x		x					x		x				N
Namibia			x	x										Y
Nepal				x	x	x			x					N

Netherlands	x	x	x	x	x	x	x	x	x		x	x	x	N
New Zealand	x	x			x	x		x		x	x	x		N
Nicaragua	x	x	x	x	x	x	x	x	x	x				Y
Niger	x	x	x	x	x	x	x	x	x			x		N
Nigeria	x	x	x	x	x			x				x	x	Y
Norway	x	x	x	x	x	x	x	x				x	x	N
Oman														N
Pakistan	x	x	x	x		x				x	x	x		Y
Panama	x	x	x	x	x	x		x			x	x		Y
Papua New Guinea	x	x		x				x						N
Paraguay	x	x	x	x	x	x		x		x	x	x		N
Peru	x	x	x	x	x	x		x		x		x		Y
Philippines		x	x	x	x	x					x			Y
Poland	x	x	x	x	x	x	x					x		Y
Portugal	x	x	x	x	x	x		x	x	x	x	x	x	Y
Qatar						x						x		N
Romania	x		x	x	x	x	x		x	x	x	x		Y
Russian Federation	x		x	x	x	x	x							Y
Rwanda		x	x	x	x	x	x	x			x	x		N
Saint Lucia	x	x	x	x	x	x		x						Y
Saint Vincent and the Grenadines														N
San Marino	x	x	x	x	x	x	x							N
Sao Tome and Principe			x	x	x	x						x		N
Saudi Arabia	x	x			x	x				x	x	x		N
Senegal	x	x	x	x	x	x		x			x	x		Y

	Forced Labour		Freedom of Association		Equal Treatment		Minimum Age	Minimum Wage		Work Hours	Night Work	Labour Inspection	Safety Health	EPZ Status*
Convention/Year	29/1930	105/1957	87/1948	98/1949	100/1951	111/1950	138/1973	26/1928	131/1970	1/1919	89/1948	81/1947	155/1981	Yes/No

Seychelles	x	x	x					x						N
Sierra Leone	x	x	x	x	x	x		x				x		N
Singapore	x			x								x		N
Slovakia	x		x	x	x	x		x		x	x		x	Y
Slovenia	x		x	x	x	x	x		x		x	x	x	Y
Solomon Islands	x							x				x		N
Somalia	x	x				x								N
South Africa	x	x	x	x		x		x			x			N
Spain	x	x	x	x	x	x	x	x	x	x	x	x	x	Y
Sri Lanka	x		x	x	x			x	x		x	x		Y
Sudan	x	x		x	x	x		x				x		Y
Suriname	x	x	x	x								x		N
Swaziland	x	x	x	x	x	x		x	x		x	x		N
Sweden	x	x	x	x	x	x	x					x	x	Y
Switzerland	x	x	x		x	x		x			x	x		N
Syrian Arab Republic	x	x	x	x	x	x		x	x	x	x	x		Y
Tajikistan	x		x	x	x	x	x							N
Tanzania, United Republic of	x	x		x				x	x			x		Y
Thailand	x	x												Y
The Former Yugoslav Republic of Macedonia	x		x	x	x	x	x							N
Togo	x		x	x	x	x	x	x						Y
Trinidad and Tobago	x	x	x	x		x								Y
Tunisia	x	x	x	x	x	x	x	x			x	x		Y
Turkey		x	x	x	x	x		x				x		Y
Turkmenistan														N
Uganda	x	x		x				x				x		N
Ukraine	x		x	x	x	x	x							N
United Kingdom	x	x	x	x	x			x				x		Y
United Arab Emirates	x	x			x						x	x	x	Y
United States		x												Y
Uruguay	x	x	x	x	x	x	x	x	x	x	x	x	x	Y
Uzbekistan														N
Venezuela	x	x	x	x	x	x	x	x			x		x	Y

Convention/Year	29/ 1930	105/ 1957	87/ 1948	98/ 1949	100/ 1951	111/ 1950	138/ 1973	26/ 1928	131 / 1970	1/ 1919	89/ 1948	81/ 1947	155/ 1981	Yes/ No
Viet Nam												x	x	Y
	Forced Labour		Freedom of Association		Equal Treatment		Minimum Age	Minimum Wage		Work Hours	Night Work	Labour Inspection	Safety Health	EPZ Status*
Yemen	x	x	x	x	x	x			x			x		Y
Yugoslavia	x		x	x	x	x	x		x		x	x	x	Y
Zaire	x			x	x			x			x	x		N
Zambia	x	x	x	x	x	x	x	x	x		x			N
Zimbabwe					x			x				x		Y
<b>TOTAL</b>	142	121	119	133	128	125	51	100	40	52	64	119	27	Y = 93 N = 80

Note: Table of ratification concerning the ILO's fundamental conventions

- No. 1 Hours of Work (Industry) Convention, 1919
- No. 26 Minimum Wage-Fixing Machinery Convention, 1928
- No. 29 Forced Labour Convention, 1930
- No. 81 Labour Inspection Convention [and Protocol, 1995], 1947
- No. 87 Freedom of Association and Protection of the Right to Organize Convention, 1948
- No. 89 Night Work (Women) Convention (Revised) [and Protocol, 1990], 1948
- No. 98 Right to Organise and Collective Bargaining Convention, 1949
- No. 100 Equal Remuneration Convention, 1951
- No. 105 Abolition of Forced Labour Convention, 1957
- No. 111 Discrimination (Employment and Occupation) Convention, 1958
- No. 131 Minimum Wage Fixing Convention, 1970
- No. 138 Minimum Age Convention, 1973
- No. 155 Occupational Safety and Health Convention, 1981

\*EPZ Status: Y = Countries with EPZs; N = Countries without EPZs.

Sources: ILO (1997) International Labour Conference 85th Session.  
Report III(part2) Lists of Ratifications by Convention and by Country (as at 31 December 1996)

**Annex 4: Percentage of Countries Which Have Ratified Selected ILO Conventions  
by EPZ Status and Statistical Test for the Differences Between Having or Not  
EPZ(s)**

Conventions	ALL	No EPZs	EPZs	Major <sup>1</sup>	Others <sup>1</sup>	Significance Tests <sup>2</sup> (p-value) <sup>3</sup>		
	(1)	(2)	(3)	(4)	(5)	(2) vs. (3)	(2) vs. (4)	(4) vs. (5)
29 Forced Labour	.82	.78	.87	.83	.89	.093	.576	.606
105 Forced Labour	.70	.68	.72	.61	.75	.563	.590	.284
87 Freedom of Association	.69	.69	.68	.50	.74	.911	.156	.088
98 Freedom of Association	.77	.72	.82	.78	.84	.119	.629	.606
100 Equal Treatment	.74	.74	.73	.67	.75	.876	.532	.498
111 Equal Treatment	.72	.71	.73	.56	.79	.755	.237	.092
138 Minimum Wage	.29	.32	.27	.17	.30	.444	.148	.242
26 Minimum Wage	.58	.55	.61	.67	.59	.473	.374	.563
131 Minimum Wage	.23	.21	.25	.28	.25	.535	.583	.796
1 Work Hours	.30	.32	.28	.22	.30	.563	.394	.537
89 Night Hours	.37	.36	.38	.56	.33	.808	.151	.103
81 Labour Inspection	.69	<b>.62</b>	<b>.77</b>	.78	.77	<b>.026</b>	.166	.950
155 Safety Health	.16	.14	.18	.17	.18	.489	.773	.896
Number of Countries	173	94	79	18	61			

Notes:

1. Countries with EPZs are classified as “Major” countries if the number of workers in own EPZs exceeds 10,000. Otherwise countries are labeled as “Others.”
2. The null hypothesis tested here is that the means of the two populations represented by the selected two samples are equal, that is, there is no difference in Government practices with respect to agreeing to a labor standard and to allowing an EPZ in their territory. To test this hypothesis, t-statistic is calculated as:

$$t = \frac{X_1^* - X_2^*}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}}$$

where  $X_i^*$  is the sample mean of group  $i$ ,  $S_i^2$  is the  $i$ th group’s variance, and  $N_i$  is the  $i$ th group’s sample size. The resulting t-value is then compared to two-tailed probability (p)-value for the t-value is obtained and listed in the table above. The results suggest that the null is rejected only in one case (indicated in bold): countries that have ratified the Labour Inspection convention (#81) have higher probability of having an EPZ.

3. The p-values listed in this annex are at 5% significant level.

Sources: Data are obtained from ILO (1997) and WEPZA (1997).

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