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# Export Processing Zones: Free Market Islands or Bridges to Structural Transformation?

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*Do export processing zones draw local manufacturers into world markets – and thereby engender broader market reform – by way of a 'demonstration effect'? The answer is likely (i) to be determined, not in the EPZ, but in the host country's national customs area, and (ii) to vary systematically with the size of the relevant market. While manufacturers from large economies are able to compete in world markets, and are therefore susceptible to the demonstration effect, their counterparts from small economies are unable to do so, and are therefore intractable. Thus, the nature of the EPZ life-cycle, like the legacy of import-substituting industrialisation, is in no small measure a function of market size.*

Export processing zones (EPZs) offer manufacturers who agree to export the whole of their output access to duty-free imports of capital and intermediate goods, abundant supplies of low-cost labour, and a wide variety of tax incentives. They thereby reconcile the otherwise conflicting interests of developing country officials, who need to generate jobs and foreign-exchange revenues, foreign manufacturers, who need to import essential inputs, and local manufacturers, who are unable to compete in world markets. In other words, EPZs are designed, not to expose local manufacturers to the vagaries of the world market, but 'to attract export-oriented light manufacturing firms and to shield domestic firms from competition' (Warr, 1990: 135; see also Balasubramanyam, 1988).

Consequently, the pace of EPZ construction is accelerating. While a study undertaken in 1987 on behalf of the International Labour Organisation identified approximately 175 EPZs in 53 countries (Kreye et al., 1987), a 1995 study cited by the Organisation for Economic Co-operation and Development identified approximately 500 EPZs in 73 countries (OECD, 1996a: 99; see also Madani, 1999: 5). According to well-informed observers, Cuba, Israel, Iran, the United Arab Emirates, and 'African nations from Tunisia in the north to Zimbabwe in the south' are embracing EPZs and their disproportionately foreign tenants (Weissman, 1996: 12; see also Romero, 1995; Madani, 1999).[1]

Nevertheless, the EPZ's role in the transition from an inward- to an outward-oriented development strategy remains controversial. While a number of analysts believe that EPZs offer their impoverished host country governments a gradual, 'two-

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1. The EPZs in Cuba, Israel, Iran, and the United Arab Emirates are described by *New Internationalist* (1998), Pollock (1994), Barraclough (1995), and Mervosh (1997) respectively.



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track' alternative to neoliberal 'shock therapy', and therefore welcome their growing popularity (Rodrik, 1999: 45-8; see also Romer, 1993), others believe that they offer an alternative to market reform *writ large,* and therefore counsel caution. For example, the World Bank worries that developing country governments will use their EPZs – and the exports and employment they engender – to 'muddle along without reforms', and therefore maintains that economy-wide trade liberalisation must be given priority over the establishment of isolated free market enclaves (World Bank, 1992a: 3).

Who is correct? Are export processing zones a means or an alternative to overarching structural transformation? This article hopes to answer the question by examining the consequences of EPZ development in comparative historical and quantitative cross-national perspective. First, it describes the EPZ 'life-cycle' identified by an earlier generation of observers. Second, data are drawn from South Korea, the Dominican Republic, and Mexico to explore cross-national differences in the life-cycle's timing and character. Third, quantitative data are used to attribute the cross-national variation identified, not only to cross-national variation in state capacity, but to cross-national variation in market size. While EPZs in large countries are likely to draw local investors and input suppliers into world markets and liberal political coalitions, their small country counterparts are likely to remain isolated, and are therefore particularly vulnerable to the perils of 'partial reform equilibrium' (see, for example, Hellman, 1998). Finally, the implications of the findings are explored for industrial transformation, not only in EPZ host countries, but in the Third World as a whole.

## The export processing zone life-cycle

The life-cycle approach to the investigation of Third World EPZs was introduced in a 1984 study undertaken on behalf of the OECD (Basile and Germidis, 1984: 61-2) and was formalised in a 1988 study undertaken by the United Nations Centre on Transnational Corporations and the ILO (UNCTC/ILO, 1988: 150-2; see also Killick, 1993; Chen, 1994, 1995). While the cycle's stages vary from account to account, the basic trajectory is consistent: the EPZ is expected to lure foreign investors, underscore the utility and feasibility of international competition, draw local manufacturers into world markets, and 'become superfluous with the creation of an industrial structure capable of developing independently' (Basile and Germidis, 1984: 61). In other words, the export processing zone is expected to give birth to a neoliberal coalition consisting of foreign investors, local exporters, and the entrepreneurs who supply their inputs, and the EPZ's expected role is therefore political as well as economic.

The advocates of this approach have advanced a number of bold claims on the EPZ's behalf. For example, Nicolas Jéquier has characterised the export processing zone as 'an important and rather painless instrument for facilitating the transition from an import-substitution-oriented economy to a more open export-oriented economy, and for adapting in a gradual way to the competitive pressures of TNCs' (Jéquier, 1988: 48). And the authors of the UNCTC/ILO report have noted that 'the "evolutionary" EPZ represents as important an innovation in terms of industrial policy, or indeed development policy, as was Friedrich List's conception of tariff barriers as a means of protecting the infant industries of the leading industrialising, or newly industrialising country of its time, namely Germany' (UNCTC/ILO, 1988: 155). Nor are they alone: Brian Berry, Edgar Conkling, and Michael Ray have characterised Mexico's

*maquiladora* programme as a 'precedent for free trade' (Berry et al., 1997: 424; see also Weintraub, 1990: 9-10; Sanderson, 1992: 174; Sklair, 1992a: 91, 1992b: 69; Castillo and Acosta, 1993, esp. 86-7; McKean and Fox, 1994: 11-12 and note 3; De Mateo. 1998: 200); and Helena Johansson believes that China's EPZs 'were envisaged as "prisons for capitalism" but turned out to be formidable greenhouses' (Johansson, 1994: 389; see also Johansson and Nilsson, 1997; Wall, 1993; Reardon, 1996).

Nevertheless, the export processing zone's contribution to the process of economic reform is notoriously difficult to assess, for the individual analyst will never know 'what would have happened without EPZs' (World Bank, 1992a: 17; see also UNCTC/ILO, 1988: 23). Was Mexico's Border Industrialization Program a necessary prelude to the North American Free Trade Agreement? Are China's 'special economic zones' opening the door to market reform? In short, do export processing zones – and their tenants and suppliers – call forth broader social, political, and economic transformations?

While a number of analysts have addressed the question by examining cross-national variation in EPZ administration, I address it by examining cross-national variation in the size of the domestic market, for the fate of a given country's reform effort will most likely be determined, not in the EPZ, where investment incentives are readily available and the demonstration effect is expected to originate, but in the national customs area, where the division of labour has been circumscribed by the size of the market and the demonstration effect is expected to take hold. In sum, I ascribe cross-national variation in the timing and nature of the EPZ life-cycle to cross-national variation in the consequences of import-substituting industrialisation, and I maintain that the latter variation is at least in part a consequence of variation in market size.

Neither claim is unreasonable. While the EPZ life-cycle is premised upon the maturation of host country infant industry, the demographic limits of import-substituting industrialisation are well-established (see, for example, Kuznets, 1960; Keesing, 1968, 1969; Hughes, 1984; Perkins and Syrquin, 1989; Killick, 1993; and Helleiner, 1996), and the small country's 'geriatric infants' (Lucas 1984: 1111) are therefore unlikely to offer inputs to export processing zones, exports to world markets, or aid and comfort to a neoliberal political coalition. On the contrary, they are likely to use the jobs and foreign-exchange revenues generated by the EPZ, as well as their own industrial frailty, to facilitate and justify the ongoing defence of the national customs area, and the EPZ may therefore impede, rather than facilitate, the small country's industrial transformation.

## Comparative historical analysis: South Korea and the Dominican Republic

The Republic of Korea and the Dominican Republic are not obvious candidates for comparison. South Korea's 47 million people share a per capita gross domestic product of $8,694. The Dominican Republic's 8 million people share a per capita GDP of $2,036.[2] South Korea plays host to a 'developmental state' (see, for example, Kohli, 1994; Evans, 1995). The Dominican Republic plays host to a 'predatory state' (see, for example, Lundahl and Vedovato, 1989; Pellerano, 1991; Itzigsohn, 2000). South Korea

2. Population and GDP data (1999) obtained from the World Bank at www.worldbank.org.

is the very archetype of a newly industrialising country, or 'NIC'. The Dominican Republic is the very archetype of a small, low-income country, or 'SLIC' (Killick, 1993).

Nevertheless, the two countries introduced their export processing zones – under the watchful eyes of government officials and private investors from the United States and Japan – approximately 30 years ago, when their per capita incomes were all but identical and their institutional characteristics were in flux, and their subsequent industrial development experiences offer an object lesson in the differences between the large country and small country EPZ life-cycles.[3] The Masan Free Export Zone (MAFEZ) was established by South Korean officials in 1970, and was originally characterised as a 'receptacle' for Japan's 'sunset' industries (Woo, 1991: 100-1). The Dominican Republic's first EPZ was set up by Gulf & Western of the Americas in 1969, and was originally used to defuse opposition to the conglomerate's growing presence in the south-eastern sugar city of La Romana (Frundt, 1979; Girault, 1981).[4]

What were the consequences of EPZ deployment? Table 1 presents data on the number of export processing zones, EPZ manufacturers, EPZ workers, and EPZ exports in South Korea and the Dominican Republic in 1980, and thereby reveals the EPZ's short-term contribution to each nation's development effort.

**Table 1: EPZ development, South Korea and Dominican Republic, c.1980**

| Country | No. of EPZs | No. of EPZ firms | No. of EPZ jobs | EPZ export value |
|---|---|---|---|---|
| South Korea | 2 | 100 | 34,000 | $628 m. |
| Dominican Republic | 3 | 75 | 18,000 | $100 m. |

*South Korea*: Data on the number of enterprises and workers are contained in Basile and Germidis (1984: 41, Table 9) and the World Bank (1992a: 32, Table A.3; number of workers interpolated). Data on exports are drawn from Basile and Germidis (1984: 55, Table 18) and refer only to the Masan zone. While 1980 data for the second EPZ, Iri, are unavailable, Basile and Germidis present data suggesting that in 1980 Iri played host to no more than 10% of the manufacturers and 5% of the investment located in Korean EPZs (41, Table 9). Hence, the overall export figure is unlikely to be inflated dramatically by the inclusion of Iri's output.
*Dominican Republic*: Data on the first two variables can be found in Dauhajre et al., (1989: 194, Tabla 38; 195, Tabla 39). Data on EPZ exports were obtained from the National Council of Free Zones.

While the export processing zones at Masan and La Romana generated foreign investment, created new jobs, and opened the door to the establishment of additional EPZs elsewhere in their respective host countries, their contributions were anything but identical, for the authorities in Seoul, unlike their counterparts in Santo Domingo, used

3. In 1969, South Korea's per capita GDP was $518 and the Dominican Republic's $519. The GDP figures I have used measure the real GDP per capita in current prices at purchasing power parity and are available from the Penn World Tables Mark V.6 (National Bureau of Economic Research at www.nber.org).
4. The Republic of Korea's Masan Free Export Processing Zone was established under the Free Export Processing Zone Law, passed on 1 January 1970; it became operational in late 1970 and 1971. The Dominican Republic's zone at La Romana was originally sheltered under Category A of the Industrial Incentive and Promotion Law (Law 299), passed in 1968; it became operational in 1969 and 1970.

'a process of constant integration' to transform their EPZs into expansive markets for locally manufactured capital and intermediate goods, and thereby captured an ever-growing proportion of the value added to each export (Basile and Germidis, 1984: 48; see also Lee, 1999).

> Between 1971 and 1979, local value added as a percentage of export value rose from 28 to 52 per cent and, over the same period, the foreign raw material share of export value fell from 64 to 46 per cent, while the local raw material share of value added rose from 6 to 47 per cent and that of wages paid fell by 66 per cent. In 1980, almost 35 per cent of the total consumption of light equipment and components by firms established in FEPZs [free export processing zones] was obtained locally from Korean firms, generally by sub-contracting (Basile and Germidis, 1984: 48).

In fact, the Korean EPZs and their tenants purchased almost $200 million worth of locally manufactured capital and intermediate goods per month in the late 1980s (UNCTC, 1991: 342), and the United Nations Centre on Transnational Corporations therefore predicted that the zones would 'gradually become indistinguishable from the rest of the country – which is, after all, their final (implicit or explicit) goal' (ibid.: 332).

Unfortunately, the Dominican Republic has been unable to follow South Korea's lead. While a study undertaken in 1989 on behalf of the United States Agency for International Development revealed that the country's 200 export manufacturers were purchasing 'almost nothing from the local economy' (ISTI, 1989: 1), the World Trade Organisation's recent *Trade Policy Review* implies that little has changed. The Dominican Republic currently plays host to more than 40 export processing zones, but their 'vertical integration and linkages with the rest of the economy are still weak' (WTO, 1996: 77), and the National Council of Free Zones (CNZF) suggests that their 500 tenants purchase no more than 0.01% of their material inputs in the national customs area.[5]

In other words, Korea's EPZs have inspired a demonstration effect, and have therefore been 'absorbed into the domestic economy' (Basile and Germidis, 1984: 54), but those of the Dominican Republic have inspired neither backward linkages nor economic reforms, and have therefore given birth to uncertainty. Why have the two countries engendered two distinct EPZ life-cycles? The World Bank celebrates the willingness of the Korean government – and castigates the failure of the Dominican Republic's government – to extend 'equal-footing policies to firms outside EPZs', thereby implying that duty-free imports of capital and intermediate goods would have transformed the latter country's feeble import-competing manufacturers into producers of internationally competitive capital and intermediate goods (World Bank, 1992a: 20-21; see also Jenkins et al., 1998: 45-6).[6] But the World Bank's answer merely begs a

5. Indeed, the CNZF's 1998 Annual Report notes that the Dominican Republic's EPZs imported US$2,439 m. worth of capital and intermediate goods in 1997 and suggests that they purchased more than DR$200 m. (approximately US$13 m.) worth of goods locally. One wonders whether the use of inconsistent currency units reflects carelessness or deliberate obfuscation (see CNZF, 1999: 64).

6. An 'equal-footing' policy extends the privileges and rewards of EPZ status to non-EPZ subcontractors and suppliers. The World Bank illustrates the importance of equal footing with an example: 'a local synthetic-fiber fabric weaving mill cannot compete with a foreign supplier of fabric to EPZ garment makers if it is

broader question: Why are Dominican officials unwilling or unable to reform the law? After all, the advantages of equal footing are not unknown in the Western hemisphere, and the physical and institutional diffusion of EPZs was expected to advance – rather than stymie – the cause of neoliberal economic reform.

Why would rational officials reject 'developmentally nutritious' (Helleiner, 1990: 889) reforms? The answer is readily found in the fate of the Industrial Linkages Program, a USAID effort to encourage backward linkages from the Dominican Republic's EPZs in the late 1980s and 1990s. While feasibility studies undertaken on the agency's behalf revealed abundant EPZ demand for textiles, precision plastic parts, metal stamping, machine shops, and tool, mould, and die making, they simultaneously elucidated a number of obstacles to their provision, including, but by no means limited to, the country's backward tariff regime (ISTI, 1988, 1989; Ecocaribe, 1992).

First, the relevant sectors frequently did not exist, for the Dominican Republic had never made significant inroads into secondary import-substituting industrialisation (i.e., the manufacture of capital and intermediate goods). Second, the extant sectors generally failed to meet world market standards for price, quality, and delivery terms, or could not meet the level of demand required by the EPZs. And, third, the existing manufacturers frequently had no interest in supplying the EPZs, for they 'appeared perfectly satisfied with the present level of their operations and not particularly eager to disturb their comfortable profit situation by attempting to expand into new markets and assume new risks' (ISTI, 1989: 8). As a result, the latent reformist coalition was decidedly more latent than reformist, the private sector failed to back up the US effort, and by 1993, the year of the programme's cancellation, the North American officials had fallen far short of their original goal.[7]

In sum, one can understand neither South Korea's achievements nor the Dominican Republic's failure without first asking why the former country's tariffs and quotas gave birth to a number of internationally competitive industries capable of supplying world market-oriented manufacturers and the latter country's tariffs and quotas gave birth to rent-seeking industrialists and low quality production. The conventional answer points towards their states' admittedly differentiated capacities, i.e., South Korea's 'forward-looking' technocrats and the Dominican Republic's 'predatory' bureaucracy, and thereby merely begs the question.[8]

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not allowed to import the necessary yarn or fiber duty-free' (World Bank, 1992a: 40, note 28). While the Dominican Republic has equal-footing legislation on the books, efficient utilisation of the legislation has frequently been circumscribed by an over-aggressive, and not infrequently corrupt, customs service.

7. The designers of the Industrial Linkages Program originally expected 40 local manufacturers to develop supply networks in the EPZs and thereby to generate $80 m. worth of linkage (i.e., goods and services transferred from the customs area to the EPZs), but the 'end-of-project' status report reveals no more than 12 local suppliers and highlights $4 m. worth of linkage (USAID, 1993: II-4). Furthermore, the occasional successful linkage was not to the 'developmentally nutritious' (Helleiner, 1990: 889) precision plastics or machine tool sector, but to the low value-added cardboard box factory or rubber band manufacturer (Ecocaribe, 1992).
8. The analysts who attribute South Korean development to relatively autonomous, far-sighted technocrats include Amsden (1989), Haggard (1991), and Evans (1995). Nevertheless, the ongoing debate surrounding the historical roots of Korea's 'developmental state' serves to highlight the South Korean government's decidedly predatory origins (see Woo, 1991; Kohli, 1994; Haggard et al., 1997; Kohli, 1997), generalised subservience to the demands of large-scale capital (Woo, 1991, especially 111), and ongoing corruption (Rodrik, 1994). On the Dominican Republic's 'predatory' state, see Lundahl and Vedovato (1989) and Moya Pons (1992). More general comparisons of East Asian and Latin American governments,

I have therefore introduced a heretofore omitted variable: the relative size of each nation's domestic market. On the one hand, South Korea's extensive demographic base and egalitarian income distribution offered manufacturers the scale and external economies they would need to expand and the 'fierce competition' they would need to mature (Lee, 1997: 1278), and gave public officials the leverage they would need to 'discipline' (Amsden, 1989) local and transnational enterprises.[9] On the other hand, the Dominican Republic's circumscribed population and skewed income distribution limited economies of scale and scope, undercut efficiency-enhancing competition, compromised the bargaining leverage of the public sector *vis-à-vis* foreign corporations and governments, and all but guaranteed the persistence of inefficient rent-seeking.[10] As a result, while Korea's manufacturers reconciled themselves to economic reform and international integration, their Caribbean counterparts remained intransigent – and either opposed, stymied, or circumvented the introduction of free market economic reforms (Mendez, 1993; Espinal, 1996; Schrank, 2000).

## Mexico as a 'critical test'

The international donor community ascribes cross-national variation in the timing and nature of the EPZ life-cycle to cross-national variation in economic governance. While I believe that South Korea's industrial evolution and the Dominican Republic's industrial inertia are mirror images of the demographically circumscribed legacy of import-substituting industrialisation, and therefore call the conventional wisdom into question, I recognise that Korea was better governed as well as larger than the Dominican Republic and that the ultimate resolution of the debate must therefore await the discovery of a large EPZ host country which has not reaped the rewards of a previously established 'developmental' state. To my mind, Mexico seems to provide the obvious test case, for the Border Industrialization Program (BIP) of the Diaz Ordaz government gave birth to a series of geographically circumscribed free trade areas along the US frontier in 1965, and the term 'export processing zone' has evoked images of low-paid Mexican workers slaving away in dimly lit, poorly ventilated *maquiladoras* ever since (Sklair, 1989; see also Dillon, 2001).

While the conventional portrait contains an element of truth, it at the same time overlooks two central factors in the *maquiladora* sector's ongoing transformation. First, in 1972 the Mexican government extended the BIP's incentives to export-oriented enterprises located beyond the northern frontier, and by 1980 approximately 70 *maquiladoras*, more than 10% of the total, were located in the country's interior – many in the Central Valley, the heart of Mexico's traditionally regnant import-substituting industrial sector (see CEPAL, 1996: Cuadro 16, 163-4; see also Harris, 1986: Chapter 3; Wilson, 1992). Second, in the 1980s the radical overhaul of the North American manufacturing economy – especially the automobile, electronics, and sewn products

development strategies, and economic outcomes are contained in Harris (1986), Evans (1987), Haggard (1991), and the volume edited by Gereffi and Wyman (1990).

9. The relationships between economies of scale and scope and South Korean industrialisation are outlined by Amsden (1989) and Woo (1991). Grabowski (1994) offers a broader theoretical inquiry into the relationship between market size and economic reform.
10. The relationship between the small scale of Dominican enterprise and the absence of linkages between the ISI and EPZ sectors is noted by ISTI (1989).

sectors – carried a steady flow of organisationally mature and technologically sophisticated investment south of the border (CEPAL, 1996: 13-14; see also Gereffi, 1996). As a result, by the late 1980s the *maquila* sector had become geographically expansive, economically diverse, and politically powerful, and the Mexican government was beginning to 'integrate the industry into the national economy' (WTO, 1993: 124).

The primary locus of integration was the Mexican interior, where nearly 500 export-oriented manufacturers – approximately 25% of the total – currently add value to a growing quantity of indigenous raw materials and locally manufactured intermediate goods (CEPAL, 1996: Cuadro 17, 165-6; see also Wilson, 1992; Castillo and Acosta, 1993; MacLachlan and Aguilar, 1998). In fact, by 1993 the interior's share of *maquiladora* employment was approaching 30%, and the region's relative contribution to 'indirect' *maquiladora* exports – i.e., local material inputs sold to *maquiladora* manufacturers – was much greater (CEPAL, 1996: Cuadro 3, 140-1). While the *maquiladoras* have traditionally purchased no more than 3% of their overall material inputs from Mexican sources, 'the maquiladoras of Mexico's three largest metropolitan centers, Mexico City, Guadalajara, and Monterrey, procured 31, 16, and 10.5% of their inputs respectively from domestic sources' (MacLachlan and Aguilar, 1998: 327).

Why are the newer, interior *maquiladoras* better integrated into Mexico's industrial structure than their older, borderland counterparts? According to Patricia Wilson, whose comprehensive inquiry into the 'new maquiladoras' (Wilson, 1992) remains the definitive work on the subject, the answer lies neither in the Border Industrialization Program *per se,* nor in transportation cost differentials, but in the interior's industrial heritage, for 'local producers, as they become maquiladoras, continue to use some of their local supplier networks for inputs. In contrast, foreign-owned and initiated maquiladoras, like those that typify the border region, continue on the whole to rely almost exclusively on imported inputs' (Wilson, 1992: 94; see also CEPAL, 1996: 66; Miramontes Zepeda, 1992: 46; MacLachlan and Aguilar, 1998: 327).

Is Wilson correct? Table 2 underscores her principal empirical finding with sectorally and regionally disaggregated data on the origins of the inputs used by Mexico's *maquiladoras*. While the frontier's exporters remain disproportionately dependent upon foreign inputs, their counterparts in the interior purchase a greater proportion of their material and non-material inputs at home *regardless of their sector of origin.*

The implications are of undeniable import, for the interior's achievements counsel a revisionist interpretation, not only of Mexico's post-World War II industrialisation experience, but of the North American Free Trade Agreement (NAFTA) and Mexico's ongoing efforts at market reform. After all, NAFTA's sudden and widespread acceptance has frequently – if by no means universally – been attributed to the 'demonstration effect' of the Border Industrialization Program (McKean and Fox, 1994: 11-12 and note 3), but the Caribbean experience suggests that the effect is predicated upon the emergence of potential exporters in the national customs area. While the Dominican Republic's sharply circumscribed market rendered rent-seeking incompatible with infant industry maturation, and thereby prevented the emergence of competitive manufacturing and a neoliberal coalition, Mexico's expansive market permitted dynamism as well as misallocation, and thereby called forth a trade agreement which has effectively eliminated the *maquiladora* sector's unique status and allowed

manufacturers along the frontier 'to become more integrated into the Mexican economy' (OECD, 1996b: 63; see also Lindquist, 2001).[11]

**Table 2: National inputs as a percentage of total inputs into Mexican *maquiladora* exports by sector and region, c. 1993**

| Sector | Total inputs | Frontier | Interior |
|---|---|---|---|
| Food | 56.5 | 33.3 | 86.6 |
| Clothing | 10.2 | 6.1 | 15.0 |
| Footwear and leather products | 18.7 | 10.9 | 45.9 |
| Furniture | 13.3 | 10.6 | 54.7 |
| Transport materials and equipment | 8.0 | 6.7 | 12.1 |
| Electrical machinery | 7.2 | 5.0 | 17.2 |
| Electronic accessories and components | 5.6 | 4.9 | 11.8 |
| Toys and sporting goods | 16.2 | 15.2 | 82.3 |

Note: 'Total inputs' include the percentage of each sector's material and non-material inputs originating from within Mexico. 'Frontier' includes the percentage of each sector's material and non-material inputs originating from within Mexico, but only for *maquiladoras* located in the northern border region. 'Interior' includes the percentage of each sector's material and non-material inputs originating from within Mexico, but only for *maquiladoras* located beyond the northern border region, i.e., in the interior of the country.
Source: adapted from CEPAL (1996: 68).

In sum, Mexico's bifurcated *maquiladora* sector provides a natural experiment in the consequences of EPZ development. While EPZs remain isolated enclaves in small markets, or where import-substituting industrialisation has proved incompatible with broader industrial development, they inspire backward linkages and demonstration effects in large markets, or where ISI has engendered at least a modicum of infant industry maturation. The generality of the large country advantage is illustrated by Table 3, for the proportion of local value added to EPZ exports (i.e., the gross value of EPZ exports less the value of imported inputs) is apparently a positive function of population, i.e., market size.[12] In fact, the Spearman rank correlation coefficient

11. The foregoing arguments are broadly compatible with revisionist accounts of Mexican ISI advanced by Jaime Ros (1994a, 1994b) and common interpretations of NAFTA's origins (e.g., Pastor and Wise, 1994; Gibson, 1997; Schneider, 1997; Thacker, 1999). According to Ros, the relatively low-cost 'transition towards a liberalized trade regime' was the product, not of the Border Industrialization Program's demonstration effect, but of 'Mexico's successful import-substitution experience in the past – in the sense that this strategy effectively modified the economy's pattern of comparative advantages in favour of manufacturing and the initially infant industries – a feature manifested in the fact that current trends in the trade pattern and industrial structure are with no major exceptions an extrapolation of the past' (1994a: 209).
12. Population is a common proxy for market size. Net exports are a commonly used indicator of backward linkage. Unfortunately, net export data are not readily available for the entire worldwide population of EPZ host countries. I have incorporated figures from a variety of sources in an effort to paint as complete a picture of the contemporary EPZ population as possible. N.B.: The association is intensified slightly by the substitution of GDP for population as a measure of market size. See Perkins and Syrquin (1989) for a discussion of the measurement of market size.

between net exports and population is approximately 0.6 and is statistically significant at the conventional 0.05 cut-off level.[13]

**Table 3: Net EPZ exports by population, c.1990**

| Country | Population | Net exports | Country | Population | Net exports |
|---|---|---|---|---|---|
| India | 849.5 | 40-50% (1980s) | Dominican Republic | 7.1 | 22% (1998) |
| Indonesia | 178.2 | 53% (1996) | El Salvador | 5.2 | 28% (1996) |
| Bangladesh | 106.7 | 20% (1995-6) | Honduras | 5.1 | 29% (1995) |
| Philippines | 61.5 | 42% (1994) | Jordan | 3.2 | 22% (1996) |
| Korea | 42.8 | 51% (1992) | Costa Rica | 2.8 | 26% (1996) |
| Taiwan | 20.4 | 45% (1992) | Jamaica | 2.4 | 12% (1996) |

Note: Population in millions (World Bank, 1992b and Penn World Tables Mark V.6 available from the National Bureau of Economic Research at www.nber.org). Net exports: Indonesia, Bangladesh, Philippines, Jamaica and Jordan calculated on the basis of Madani (1999, Table 4); India obtained from UNCTC/ILO (1988: 45) and Jenkins et al. (1998: 10 and 41); Korea and Taiwan from World Bank (1992a: 15); Dominican Republic calculated on the basis of Consejo Nacional de Zonas Francas (1999: 15); and approximations for El Salvador, Honduras, and Costa Rica derived from Jenkins et al. (1998: 41-2).

The principal exception to the rule is a relative newcomer to the world of export processing, Bangladesh, where 'the ratio of net to gross exports has improved since the mid-1980s (from an average of 11 percent in the second half of the 1980s to an average of 20 percent in the first half of the 1990s)' (Madani, 1999: 24; see also ILO, 1998: 6-7).

Nevertheless, the simple correlation coefficient does nothing to control for the effects of the EPZ life-cycle or the quality of market governance, and I therefore conclude my substantive analysis with elementary multivariate techniques.

## Multivariate cross-national analysis

Is the export processing zone an inherently *transitional* policy instrument, or does it hold out the prospect of a sub-optimal partial reform equilibrium? While conflicting definitions and inadequate measures tend to impede a rigorous quantitative evaluation of the life-cycle's generality and nature, the data summarised in Table 4 should allow us to undertake a preliminary analysis. The table presents 1990 EPZ employment data, as well as data on the number of residents employed in industry, for each of the 20 countries for which the World Bank has published consistently defined data. Not included in the table, but easily calculated, is a variant of a commonly used indicator of

13. I interpolated the value of India's net exports in order to calculate the correlation coefficent. N.B.: Selection bias tends to flatten, rather than elevate, the slope of a correlation in the bivariate case, and the aforementioned association is therefore unlikely to be a result of sample selection bias. See Heckman (1990: 208).

the EPZ's relative importance in the national economy: the ratio of EPZ employment to overall industrial employment by country (UNCTC/ILO, 1988: 20-1; see also Jéquier, 1988: 46; Basile and Germidis, 1984: Table 12; UNCTAD, 1985: Table 5; Jenkins et al., 1998: Tables 5-8; Madani, 1999: Table 6).

**Table 4: EPZ employment and industrial employment, 20 countries, c. 1990**

| Country | EPZ employment | Industrial employment | Country | EPZ employment | Industrial employment |
|---|---|---|---|---|---|
| India | 30,000 | 6,245,000 | Sri Lanka | 55,000 | 236,760 |
| Indonesia | 50,000 | 2,259,200 | Guatemala | 89,000 | 103,300 |
| Pakistan | 2,000 | 4,100,000 | Senegal | 1,200 | 20,188 |
| Bangladesh | 7,000 | 13,100,000 | Dom. Rep. | 115,000 | 157,576 |
| Philippines | 35,400 | 1,580,000 | El Salvador | 3,500 | 50,100 |
| Thailand | 12,000 | 2,191,800 | Honduras | 3,000 | 172,000 |
| S. Korea | 20,300 | 4,198,000 | Costa Rica | 6,000 | 137,420 |
| Colombia | 7,000 | 488,880 | Jamaica | 15,000 | 136,100 |
| Taiwan | 70,700 | 3,420,000 | Trinidad | 400 | 32,800 |
| Malaysia | 98,900 | 841,800 | St Lucia | 1,500 | 17,700 |

Data: See Table 5 for description of data sources.

While the natural logarithm of the aforementioned ratio provides a serviceable indicator of a host country's degree of dependence upon export processing zones, i.e., an 'EPZ dependency index', the indicator's availability is circumscribed by the lack of longitudinal data on EPZ employment. Nevertheless, the three independent variables under consideration – the EPZ life-cycle, the size of the local market, and the quality of economic governance – generate theoretically clear and empirically observable cross-sectional implications, and they are therefore susceptible to the following quantitative evaluations.

(i) *The Life-cycle Hypothesis*. The life-cycle hypothesis suggests that the proportion of a country's industrial labour force working in the export processing sector should grow until the sector is integrated into the national productive structure. The life-cycle hypothesis is therefore susceptible to a quadratic regression model, with the age of the EPZ sector (i.e., the number of years between the inauguration of the country's EPZ project and 1990) and the squared value of the age of the EPZ sector (i.e., the quadratic term) on the right-hand side. While polynomial models do not yield readily interpretable individual regression coefficients or t statistics, the life-cycle hypothesis would be vindicated by a positive coefficient on the age term and a negative coefficient on the quadratic term.

(ii) *The Market Size Hypothesis*. The market size hypothesis suggests that, *ceteris paribus,* the proportion of a country's industrial labour force working in the export processing sector will be inversely related to the size of the local market. On the

one hand, the large market's EPZs are expected to stimulate backward linkages to the national customs area, where import-substituting industrialisation has already established a firm industrial foundation, and to thereby augment the dependent variable's denominator, i.e., the number of workers in the non-EPZ industrial sector. On the other hand, the small country's EPZs are expected to remain isolated from the customs area, where ISI has engendered nothing but inefficiency, and to thereby grow at the expense of national industry.

(iii) *The Quality of Governance Hypothesis*. The quality of governance hypothesis suggests that the proportion of a country's industrial labour force working in the export processing sector is inversely related to the quality of governance. While capable public sector officials have access to a wide variety of liberalisation measures, including duty drawbacks, bonded warehouses, and overarching market reform, their ineffective counterparts have no alternative to the EPZ. Thus, the international donor community expects EPZ dependence to remain high in 'constrained environments' (Louis Berger International, Inc., 1989: 50-51; see also World Bank, 1992a: 21).

Table 5 offers a brief summary of the variables and data sources used – and predictions evaluated – in the following regressions. Unfortunately, the quality of governance indicator was unavailable for St Lucia and the full model is therefore based upon 19 rather than 20 observations.

**Table 5: Variables, data sources, and hypothesised relationships**

| Variable | Indicator | Data sources | Expected sign |
|---|---|---|---|
| EPZ dependency index | Natural logarithm of the ratio of EPZ to non-EPZ industrial employment for each country c.1990 | World Bank (1992a); ILO (1994: Table 5A); USDOL (various years); Banco Central de Honduras (1992: Cuadro 63); Dauhajre et al., (1989: 195, Tabla 39); Government of Pakistan (1992: 131, Table 11.5) | |
| EPZ life-cycle | Age of each country's oldest EPZ in 1990 plus a quadratic term (i.e., 'age squared') | World Bank (1992a: Table A3); Willmore (1996: 5 and 8 for St Lucia and Trinidad) | Age: + $Age^2$: - |
| Market size | Natural logarithm of population or GDP for each country in 1990 | World Bank (1992b: 218-9, Table 1; 222-3, Table 3; 285, Box A.1); Penn World Tables Mark V.6. | - |
| Quality of governance | Index of 'government effectiveness' | Kaufmann et al. (1999) | - |

Table 6 presents the results of six ordinary least squares (OLS) regression equations; unstandardised regression coefficients are presented together with their parenthesised t statistics. The baseline model (Model 1) treats the EPZ dependency index as a function of the age of each country's EPZ project in 1990 and age squared. While the relationship between the dependency index and the age of the EPZ project is

appropriately concave, as predicted by the life-cycle hypothesis, the model's explanatory power ($R^2$ = .14) is quite weak, and the natural logarithm of the 1990 population is therefore added as a proxy for the size of the market in Model 2 and the natural logarithm of the 1990 gross domestic product as a proxy for the size of the market in Model 3.

## Table 6: Regression analysis

| Variable | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
|---|---|---|---|---|---|---|
| Age | .318 | .367 | .280 | .360 | .358 | .317 |
| | (1.33) | (1.91)# | (1.37) | (1.37) | (1.89) # | (1.56) |
| $Age^2$ | -.008 | -.008 | -.005 | -.010 | -.006 | -.005 |
| | (-1.12) | (-1.34) | (-0.74) | (-1.07) | (-1.04) | (-0.70) |
| Population | | -.603 | | | -.895 | |
| (ln) | | (-3.26)* | | | (-3.89) * | |
| GDP (ln) | | | -.618 | | | -.950 |
| | | | (-2.73) * | | | (-3.39)* |
| Governance | | | | .488 | -.370 | .660 |
| | | | | (.520) | (-.523) | (.916) |
| Constant | -6.47 | -5.37 | -0.66 | -6.59 | -4.828 | 2.175 |
| | (-3.62) | (-3.66) | (-0.25) | (-3.47) | (-3.36) | (.073) |
| N | 20 | 20 | 20 | 19 | 19 | 19 |
| $R^2$ | .14 | .48 | .41 | .15 | .59 | .53 |

# p < .10; + p < .05; * p < .025 Unstandardised regression coefficients are presented together with their parenthesised t statistics.

What are the implications for the market size hypothesis? The choice of proxy is irrelevant: the relationship between the degree of dependence upon EPZs and the size of the host country's market is invariably negative, pronounced, and statistically significant. In fact, the standardised regression coefficients (not presented in the table) suggest that a 1 standard deviation increase in the size of a country's market is associated with a 0.5 standard deviation decline in the dependency index, regardless of life-cycle stage or measure of market size.[14] Nor is the association a mere artefact of small country trade dependence, for the inclusion of a number of control variables, including the ratio of exports to GDP, failed to undermine the significance of the individual market size coefficents.[15]

Nevertheless, the international donor community attributes cross-national variation in the nature of EPZ dependence to variation in the quality of economic policy-making. A measure of 'economic governance' is therefore incorporated into Models 4, 5, and 6. While Model 4 includes the governance measure without a measure of market size, Models 5 and 6 incorporate both the governance measure and the two distinct measures of market size: the natural logarithms of population and GDP. The results are robust against every possible specification. The governance measure generates weak and

14. N.B.: The EPZ age variable serves as a useful control for the effect of time and thereby enhances the credibility of the remaining cross-sectional results (see Lieberson and Hansen, 1974: 539).

15. Results available from the author upon request.

inconsistent regression coefficients, and the market size indicators retain their statistical and substantive potency. I am therefore confident that, *ceteris paribus,* small countries are more dependent upon EPZs than their larger counterparts.

## Conclusion

The market transformations under way in the contemporary Third World are not all of a piece. While the large, newly industrialising countries have been able to build upon the achievements of import-substituting industrialisation, and have therefore entered world markets from a position of relative strength (see, for example, Evans, 1995; Amsden, 2001), their less prosperous counterparts have been left to deal with the failures of ISI, and have therefore used EPZs to 'avoid the disruptive effects which usually accompany the sudden arrival of technologically more advanced foreign firms, while at the same time allowing a gradual acclimatization of foreign firms and local enterprises to one another (notably with the help of joint ventures within the EPZ)' (Jéquier, 1988: 48; see also Killick, 1993: 239). Nevertheless, the world's most successful export processing zones have been established in the newly industrialising countries, and their achievements are unlikely to be replicated in the Third World's less prosperous environs. After all, the prospects for technology transfer, backward linkage, and a virtuous circle of export upgrading and economic reform depend, not upon the attitudes and capacities of foreign investors in the free zones, but upon the attitudes and capacities of local manufacturers in the customs area – who are, not coincidentally, the problem in the first place.

Why are small countries unlikely to replicate the large country EPZ life-cycle? On the one hand, small country manufacturers are rarely large enough or mature enough to provide direct or indirect exports, and they are therefore unlikely to offer attractive joint venture or alliance partners. On the other hand, manufacturers who have no hope of prospering in world markets are unlikely to join a reformist political coalition and, on the contrary, are likely to use the jobs and foreign-exchange earnings generated by the EPZ to justify the maintenance of tariff and non-tariff barriers, and to thereby slow the pace of broader market reform.[16] Of course, the foregoing arguments do not necessarily undermine the case for the EPZ in small, low-income countries. The less fortunate developing countries are in dire social and economic circumstances, and EPZs are able to provide desperately needed jobs and foreign-exchange revenues. They are unable, however, to transform feeble manufacturers into world market-oriented firms, and they are therefore unlikely to draw the small country on to a large country growth trajectory.

In sum, the options available to developing country governments are strongly conditioned – albeit not determined – by the demographically and economically circumscribed legacy of import-substituting industrialisation. While large and small countries are able to reap rewards from EPZs, they are unlikely to reap the same rewards, and the institution's costs and benefits must be assessed accordingly.

16. Carlos Despradel, the former governor of the Dominican Republic's central bank, attributes the country's failure to adopt an outward-oriented development model to the safety valve provided by the EPZs, tourism, and overseas remittances (1994: 12).

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