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Publication Details

Jayanthakumaran, K, An Overview of Export Processing Zones: Selected Asian Countries, Working Paper 02-03, Department of Economics, University of Wollongong, 2002.

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Working Paper Series 2002

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WP 02-03

An Overview of Export Processing Zones: Selected Asian Countries

by

Kankesu Jayanthakumaran*

ABSTRACT

This paper surveys the literature on the performance of Export Processing Zones (EPZs) that have used benefit-cost analytical framework. Survey reveals that as industrial development proceeds, the gap between market and opportunity cost of labour narrow and the interest on EPZs tends to disappear. Interest on EPZs may hold only if the zones generate private profit to domestic shareholders. Recent policy measures of World Trade Organisation may eventually result in lower rates of private returns and may possible threat to the existing and new EPZs.

I. INTRODUCTION

The literature on Export Processing Zones (EPZs) compares descriptive, theoretical and benefit-cost analysis. Descriptive studies carried out by international organisations and academics focus on conceptualisation, objectives, incentives, developmental effects and performance of EPZs. Although most of these studies concern net benefits to the host economy they lack appropriate analytical frameworks (Warr 1989: 66). Theoretical studies focus on factor movements and use the Heckscher-Ohlin (H-O) framework. The standard H-O model assumes factors of production are immobile. These studies fail to capture the international mobility of capital by assuming implicitly that the capital used in the EPZ is domestic capital in fixed supply that has moved from the host economy. Conventional benefit-cost analysis captures the economic welfare of citizens of the host country by incorporating the benefits and costs for the entire lifetime of the project. The advocates of this framework believe the benefits and costs can be identified conceptually and quantified empirically.

This paper surveys the literature on the EPZs that have used a benefit-cost analytical framework and evaluates the future of EPZs in the light of the abolition of the Multi Fibre Arrangement

(MFA). The background of EPZs is discussed next. Section three analyses the method for the 'enclave model'. Section four reports on the economic performance of selected Asian countries. Section five surveys the results of benefit-cost analysis. Section six discusses the recent policies of WTO and their impact on EPZ. The last section summarises the conclusions.

II. BACKGROUND

Terms such as Export Processing Zones (EPZ), Free Trade Zones (FTZ), Special Economic Zones (SEZ) and Export Processing Factories (EPF) refer to similar concepts with variation for policy prescriptions and objectives. Given the fact that EPZ is the most commonly used word, this paper uses EPZ interchangeably with FTZ, SEZ and EPF. Most EPZs provide for custom-free and tax exempted export-oriented manufacturing, investment incentives and streamlined administration, cheap utilities, lower wages and better infrastructure. All of them involve processing intermediate imports for exports. Most of them engage in labour-intensive light manufacturing such as garment production, assembly of light electrical goods and electronics. Zones also have goals such as promoting linkages with domestic economies, encouraging technology transfer and promoting new industrialisation strategies. Zones encourage employment and foreign investment. The goals vary among zones, and over time, depending on need of the host country. For example, zones in Thailand have the additional purpose of decentralising industries from Bangkok to overcome the problems of congestion and pollution.

Export Processing Zones (EPZs) are a recent phenomenon which allow the creation of an 'enclave', isolated from the domestic economy, within which export-oriented manufacturing activities can freely operate without state interference. Within the zones, economic and foreign trade activities are freed from controls. It may be convenient for developing Asian countries to invite foreign investment to undertake manufacturing activities without subjecting the entire

economy to a liberalised and deregulated system. Foreign investments in the zones are given favoured treatment with respect to taxation, infrastructure, import controls and industrial regulations. In return, foreign investors are expected to process all intermediate imports within the zone and to export without adversely affecting the domestic economy. Industries can easily be relocated, as production technologies are standardised with low skilled workers. This is known as foot-loose manufacturing. By definition, EPZs are not eligible to produce any form of forward linkages, but, backward linkages are not ruled out. The higher the isolation from the domestic economy the lower will be the backward linkages.

The role assigned for the EPZs differs considerably from country to country. In Singapore, the EPZs were originally meant as part of a package intended to attract investment to a strategically located economy already free of import/export regulations. Economies in transition, for example Taiwan, South Korea, Malaysia and Thailand, EPZs initiated as part of a shift in policies from an inward to an outward orientation. In these countries EPZs represent just one of the steps taken towards becoming more efficiently integrated into the world economy. By efficiently integrating with domestic economy, EPZs in South Korea and Taiwan evolved to the stage where they are no longer enclaves. Zones in both countries, especially Mason in South Korea and Kaohsiung in Taiwan, facilitated the development of surrounding regions. The Philippines, India and Indonesia represent inward-oriented countries where the EPZs were introduced to create at least some areas free from distortions while the rest of the economy was at that time still subjected to considerable distortions. China initiated its open-door policy and ongoing economic reforms by introducing Special Economic Zones (SEZ) in 1979. Initially, China promoted investment in a few carefully selected areas without promoting linkages with its domestic economy. The level of infrastructure development and the level of involvement of foreign investors attracted the further development of SEZs. SEZs were expanded to include 14

coastal cities (1984), three delta areas (1985) and all of Hainan Island (1988). At the policy level, China promoted linkages between SEZs and firms from inland, and sectors such as agriculture, services and tourism.

EPZs exploit the international mobility of capital, combine them with domestic workers and export traded goods. The firms located in the zone transfer capital goods and semi-processed goods to countries where they can earn a rate of return greater than in the home country. Manufacturing activities within the zones often involve traded intermediate inputs, capital and workers. This is in contrast to international trade theory which focuses on final goods and fails to capture the international mobility of footloose activities. Warr (1989: 66-68) related EPZ activities to Vernon's (1966) 'product life cycle' process stating that a migration of newly developed manufacturing processes from developed countries to developing countries as international competition target the unit value-added generated by these processes. In this process scarce capital goods were used efficiently by developed countries. Later the manufacturing process shifted to developing countries to offset the growing differences in labour cost between developing and developed countries.

Johansson (1994: 394-95) believed that neoclassical models failed to consider the spill-overs from foreign direct investments (FDI) within EPZs, and advocated new growth theory literature. According to him the enclave nature of EPZs and the low-skilled production process do not promote technology transfers and associated externalities. However, EPZs do promote the role of externalities like learning-by-doing and on-the-job accumulation of human capital. New growth theory focuses on three issues that have often been neglected in the neo-classical literature. First, domestic firms lack the technical, marketing and managerial know-how, and FDI in the zones fill this gap. Second, domestic firms seldom have access to international

distribution channels and they need support from international or joint-venture companies. Finally, entry into international markets would be difficult without access to established foreign firms with wide international business dealings. The EPZ which incorporates the above factors may be beneficial to a country because of their spillovers and their catalytic impact.

In the light of new growth theory, Johansson and Nilsson (1997: 2121-23) tested the catalyst effect of EPZs of ten countries and found that the export generating effect of the Malaysian EPZs was large, indicating the presence of a catalyst effect. Foreign affiliates attracted to the EPZs stimulated local firms to begin to export by showing them how to produce, market and distribute manufactured goods on the international market. Authors failed to find similar catalyst effects in the other countries[1].

III. METHODOLOGY

i. Enclave economy

A few empirical studies attempt to quantify benefits and costs of EPZs within the framework of an 'enclave model' and use conventional benefit-cost analysis. A general understanding of this approach is that EPZs generate only a limited backward linkage to the host country's economy. Forward linkages are dubious. Initial costs and infrastructure costs to the host country are likely to be very high. With the above background Warr (1989) has specified an 'enclave model' which provides a framework to identify the benefits and costs to the citizens of the host country (Figure 1).

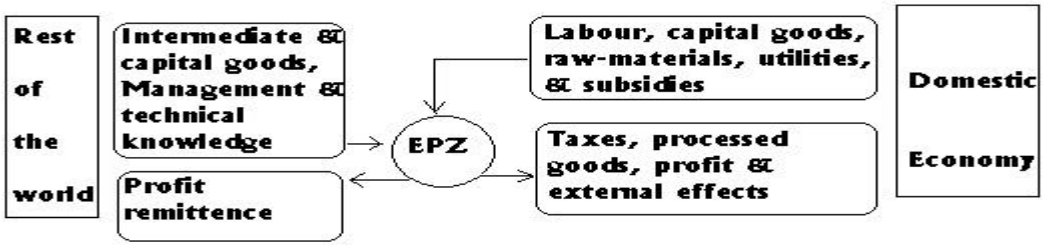

Figure 1: Enclave Model

The flow of goods and services and the financial flows between the rest of the world and EPZs are irrelevant for evaluating the welfare impact of the host country citizen. These transfers are taking place within the 'enclave' nature of zones but not within the rest of the host economy. When EPZ firms purchase intermediate and capital goods from their subsidiaries abroad it is an inter-industry transaction and a matter of transfer pricing. When a firm transfers profits to a home country it doesn't have any welfare impact on the host country's citizens. However, if there is tax on profit then it is relevant to the host economy.

The flow of goods and services and the financial flows between the host economy and EPZ are relevant for the welfare of the citizens. The domestic economy provides capital, infrastructure and administrative expenditures, workers, public utilities and some limited local input. In return, the host economy receives wages, electricity tariffs, taxes, profits channelled to domestic shareholders and payment for local inputs. EPZ employees receive skills. It is likely that local middle managers receive training, modern managerial practices and the notion of quality control. Domestic borrowing by EPZ firms would enhance banking activities within the host economy. These relationships are relevant for the welfare of the citizens. Domestic sales from EPZ firms are usually prohibited. They occur sometimes where goods rejected by quality controls are allowed to be sold domestically. The proceeds are a small percentage of total sales

and are subject to duty. This indicates that the 'enclave' nature of EPZ does not promote forward linkages in most cases. The above relationships provide the basis for a conventional cost-benefit analysis, by comparing the observed situation with the hypothetical results of not having a zone.

ii. Benefits and costs

The core issue of Warr's (1989) approach is that direct financial flows, such as foreign investment inflows or profit repatriation, have no welfare outcome for a host country. It is the use of local resources and the net benefit to the host economy as a result of EPZ activities that need to be focused on. Descriptive analyses such as export performance or number of jobs created is inappropriate for benefit-cost calculations. The net effect of these activities on groups in the host economy is the matter of interest. This benefit-cost calculation further assumes those backward linkages such as jobs and local purchases do not always contribute benefits to the local economy. It is the excess of actual payments at market prices and the opportunity costs of the respective items that create benefits to the citizen. For example, in economic terms, there will be a net benefit if a worker's actual market wages exceeds the social opportunity cost of employment (shadow wages) in the zone. This indicates that social benefits derived from generating an additional job outweigh the costs. Considering the fact that EPZs attract relatively more unskilled workers and women, benefit-cost analysis recognises the variations of social value among skilled and unskilled and male and female workers. Assigning appropriate social value is an important factor for this type of study.[2] Contrary to this there will be a net loss if a host government subsidise utilities to EPZ firms and the market price is below opportunity costs.

Based on the 'enclave model', the following benefits and costs can be identified (Jayanthakumaran and Weiss 1997: 732).

Costs:

- the domestic economy provides capital infrastructure cost (K), and
- administrative expenditure for zone operation (A).

Benefits:

- the difference between wages paid to local labour (MWR) and the national opportunity costs of this labour, as measured by the shadow wage (SWR),
- the difference between payments by firms for public utilities and locally purchased inputs (DP) and the opportunity cost of these public utilities and locally purchased inputs (MSC),
- all tax payments by firms (T), and
- net profit income that goes to local equity shareholders in the EPZ firms (NP).

Thus, an economic net benefit-cost position in any year may be expressed for year t as;

$$NBC_t = (MWR - SWR)_t L + (DP - MSC)_t Q + T_t + NP_t - K_t - A_t$$

Where market and shadow wage is referred to as MWR and SWR respectively. Domestic price of locally purchased inputs and public utilities is referred to as DP and opportunity costs of locally purchased inputs and a public utility is referred to as MSC. L and Q refer to the number of workers and units of domestic inputs respectively. Tax payments and net profits accruing to local shareholders are referred to as T and NP respectively. K and A refer to the infrastructure cost of the zones and operational costs respectively. The main drawback to this approach is that costs are readily available but the benefits are more difficult to estimate. Some benefits such as transfer of skills and technology need to be estimated.

In economic terms, there will be a routine contributions to net benefit if a worker's wages exceed the social opportunity cost of employment in the zone, if average electricity tariffs exceeds the

opportunity cost of supplying the additional power, and if the prices paid by the firms for purchases exceed the opportunity cost of supplying them. Tax earnings generated by EPZ firms represent a clear economic benefit for the host economy. In the absence of the EPZs, these firms are unlikely to operate and there would be no taxes. The share of profits going to domestic shareholders remains in the country and is another benefit[3]. The foreign-owned share of profits will not come into our calculations, as it has no welfare impact on the domestic economy. The EPZ firms convert foreign currency into local for the payments of local purchases and wages. The difference between the opportunity cost of exchange rate and the official exchange rate can be a benefit/cost to the domestic economy if the domestic price system is used for calculations (please see page 12, for more details).

If net benefit (NBC_t) is positive, it reflects an excess of benefits and costs for the year studied. If the sum of the discounted benefits exceeds the sum of the discounted costs with the given discount rate, a project is viable. Efficiency of an EPZ further requires that NPV > 0, where NPV is the net present value of the zone, r is the shadow cost discount rate for the economy as a whole.

$$NPV = \sum^{t} \frac{NBC_t}{1+r}$$

In addition, it is a general practice to evaluate projects in terms of Economic Internal Rate of Return (EIRR). A new project should generate an EIRR at least as great as that in alternative investments. Efficiency requires EIRR > r, where EIRR refers to the economic internal rate of return of the EPZ and EIRR meet the following condition;

$$\sum^{t} \frac{NBC_t}{1+EIRR} = 0$$

iii. Shadow price estimates

In cases where market prices diverge from opportunity costs it is necessary to appraise activities at shadow prices rather than market prices. The estimated set of conversion factors (CF) can be used either in a world price system or in a domestic price system. In a world price system shadow prices are shown in world price numeraire indicating that traded goods are estimated directly at world prices and non-traded goods are converted into world price equivalents, usually on the basis of their marginal costs of production at world prices. In a domestic price system domestic prices are the numeraire, the world price of these traded goods must be expressed as equivalent to a value in units of domestic prices (Curry and Weiss, 1993). In a world price system CF is defined as the ratio of shadow price (Sp_i) to a domestic market price (MP_i).

$$CF_i = \frac{SP_i}{MP_i}$$

Table 1 indicates selected conversion factors for Indonesia, South Korea, Malaysia, the Philippines and Sri Lanka in the initial stages of EPZs. These are the conversion factors for the 1970s and 1980s. Generating employment is one of the major objectives of establishing EPZs. Conversion factors for labour for the range of above countries indicate that the opportunity cost of labour is less than the market wage rates. In the Philippines this is approximately 0.64, implying a net gain of around 36 per cent of their market value. Conversion factors (CFs) are likely to vary among skilled, unskilled and male and female workers[4]. For example in Sri Lanka CF of skilled and unskilled workers is 0.785 and 0.722 respectively (Curry and Lucking 1991: 59). Summerfield (1995) studied the shadow price of men and women workers in the zones in Mexico and China and recommended equal shadow prices. He argued that the labour involved is at or below market wage regardless of whether the worker is male or female. Managerial training and skills achieved through training are benefits to the host economy. Managers trained

by EPZ firms are likely to receive higher salaries in domestic firms. To capture this externality effect one can in principle lower the parameter of the opportunity cost of labour.

Domestic purchases are another component. The opportunity cost of supplying locally produced inputs to EPZs can be derived by using the average conversion factor for the whole economy to revalue their domestic market price value. In Table 1, the opportunity cost of domestic inputs is less than the market prices in all countries indicating that there are benefits and possible technology transfers due to this. For example, the conversion factor is 0.85 in Indonesia, implying a net gain of around 15 per cent of their market value. In practice, technology transfer of EPZ firms to domestic firms through local purchases was not substantial. This reflects the EPZ's dependence on 'footloose' manufacturers and its isolation from the domestic economy.

Table 1: Selected conversion factors: Indonesia, South Korea, Malaysia, the Philippines and Sri Lanka

Category	Indonesia*	Korea*	Malaysia*	Philippines*	Sri Lanka**
Labour	0.75	0.91	0.83	0.64	
Skilled					0.79
Unskilled					0.72
Foreign exchange	1.00	1.08	1.11	1.25	-
Domestic raw-materials	0.85	0.92	0.90	0.96	0.78
Domestic capital	0.85	0.98	0.91	0.96	0.91
Electricity	1.05	1.33	0.93	1.30	1.57

Source: * Warr (1989) and **Jayanthakumaran and Weiss (1997)

Electricity consumption by EPZ firms generates linkages with the host economy. If the average tariff is less than the opportunity cost of supplying additional power, there is a subsidy to the EPZ firms. The national conversion factor for electricity is used to revalue electricity charges at market prices to obtain the economic opportunity cost of supplying the power. The conversion

factors for most of the countries are above 1.0, implying that firms in fact receive subsidised power. All countries other than Malaysia have generated costs in this regard.

Warr (1989) has used the domestic price system in his benefit/cost analysis and incorporated the shadow exchange rate. Foreign firms in EPZs are expected to convert their foreign exchange to local currency to meet their expenses such as wages, electricity tariffs, local purchases and taxes. According to Warr, the difference between the official exchange rate (OER) and the shadow exchange rate (SER) arising from the currency conversion can be a benefit/cost to the host economy. In other words, if the OER used in such currency transaction does not reflect the opportunity cost of foreign exchange, referred to as SER, the economy will increase the premium (SER - OER). In Warr, all foreign exchange converted to local currency creates a benefit to the host economy indicated by the formula (SER - OER)* F, where F is the sum of foreign exchange converted at the official exchange rate. Jayanthakumaran and Weiss (1997) used the world price system, as an alternative, where all non-traded shadow price is reduced relative to world prices. In this study, CFs already incorporated an adjustment for a scarcity of foreign exchange, and any separate use of the premium (SER - OER) would be double counting.

IV. ECONOMIC PERFORMANCE: SELECTED ASIAN COUNTRIES

As identified by the 'enclave model', selected performances such as local purchases, employment and tax revenue for the zones in South Korea, Malaysia, the Philippines, Indonesia, Sri Lanka and China are depicted in Table 2a and 2b. Two dominant industries within EPZs are textiles, clothing and footwear, and electronics. Local purchases by EPZ firms and technology transfer are the important anticipated benefits that one can expect for establishing EPZs. For South Korea, Healy and Lutkenhorst (1989: 50) have shown significant linkages in terms of purchases of domestic raw materials and domestic services such as transport, finance, insurance

and packaging. Manufacturing of ferrous metals and of footwear exhibited the highest domestic purchases. They argued that the sub-contracting was exceptionally high, especially in the electronics industry, as compared with EPZs in other Asian countries. Warr (1989: 70-71) found that Indonesian zones are highly reliant on the garment industry and foreign firms purchased local textiles. Zones in Malaysia highly focused on the electronics industry and local purchases constituted a small percentage of the total.

For Sri Lanka, Jayanthakumaran (1995: 14) observed that most of the local purchases were sub-products, or services, of wearing apparel. These purchases are at a small level and the percentage of domestic purchases to total raw materials remained static from 1981, at around 5 per cent in all sectors. The attempts to promote sub-contracting were not successful for a number of reasons. First, EPZ firms mostly buy their inputs from the cheapest source from outside the country, utilising the facilities offered to them such as tariff free import of raw materials, parts and components. Second, firms have no direct contact with domestic firms. Finally, linkages of zone enterprises with local industries are limited, as there is a low level of industrialisation in the country and the nature of import-based manufacturing processes that they adopt. Local purchases are not very enthusiastic in the other Asian zones. As far as technology transfer is concerned, technology used for the garment industry is simple and universally available, while for electronics it is heavily guarded (Warr 1989: 75).

EPZ enterprises are provided with developed factory sites with infrastructure requirements such as water, power, roads, a container yard for sea-going containers and an air-cargo terminal. Most of these services are subsidised for the sake of promoting local investments. Foreign firms benefit from subsidised tariffs for the above public utilities. Table 2a indicates electricity payments for the zones in South Korea, Malaysia, the Philippines and Indonesia. These

countries not only offer bw cost public utilities but also tax concessions to attract foreign investors. We can note that Malaysia, the Philippines, Indonesia and Sri Lanka did not gain tax income at the initial stages.

Another anticipated benefit is the jobs generated by EPZ firms and subsequent transfer of skills. Foreign investors within EPZs were attracted to labour-intensive, low-skilled workers available for low-wages while local investors were attracted to differential policy treatments. However, contrary to this, the electronics industry widely applied labour-saving technology since the 1970s, as a result of rapid technological innovation. Wages within the zones tend to be slightly higher on average than wages outside the zones. For example, 30 per cent higher in Malaysia in the early 1990s, 10 per cent higher in Masan zone (South Korea) between 1971-87, 14 per cent higher in Kaosiung (Taiwan) over 1967-1988 (Madani 1992: 43-49)[5].

Table 2a: Linkages with domestic economy: Selected Asian countries

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
South Korea (Masan)											
No. of firms	70	115	110	105	99	99	97	94	88	89	83
No.employed	7072	21240	20822	22248	29615	28401	30960	31153	28532	28016	26012
Percentage of net earnings to exports*	30.9	36.8	38.6	41.2	49.2	49.2	51.8	51.8	53.0	53.4	
Percentage of local to total raw-materials	6	20	22	24	30	33	32	34	33	33	34
Millions of US$											
Tax	0	1.44	1.79	1.55	1.71	1.50	1.85	1.78	1.74	2.31	2.17
Electricity	0.2	1.3	2.3	2.0	3.4	3.8	4.5	4.8	4.5	5.1	5.3
Malaysia (Penang											
No.of firms	10	21	31	32	33	34	35	35	41	49	50
No.employed	-	15627	18569	22412	25780	27895	30372	35379	38355	38078	36298
Percentage of local to total raw-materials	5	2	2	4	3	5	3	3	2	3	4
Millions of US$											
Tax	0	0	0	0	0	0	0.14	0.15	0.09	0.074	1.29
Electricity	0.4	0.7	1.7	5.7	6.9	-	8.6	12.1	17.8	23.5	23.2
The Philippines											
No.firms	1	5	14	16	39	38	47	51	51	52	52
No.employed	-	1298	3321	5502	8962	12821	17495	18877	19204	19858	19410
Percentage of local to total raw-materials	30	30	8	10	21	20	7	11	14	9	6
Millions of US$											
Tax	-	-	0.07	-	0.4	0.6	1.5	2.2	1.9	1.7	1.4
Electricity	-	0.1	0.3	0.5	0.7	0.9	1.2	1.6	1.5	1.7	1.6
Indonesia (Jakarta)											
No.firms						4	7	15	18	18	18
No.employed						773	1653	4317	6374	7520	7742
Percentage of local to total raw-materials						0	0.80	9	13	28	41

Source: Warr (1989), * Healey and Lutkenhorst (1989)

Table 2b: Linkages with domestic economy: Selected Asian countries

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Sri Lanka (All zones)*										
No. of firms	12	22	37	46	57	67	62	72	75	80
No.employed	5876	10291	19078	21500	24093	26291	28686	36592	42186	45728
Percentage of net earnings to exports	20	20.8	26.9	22.3	28.8	32.1	32.5	25.6	26.7	20.3
Percentage of Local to total raw-materials			4.8	6.4	5.6	5.5	5.1	4.1	4.9	5.0
China (Shenzhen)**										
No.employed	4660	5300	7700	13360	10200	19200	31700	36931	58069	83960

Source: *Jayanthakumaran and Weiss (1997) and ** Chen (1993)

Unskilled female workers take majority of the jobs in EPZs. For Sri Lanka, 80 per cent of workers were women and about 76 per cent of women were in the 16-25 age group in the 1990s. Garment and wearing apparel were the dominant industries within EPZs and generated more than 80 per cent of the total jobs. The nature of jobs within the zone is similar to that of the jobs outside the EPZs and therefore it was unlikely that additional skills were created and transferred to the domestic economy. Payment to workers is a major component of value adding. However, there was hardly any improvement in the wages-to-sales ratio, fluctuating between 7 to 10 per cent between 1979-88. Workers in the EPZs were ignorant of their legal rights of compensation, protection at the work place and trade union activity. They were also unaware of the methods of occupational health and safety and precautions necessary at the work place. Working conditions are similar between the zones in different countries[6]. One would expect that externalities in the form of managerial skills, practices and notion of quality control would occur. However, evidences show those workers gain very strict factory discipline. If there is a transfer of managerial skills and practices including quality control, it may be small and not quantifiable.

V. RESULTS: BENEFIT-COST ANALYSIS

Spinanger (1984), Warr (1989 and 1990), Chen (1993) and Jayanthakumaran and Weiss (1997) have used conventional benefit-cost analysis by quantifying benefits and costs and computed net

benefits of the zones concerned. EPZs studied are Masan in South Korea, Penang in Malaysia, Bataan in the Philippines, Jakarta in Indonesia, Shenzhen in China and Katunayake and Biyagama in Sri Lanka.

Spinanger (1984) formed two hypotheses of which one represents a static and the other a dynamic effect. Static benefits occur via increases in the supply of foreign exchange, remuneration of factors of production and suppliers of intermediate and other inputs, as well as via the achievement of economies of scale in developing land, infrastructure and government services. Dynamic benefits occur through promoting essential impulses for the industrialisation of the host country in the form of linkages effects such as demonstration effects, skills and technology. Spinanger (1984) obtained a positive impact in Penang in Malaysia in a benefit-cost analysis assuming the lifetime of machinery was 8-12 years in Malaysia. Further, he found a slightly positive impact in Bataan in the Philippines. This analysis itself has some drawbacks. As Spinanger admitted, the infrastructure cost was not included and if included there would be a negative impact in Bataan's case (Warr 1990). There are strong reasons for believing that the market prices of these countries are distorted, so shadow prices are more appropriate to use: however Spinanger's analysis was based on market prices.

Table 3: Welfare Impact of EPZs: Net Present Value and Components

Category	South Korea* millions of 1982 U.S. $	Philippines* millions of 1982 U.S. $	Indonesia* millions of 1982 U.S. $	Malaysia* millions of 1982 U.S. $	Sri Lanka** millions of 1988 Sri Lankan Rs.	China*** millions of 1988 U.S. $
Employment	39	59	4	111	894	
Foreign exchange earnings	65	72	0	94	-	
Domestic raw-materials	16	3	5	18	355	
Domestic capital equipments	0	0	0	10	0	
Taxes and other revenues	18	11	23	10	97	
Domestic Profit		-	-	-	1122	
Electricity use	-13	-4	-1	-53	-271	
Infrastucture & administrative costs	-85	-219	-16	-47	-764	
Domestic borrowing	0	-147	0	0	0	
Net Present Value	40	-225	15	143	1433	58.6
Internal Rate of Return (%)	15	-3	26	28	23	10.7
Economic Discount Rate (%)	7.5	7.5	7.5	7.5	6	7.5
Project life (years)	25	25	25	25	15	25

Source:
* Warr (1989), ** Jayanthakumaran and Weiss (1997), *** Chen (1993)

Table 3 indicates measures of the welfare impact of EPZs. Warr (1989, 1990) has done extensive work in formulating benefit-cost methodology and applying them in four Asian countries; Indonesia (the Jakarta EPZ), South Korea (the Masan FEZ), Malaysia (the Penang FTZ) and the Philippines (the Bataan EPZ). All of EPZs started their operation in the early 1970s with initially garment manufacture as the dominant industry. Electronics assembly followed in South Korea and the Philippines. Warr obtained a positive net present value for the EPZs located in Indonesia, South Korea and Malaysia and a negative present value in the Philippines. Warr covered most of the static benefits, related to Spinanger's first hypothesis, while some of the dynamic benefits still remained difficult to identify. Employment generation in South Korea, Malaysia and the Philippines accounted for more than half the gross benefits in each case. Local purchases and taxes are relatively high in Indonesia. The heavy infrastructural costs and negative impact on the capital market resulted in the negative net benefit in the Philippines' Bataan EPZ. However, among the three major objectives of EPZs - foreign

exchange earnings, generating employment, and technology transfer - the first two were met in most of the zones.

Economic internal rate of return for South Korea, Malaysia and Indonesia was around 15%, 28% and 26% respectively, which is well above the shadow discount rate of respective countries. Warr's observation about backward linkages can be summarised as follows;

- Employment and income gains to labour are the main source of gain for most of the zones. This benefit will disappear if employment opportunities outside the zone improve.
- Transfer of technology from EPZ firms to domestic firms was insignificant. EPZ firms either used universally available technology, as in the garment industry, or if they use advanced technology, as in the electronic industry, it uses heavily guarded and its dissemination highly restricted.
- In the situation where EPZ firms purchase locally produced goods, such links transfer technology to domestic firms. Domestic firms are expected to access technical know-how through the process of sub-contract. Warr (1987, 1990) found this had not been significant except in Indonesia. In Indonesia, garment firms in the EPZs purchased locally made textiles. The net benefit from local purchases is one potential element in benefit cost analysis and this can be promoted if domestic supplier industries are occupied.
- Managerial practices and training can be transferred to local middle managers and this will have some effect on domestic industry. Warr (1989: 78) suggested that this external effect can be incorporated by lowering this parameter of the opportunity cost of labour. However, Warr did not find a proper base for estimating this effect.
- Warr (1989: 77) has omitted domestic profit on the grounds that the amount of profit transferred to domestic economy was difficult to quantify and unlikely to be very significant.

Jayanthakumaran and Weiss (1997: 735) found that EPZs in Sri Lanka generated returns of about 23 per cent, well above the estimated opportunity cost of capital of 6%. Activities aside from textiles and clothing have generated modest returns. The two main benefits are profits to shareholders and income gains to labour, as wage rates on new projects in Sri Lanka exceed opportunity costs. The former is about 45 per cent of gross benefits in present value terms and the latter is about 36 per cent[7]. Local purchases, other than electricity, generated 14 per cent of gross benefits. Domestic profits have been an important source of benefit to the Sri Lankan economy.

Jayanthakumaran and Weiss (1997: 736) further noted that high returns are not distributed evenly between sectors and owner. From a national point of view, textiles and wearing apparel have shown high returns of about 25 per cent. Other sectors were likely to be privately profitable for their owners, but not nationally, as the owners did not necessarily meet the capital expenditure of the EPZs. In terms of ownership, wholly owned domestic firms generated national returns of about 28 per cent compared to 22 per cent for joint ventures and 21 per cent for wholly owned foreign firms. This is from a national point of view and mainly due to the influence of domestic profit.

Chen (1993) has used a domestic price system and estimated employment, tax revenue, foreign exchange earnings, domestic profits, electricity and technical training for Shenzhen SEZ. The benefits have exceeded public expenditure. The SEZ generated rate of return of about 10.7 per cent was well above the opportunity cost of capital. The major source of benefits were employment, foreign exchange earnings, tax revenue and technical training. Domestic profit is small in all but one year. Chen (1993) concluded that Shenzhen zone is profitable both in national economic and the commercial point of view.

VI. WORLD TRADE ORGANISATION AND EPZS

One can notice a growth of EPZs in the 1970s with the mass introduction of textiles, clothing and footwear products using cheap labour. Textiles, clothing and footwear (TCF) were the dominant industries in almost all EPZs in Asia as soon as they were established. Zones in Sri Lanka, Indonesia and the Philippines are highly dependent on TCF industries while TCF industries play quite a considerable role in the remaining EPZs. Due to the emergence of the Multi Fibre Arrangements (MFA 1973-94), a regulatory arrangement designed to govern international trade, between the major industrialised and semi-industrialised countries, foreign firms moved into new countries in search of unexploited quotas. When the manufacturers from successful Asian countries had fulfilled the export quota of their own countries in the late 1970s, a growing number of firms migrated to new countries to obtain the available quota generated by MFA. This is widely known as 'quota hopping'.

Initially, new countries entering the market benefited by accessing a guaranteed market from a MFA quota allocation. In Sri Lanka, EPZs and the rest of the economy are supposed to share the overall quota allocated. Sri Lanka fulfilled 80 per cent of the quota allocated in 1988. It is anticipated that if future performance exceeds the quota limit, the development of this sector will be jeopardised (Jayanthakumaran, 1995: 14). Willmore (1995: 530) indicates that without country specific quotas, a large part of the garment production of the Dominican Republic could relocate to China.

The 'Uruguay Round' negotiations agreed to phase reductions of MFA and to integrate all products in four phases ending in 2005. The first, three phases included products such as tops and yarns, fabrics, made-up textile products and clothing. During phase 1, each party would

integrate products from the specific list in the agreement, which accounted for not less than 18 per cent of 1990 imports from January 1995. During phase 2, each party would integrate products not less than 17 per cent of 1990 imports by January 1998. During phase 3, each party would integrate not less than 18 per cent of 1990 imports by January 2002. All remaining products would be integrated during phase 4 from 2005. Firms migrating for quota would come to an end by 2005. The growing fear is that, in the absence of guaranteed markets, firms may distance themself from a number of new and recently established EPZs.

The Uruguay Round negotiations further established that preferential incentives provided to EPZs, such as tax breaks and utility subsidies that were not applied nationwide, can be construed as export subsidies and subject to countervailing duties. Duty free imports and exports were not included at this stage. The least developed countries and countries with less than US $ 1000 per capita GNP are exempt from this ruling on prohibited subsidies. This indicates that some developing countries with EPZs may be subject to countervailing measures, in near future. Further, current trends towards restricting child workers and the exploitation of female workers in developing countries generate lower returns to the firms operating within EPZs.

VII. SUMMARY

Benefit-cost analyses applied by authors are consistent enough to compare. The results show some support for the hypothesis that the EPZs had a positive economic impact for the citizens of a host country. The major drawback of these studies is that conversion factors were assumed to be constant throughout the period of study. Our literature survey unambiguously shows that zones in South Korea, Malaysia, Sri Lanka, China and Indonesia are economically efficient and generated returns well above the estimated opportunity costs of these respective countries. The above zones have been an important source of employment in all cases and have promoted local

entrepreneurs in the cases of South Korea and Indonesia. The heavy infrastructure costs involved in setting up the zone in the Philippines resulted in negative net present value.

Domestic profits were an important source of benefit in Sri Lanka mainly because of greater domestic and joint venture structure in ownership. Warr (1989: 77) neglected domestic profits in the cases of South Korea, Malaysia, Indonesia and the Philippines for the reasons that domestic profits are difficult to quantify and unlikely to be very significant. Chen (1993: 267) integrated domestic profits in China and concluded that the impact was small in all but one year. The results do suggest that a heavy reliance on foreign investors is unlikely to maximise the welfare of citizens and that there should be a balance between domestic and foreign investment.

The effective utilisation of EPZs as instruments of industrialisation requires the availability of linkages with the rest of the economy. In the initial stage of development at least employment and income gains to labour seems to be important benefits, as wage rates on the EPZs generally exceed opportunity costs. This survey unambiguously reveals that the zones have provided an efficient means of absorbing surplus labour in the initial stages. However, as industrial development proceeds, the expectation is that the gap between market and opportunity cost narrow and the national interest in the EPZs tends to disappear. National interest may hold only if the zones generate private profit to domestic shareholders.

There is a strong correlation between the growth of EPZs and MFA in general. A growing number of firms migrated to obtain quotas originated by MFA. Export-oriented textiles, clothing and footwear industries have made significant contributions mostly in terms of generating employment and in some cases, especially in South Korea and Indonesia, promoted local entrepreneurs to access new markets. The WTO is currently involved with phase reduction of

MFAs, removal of the exploitation of child and female workers in developing countries and the removal of a number of incentives of EPZs. As noted, these policy measures will eventually result in lower rates of return and will be a possible threat to the existing and new EPZs.

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[1] Johansson and Nilsson included the following countries in their analysis; Dominican Republic, Egypt, Hong Kong, Malaysia, Mauritius, the Philippines, Singapore, South Korea, Sri Lanka and Tunisia. EPZs played a minor role in South Korea relative to overall economy.

[2] Summerfield (1995) argues that the appropriate shadow price of the labour involved is at or below the market wage regardless of whether the worker is male or female based on the evidences from Mexico and China. This was contrary to ILO's recommendation for incorporating a higher shadow price for women based on the fact that the young female workers would not have been in the labour force otherwise.

[3] Jayanthakumaran and Weiss (1997) estimated net profit (NP) using the following formula;

$$NP_t = a(EXP_t - IMP_t - DP_t - W_t - D_t - M_t)$$

where 'a' is the proportion of equity held by local shareholders,
EXP is export sales, IMP is import cost, DP is domestic purchase, W is wage cost, D is annual capital charge based on a capital recovery factor at current discount rate, and M is a managerial charge paid to foreign partners. In this expression D reflects the annual charge for the local equity contribution.

[4] The parameter is likely to be lower, if one assumes that all the women workers are drawn from the unemployed. However, it is likely that rural women are involved in some kinds of jobs domestically, which are mostly unaccounted for in the national accounts, and whose value is difficult to measure since there is no clear basis for identifying their contribution to the national economy. Considering the difficulties of measuring the actual CF for female workers from the economy, this sorts of study tests the sensitivity of the results to the use of the CFs assigning a range of values.

[5] Wilmore (1995: 530) found that wages were higher within EPZs in Dominican Republic compared to the factories producing behind the protection barriers.

[6] See Jayanthakumaran (1995) for Sri Lanka, Castro (1982) for the Philippines, Warr (1984:172) for South Korea and Summerfield (1989: 32-33) for China.

[7] In 1988, of the total firms 32 per cent were wholly foreign owned, 56 per cent were joint ventures and the rest were domestic firms. The sensitivity for the average labour CF was tested. The overall judgement on the relatively high economic returns to the zones is not affected by the alternative treatment of unskilled labour.