7. Trade and Competitiveness Aspects of Environmental and Labor Standards in East Asia

Keith E. Maskus, World Bank and University of Colorado at Boulder[†]

Rapid economic growth is often blamed for widespread deterioration of the natural environment in East Asian economies through deforestation, urbanization, and industrialization. Put differently, it is claimed that domestic and multinational companies gain a competitive advantage from the willingness of public authorities to permit environmental resources to be used indiscriminately or without charge. Similarly, it is claimed that a permissive government attitude toward the protection of workers' rights permits firms to suppress wages and working conditions, generating a cost advantage on the labor side. A particular concern is that labor and environmental standards may have been weakened in the aftermath of the Asian crisis or because of additional trade liberalization in the late 1990s and that this has boosted exports since the crisis. Poor environmental stewardship and a failure to support at least core labor rights raise issues of human rights, health maintenance, educational attainment, and sustainability.

This chapter reviews theoretical and empirical analysis to help clarify these issues. Three competing hypotheses are influential in the literature. One is that foreign direct investment and trade respond at least in part to country standards. If weak environmental and labor standards provide cost advantages that attract domestic and foreign firms to locate in areas with weak standards, they may stimulate growth in exports. If weak or ineffective standards are an important spur to competitiveness and export growth, and firms at least implicitly demand such weakness through their location decisions, governments may compete to offer low standards in a "race to the bottom.. Now that many countries have significantly reduced their tariffs and other border restraints on trade, standards that raise costs have presumably increased their influence on trade.

An alternative hypothesis is that exceptionally weak environmental and labor standards restrain economic competitiveness, exports, and growth.[1] Unchecked or untreated discharges of chemicals into water supplies can harm agricultural production and limit workers' health status and productivity. Widespread reliance on child labor limits educational enrollments and the development of labor skills, and potentially restricts both the modernization of the output mix and growth rates. To the extent that firms require high productivity, low absenteeism, and clean resources, weak standards can deter investment and restrict exports. In this view, competitiveness flows more readily from higher social protection than from lower.

Both these hypotheses suggest that competitiveness, trade, and FDI depend on the cost impacts of environmental and labor protection regulations (and their enforcement). A third

[†]The author is grateful to Professor Kanemi Ban for helpful comments at the workshop at the World Bank Tokyo office.

[1] This can happen directly if, for example, a failure to approve collective bargaining by workers permits monopsony employers in particular regions to restrain wages and output. Martin and Maskus (2001).

claim reverses this causation, arguing that the optimal standards for a country depend on factor endowments, development levels, technology, and national preferences.[2] In this context, regulations are endogenous to changes in openness to trade and FDI. Openness may either worsen or improve the natural environment, depending on prevailing conditions, but to the extent that openness raises incomes, demand for stronger environmental protection may be expected to rise. Similar comments apply to rules on the protection of workers. Both of these processes have been observed in recent decades in Japan, Korea, Taiwan, and Singapore as development proceeded, in part because of export-led growth.

These hypotheses cannot be conclusively tested. One reason is that the relationships between labor standards or environmental standards, on the one hand, and international trade, on the other hand, are complex and involve causality in both directions. Another reason is that it is difficult with available information to capture the subtleties of labor rights or environmental conditions for statistical analysis. Even so, by reviewing the balance of evidence it is possible to draw useful guidelines for policy. The following section considers general issues in the area of labor standards and trade, followed by a discussion of the situation in East Asian nations. The next sections repeat this structure for environmental regulation, followed by a review of environmental protection issues arising in the Doha round of multilateral trade negotiations. A concluding section offers policy recommendations.

Labor standards: Background and institutions

The literature on relationships between labor market regulations and international competition is huge, reflecting the complexity of the subject.[3] This section summarizes key institutional questions and available evidence.

Numerous kinds of regulations provide workers with rights in labor markets:

- *Basic rights* comprise prohibition of slavery and physical coercion, elimination of discrimination, and a ban on exploitative use of child labor.
- *Civic rights* include freedom of association, collective bargaining, and expression of grievances. Together these provisions constitute the so-called core labor standards (CLS), which embody principles that are supposed to be universally respected as a matter of human rights.[4]
- *Survival rights* provide for a living wage or minimum wage, limited hours of work, information about working conditions and job hazards, protection from occupational hazards, and compensation for employment-related accidents.
- *Security rights* include protection against arbitrary firing, rights to severance payments, and access to health and retirement benefits and survivors' compensation.

[2] Anderson (1996); Antweiler et al. (2001).
[3] For extensive reviews see OECD (2000, 1996), Elliott (2001), and Maskus (1997).
[4] The right to strike is not generally considered a CLS.

These various rights are granted by governments to workers through regulations on employer practices.[5] Such regulations vary considerably across countries, and even within countries.

An important distinction may be made between CLS and other rights. To a considerable degree, CLS may be interpreted as policies buttressing the basic freedoms in the workplace. Eliminating coercive forms of labor and discrimination gives workers and firms wider choices, removing costly distortions in labor markets,[6] while recognizing the rights of workers to associate freely and engage in collective bargaining allows worker groups to counter the distortionary impacts of single employers. In contrast, survival rights and security rights award workers benefits that might not otherwise emerge in competitive labor markets. But they also raise the costs and reduce the flexibility of firms, and as the strength of such mandates rises, the competitiveness of firms may fall.[7]

As well as regulating employers' practices, governments may directly support workers through public services—both social safety net programs, including temporary unemployment compensation, and programs to improve workers' ability to function in labor markets, including job training, wage subsidies, employment services, job creation through public works projects, and education.

To compare key East Asian economies' policies on worker rights and support programs, Table 7.1 provides information on decisions regarding ratification of the eight "fundamental" conventions of the International Labour Organization (ILO) that cover the CLS. The many ratifications that have taken place since 1996 are listed in bold type; they suggest that worker protection standards have improved since the Asian crisis. On the basis of these data, legislated labor standards have not been reduced in the East Asian region since 1997; indeed, there is some evidence of a general trend toward raising them.[8] Nevertheless, a review of legislation finds that Korea is the only country to have significantly strengthened its regulatory framework for labor protection. China has done little to improve its formal recognition and protection of union rights. Meanwhile, allegations persist that governments raise roadblocks to union activities while the enforcement of labor laws is often thought to be weak.[9]

[5] Many such benefits may be provided by employers voluntarily or through collective bargaining arrangements. Thus, government regulation may simply provide a floor for these rights.

[6] Maskus (1997); Martin and Maskus (2001).

[7] An across-the-board set of requirements might be offset by depreciation of the home currency, with little net impact on international competitiveness (Sykes, 1995). The claim that strong civic and security rights may raise costs is not universally accepted; institutional labor economists argue that they increase the attachment of workers to firms and skills, which can lower costs. It is an empirical question.

[8] Note, however, that ratification signals only an intention to comply with a convention, rather than reflects countries' actual labor market policies. The ILO has little scope for enforcing these rights. Conversely, a decision not to ratify does not mean that the inherent rights in a convention are denied, for governments may provide such rights while objecting to the language of a particular convention. The United States, for example, has ratified only two of these agreements (Conventions 105 and 182), but its practices largely comply with ILO expectations. A review of labor standards in eight East Asian countries appears in the Website accompanying this volume, at http://www.worldbank.org/eaptrade.

[9] According to information on the ILO Website, between 1997 and 2001 there were two complaints by unions against government practices in China, one in Hong Kong, one in Cambodia, one in Indonesia, two in Korea, one in the Philippines, one in Thailand, and none in Malaysia, Singapore, or Vietnam.

Table 7.1: Ratifications of fundamental ILO conventions covering worker rights

Convention	*Minimum age*	*Worst forms of child labor*	*Forced labor*	*Abolition of forced labor*	*Equal remuneration*	*Nondiscrimination*	*Freedom of association*	*Collective bargaining*
Convention Number	138	182	29	105	100	111	87	98
Cambodia	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
China	Yes	No	No	No	Yes	No	No	No
Hong Kong	Yes*	NA	Yes*	Yes*	No	No	Yes*	Yes*
Indonesia	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Korea, Rep. of	Yes	Yes	No	No	Yes	Yes	No	No
Malaysia[a]	Yes	Yes	Yes	No[a]	Yes	No	No	Yes
Philippines	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Singapore[a]	No	Yes	Yes	No[a]	Yes	No	No	Yes
Thailand	No	Yes	Yes	Yes	Yes	No	No	No
Vietnam	No	Yes	No	No	Yes	Yes	No	No

Notes: *Hong Kong is not a member of ILO but has issued its intention to comply with the conventions indicated. [a]Malaysia and Singapore have denounced Convention 105. Words in bold indicate ratification decisions since 1996.
Source: OECD (2000) and ILO Website (www.ilo.org).

Workers in the informal sector are not directly affected by changes in labor legislation. They have few rights and may work in conditions that are less sanitary and more dangerous than those in formal employment.[10] Child labor tends to be concentrated in the informal sector. Employment in the informal economy depends on many factors, including the cost impacts of labor regulations in the formal economy, but especially on the rate of overall growth in the economy.

One impact of the Asian crisis was a shift toward informal employment in many East Asian economies,[11] which suggests that working conditions deteriorated on average. Though the shift was temporary in much of the region, it has persisted in Indonesia and the Philippines.[12]

Evidence on labor standards, trade, and competitiveness

The provision of workers' rights affects the costs of hiring workers and therefore may influence international price competitiveness. For example, the ability of firms to require employees to work long hours without a premium for overtime, or to discharge workers with little notice or severance pay, presumably reduces their labor costs per unit of output, which may be significant in labor-intensive products. Extensive government support programs for training and employment services can reduce average labor costs, depending on how they are financed. Unfortunately, it is quite difficult to ascribe changes in trade performance to such actions, both because they are difficult to measure (particularly at the firm level) and because

[10] Maskus (1997).
[11] Betcherman and Islam (2001).
[12] In the Philippines, the gross primary school enrollment rate, which is strongly and negatively correlated with child labor, fell from 99.2 percent in 1997-98 to 98.1 percent in 1998-99. Lim (2000). Overall, however, there is no evidence of a significant increase in child labor use during the crisis in the Asia-Pacific region.

the relationships are complex. This section considers these relationships and reviews some general evidence.

How does openness affect labor standards and the conditions of work?

Table 7.2 gives an aggregate index of the strength of labor standards across several developing countries in the late 1990s.[13] Among East Asian economies, China, Indonesia, and Malaysia rank near the bottom of this scale. Regulations in the labor market depend on a variety of influences, including economic openness, which vary across countries and over time.[14]

Table 7.2: Overall ranking of labor standards

Country	*Labor Standards Index, late 1990s**	*Fundamental ILO*		*PPP per capita GDP, 1999*	*Freedom House Index, 1998-99***
		1995	1999		
Chile	83.3	3	7	8,720	5.5
Argentina	80.8	6	7	12,258	5.0
South Africa	78.0	1	5	8,994	6.5
Korea, Rep. of	71.3	0	3	15.778	6.0
Brazil	67.8	5	5	7,130	4.5
Philippines	63.8	5	6	3,803	5.5
Thailand	63.0	2	3	6,095	5.5
Colombia	62.0	6	6	5,821	4.5
Peru	59.0	6	6	4,626	3.5
Venezuela	56.0	7	7	5,586	5.5
Mexico	55.3	5	5	8,329	4.5
Turkey	55.0	5	8	6,374	3.5
India	46.5	3	3	2,250	5.5
Malaysia	46.3	2	4	8,215	3.0
Indonesia	44.5	3	7	2,873	3.0
Egypt	44.0	6	7	3,423	2.0
Pakistan	40.0	5	5	1,813	3.5
China	36.3	1	2	3,620	1.5
Correlations with Labor Standards Index				0.71	0.77

* This index is a weighted average of four broad categories: ratification of the ILO fundamental conventions, a comparison of national labor laws with ILO standard recommendations, an evaluation of each government's capacity to implement its laws and policies, and an assessment of the level of compliance with or violations of the core labor standards.
** This index is the average of the figures for political rights and civil liberties from the Freedom House Website (www.freedomhouse.org). Here they have been scaled so that a figure of 1 means the least political freedom and a figure of 7 means the most political freedom.
Source: Labor Standards Index from Verite (2002) (VERLS); GDP data from World Bank, *World Development Indicators 2001*.

As the table suggests, a primary determinant of labor standards is the level of income per person or per family in an economy. The poor may have little ability to refuse dangerous work. Clearly, extensive poverty is the main factor underlying high rates of child labor participation.[15] As incomes rise, the treatment of labor improves for several reasons. First, the

[13] Verite (2002).
[14] OECD (1996); Maskus (1997); Freeman (1994); Fields (1995).
[15] Grootaert and Kanbur (1995).

contribution of children to household income becomes less important, and schooling becomes a higher-valued alternative as parents are more capable of investing in their children. The child labor supply in many East Asian countries fell dramatically as those economies became richer.[16] Second, richer households gain greater access to credit markets, permitting them to invest more in acquiring skills. This can be a decisive influence in decisions by rural households to keep their children in school, but it is also important for increasing adult productivity, which supports better working conditions. Third, the demand for tighter labor protection increases. This reflects both the impact of rising real wages—which make workers demand more protection to safeguard their incomes from dismissal or injury—and the nature of labor standards as public goods that become more affordable as incomes increase.

Another important determinant of labor rights is the endowment and output mix of the economy. In countries with abundant unskilled labor, firms in labor-intensive sectors may view workers as easily replaceable and have few incentives to train them. In economies with greater endowments of skilled labor and training, workers offer more differentiated—and more valuable—skills that make employers more concerned about retaining them and about avoiding the output losses associated with occupational injuries. Rapid growth emanating from the accumulation of human capital tends to increase demand for better working conditions.

Another determinant is the nature of competition in both product and labor markets. A firm that is the sole or main employer in a local labor market can suppress wages or working conditions.

A government's willingness to legislate and enforce better labor standards depends on the political-economic situation. There is a strong positive correlation between democracy and the rights of workers to freely associate,[17] as corroborated by the last column of Table 7.2.[18] In countries without effective political competition, it may be difficult to establish stronger standards, even where economic efficiency could be improved by doing so or where much of the public would prefer them.

How might labor standards be affected by changes in a country's trade and investment regulations?

Tariff cuts may be expected to have several distinctive impacts on workers, depending on the economic circumstances of each country:

- Relative price changes from trade liberalization would tend to push capital and labor into products in which the country has a comparative advantage. This could either worsen or

[16] U.S. Department of Labor (1994).
[17] OECD (2000).
[18] This index is the average of the figures for political rights and civil liberties from the Freedom House Website (www.freedomhouse.org). Here they have been scaled so that a figure of 1 means the least political freedom and a figure of 7 means the most political freedom.

improve net working conditions in the economy, depending on whether conditions are worse or better in the expanding industries than those in other sectors.[19]

- In labor-abundant countries, tariff cuts ordinarily would raise the real wages of less skilled labor and increase aggregate income. These impacts should induce workers to demand stronger labor standards. Over time, employers should be willing to provide better working conditions as a result.
- Trade liberalization can increase poverty under certain circumstances.[20] Wages in formal manufacturing may fall significantly for workers whose incomes had previously been protected. Workers who are laid off could end up in the informal economy, pushing down wages there. Trade liberalization increases the prices of export goods, which may have a large weight in household consumption baskets. To the extent that openness to trade reduces wages and increases poverty, labor standards and worker protection will deteriorate. This would be especially problematic in those regions that are not competitive in producing exportable goods. In East Asian developing economies, however, greater openness to trade has increased incomes, reduced poverty, and improved working conditions.[21]
- As the product markets of different countries become more integrated through trade liberalization, firms may seek out locations with weaker standards. Studies of practices in developed countries have found no evidence of a "race to the bottom" in labor standards.[22] Unfortunately, there do not appear to be any studies of competition in labor standards among developing countries that produce similar goods for export.

Labor standards in Export Processing Zones

Some analysts view export processing zones (EPZs), or free trade zones, as examples of competitive standard setting.[23] In many instances, workers within EPZs have been denied the rights to unionize and bargain collectively, and safety and health conditions are poor.[24] This complaint has been leveled at some of the EPZs in China, the Philippines, and Indonesia, suggesting that East Asian countries may be competing in this way. However, no evidence

[19] In export-oriented, labor-intensive sectors in labor-abundant countries that have weak labor standards, conditions of work would deteriorate. However, if the effect of trade liberalization is to draw workers from the informal sector, net conditions could improve. Overall, whether the informal sector expands or contracts would depend on circumstances. Maskus (1997).

[20] See Dollar and Collier (2001) and McCulloch et al. (2001) for extensive discussion.

[21] Dollar and Collier (2001) and Dollar and Kraay (2001) are two of many sources. The child labor force participation rate in the East Asia-Pacific Region fell from 21.5 percent in 1995 to 19 percent in 2000, despite the economic crisis. ILO (2002); UNICEF (1999). Though for various reasons these estimates may not be strictly comparable, they do not suggest that child labor use significantly increased during the crisis. Edmonds and Pavcnik (2002), who studied household surveys in Vietnam, discovered that an increase in the real price of rice in the 1990s, associated largely with a decision to phase out the export quota on rice, raised net incomes of rural households enough to reduce the use of child labor sharply. By their estimates, a 30 percent increase in the price of a kilogram of rice led to a decline of 9 percentage points in the use of child labor. The children, especially secondary-school-age girls, were able to go to school instead.

[22] Maskus (1997); OECD (2000).

[23] EPZs are regions within an economy offering tax advantages, free importation of inputs (or duty drawbacks), infrastructure development, and other inducements to firms—often multinational enterprises—to locate there and produce goods for export. Madani (1999); Moran (2002).

[24] Moran (2002).

was found that standards in EPZs had been weakened in the aftermath of the Asian crisis or because of additional trade liberalization in the late 1990s.

In contrast, there is evidence that the operations of multinational enterprises, even within EPZs, tend to improve working conditions and wages relative to those in the rest of the economy.[25] It is not difficult to understand why multinational firms pay higher than average wages in developing countries. First, these firms invest much more in advanced industries, such as electrical equipment, electronics, industrial machinery, and automobile parts, than in garments, textiles, footwear, and toys. Jobs in the former industries require higher skills and pay considerably higher wages. Second, these firms tend to produce for export, which requires sustained quality, specific skills, and limited absenteeism, and they are willing to pay higher wages in return. Third, they typically bring superior technologies to the factory floor, which raise productivity and wages relative to those of domestic firms. In this regard, openness to foreign direct investment is generally a force for raising labor standards, rather than the other way around.

Evidence on labor standards affecting trade performance and FDI

Have weak labor standards in East Asian developing economies contributed positively or negatively to the export performance of these economies and to their attractiveness for inward FDI?

This is a difficult question to answer. First, economic theory cannot establish a clear relationship between weakness in labor standards and international trade competitiveness.[26] Second, labor standards and working conditions are only two of numerous determinants of relative costs and it is virtually impossible to isolate their impacts using aggregate data; a truly informative answer would require detailed survey work at the firm level and would track the dynamics of labor use over several years. Third, available aggregate measures of labor rights are crude and cannot capture the subtleties of cost impacts or enforcement efforts, nor can they control adequately for other influences on trade. Evidence on this subject must be treated with caution.

As to the relationship between *labor standards and international trade performance*, Aggarwal's (1995) study of manufacturing sectors in developing countries found that workers in export-oriented firms received higher wages and benefits than those in less export-oriented firms. Countries with weak labor rights did not have higher import penetration ratios in the United States than countries with stronger labor rights. Rodrik's (1996) cross-country econometric analysis found no relationship between basic measures of labor standards and international trade flows. Similarly, OECD (1996) found no relationships between labor standards and measures of export performance. Neither could the OECD

[25] Romero (1995) reports extensive evidence that wages are significantly higher in manufacturing jobs within EPZs than in similar positions outside. Moran (2002) provides much anecdotal evidence to the effect that MNEs pay wages 20-25 percent higher than those paid by domestic firms for similar jobs. He also describes a process of continuing improvements in the 1990s in safety conditions, minimum wages, and benefits packages within several EPZs, including two (Mactan and Baguio City) in the Philippines. See also Jacobson (1999). Drezner (2001) reviews theories of why multinational firms are likely to be a force for raising standards.

[26] See discussion at http://www.worldbank.org/eaptrade.

authors detect any correlations between measures of revealed comparative advantage and attempts to suppress labor union rights, nor any association between individual countries' core labor standards and the prices of their imports of textiles and apparel into the United States. They concluded that differences in core labor standards have no detectable effects on patterns of specialization, competitiveness, or exports.

Van Beers (1998), analyzing OECD trade data, found a weak association between stricter labor standards and lower exports of labor-intensive goods. His index of labor standards included such measures as maximum working hours, conditions of employment contracts, and minimum wages, suggesting that strong security rights can negatively affect trade performance in richer nations. In this regard, however, it may be inflexible labor market mandates that reduce competitiveness rather than fundamental labor standards.[27]

As to the relationship between *labor standards and FDI,* Aggarwal (1995) found no association between U.S. direct foreign investment and poor labor standards; if anything, FDI from the United States was less concentrated than expected in countries with low standards. Rodrik (1996) found some indication that FDI from the United States was lower than expected in countries with limited core labor standards. OECD (2000) reported that larger inflows of FDI are associated with stronger labor rights. This study also reported growing evidence that export processing zones with poor working conditions are less likely to attract sustained, long-term FDI than those with better conditions. Kucera (2001) regressed aggregate flows of FDI into many developing countries on several indexes of labor standards. He found no statistical indication that weak labor rights attract FDI, and some of his coefficients suggested that the opposite result holds.

Further evidence for East Asia

The earlier analysis suggests that weak labor standards are capable of expanding exports most readily in such labor-intensive goods as apparel, textiles, footwear, and miscellaneous manufactures such as toys and sporting goods. The Asian crisis may have reduced relative costs of production in labor-intensive exports for several reasons. First, even if legislated labor standards were not diminished in this period, authorities may have signaled a reduced commitment to enforcing workers' rights within labor-intensive industries. Second, the costs of acquiring inputs from subcontractors may have fallen quite sharply during the crisis if wages fell in the subcontractor firms. Third, exchange-rate changes may pass through more quickly to competitive sectors. Under such circumstances, one would expect that effectively weaker labor standards would have raised the share of labor-intensive manufactures in total exports between 1995 (before the crisis) and 1999 in East Asia.

At best, however, the data simply do not support this notion. Data on the shares of labor-intensive products in total manufactured exports show that, except perhaps in China and

[27] Mah (1997) studied 45 developing countries and found the ratio of exports to GDP to be negatively correlated with decisions to ratify fundamental conventions on freedom-of-association rights and rights to nondiscrimination. The lack of control variables in the equations, however, estimated renders these results questionable.

Indonesia, the output mix shift has shifted away from labor-intensive goods over time.[28] The export data cannot reveal much about how labor standards affected changes in trade shares, because numerous other factors could have driven these changes.[29] But data on labor conditions in this period provide useful complementary insights[30]: despite the large increases in unemployment between 1995 and 1999 in Hong Kong, Indonesia, Korea, Malaysia, the Philippines, and Thailand, there was virtually no change in reported hours worked per week. Moreover, in these countries, the number of reported injuries per 100,000 fell sharply during 1995-1999. Thus, at least on these simple indicators, firms (in the formal sector) were not pressuring workers to work harder or more dangerously.

For a more formal test of the hypothesis that labor standards have affected East Asian exports of labor-intensive goods, and did so more strongly after the onset of the crisis, an econometric analysis was undertaken.[31] The underlying models are estimated for 1995 and 1999 to see if any differences may have arisen during the crisis in terms of the impact of standards on exports. (If weak labor rights were a factor raising exports of labor-intensive manufactures, we would expect to find a negative coefficient in both years. But if the negative coefficient were larger in 1999 than in 1995, it would suggest that differential labor rights provided a stronger impetus to exports in the latter year.) This is at best a partial and crude test of the notion that labor rights were effectively weakened during the crisis and that they helped boost exports in the postcrisis period.

Three measures of labor standards were used. The first is an index of the strength of freedom-of-association rights (FA) in the exporting countries. The second is the index of four labor standards developed by Verite (2002) (VERLS, Table 7.2, above). The third is the number of the eight fundamental ILO conventions that were ratified by the exporting countries by 1995 or 1999 (Table 7.1, above).

For two of these three measures of labor standards, the results suggest that bilateral export volumes in labor-intensive goods actually rise as worker protection is increased—a finding that is particularly true within East Asia (Table 7.3).[32] The balance of evidence does not support the view that weak labor rights promote exports in these goods, nor does it suggest decisively that during the economic crisis weak labor rights translated into stronger labor-intensive exports.

---

[28] Appendix Figure 11.1 at http://www.worldbank.org/eaptrade shows the shares of labor-intensive manufactured exports in 1995-99 for eight East Asian economies.

[29] For example, the growth in volume of exports of apparel and textiles to key markets may have been constrained by quotas. It is also possible that the price impacts of depreciating exchange rates were relatively greater for labor-intensive goods, tending to reduce their values if not volumes.

[30] ILO (2001).

[31] Details of this analysis are in the appendix to this chapter, at http://www.worldbank.org/eaptrade.

[32] The results using the third measure differ from those using the first and second. Close consideration of the three measures provides insight. The OECD measure of freedom-of-association rights (FA) is directly keyed on a central and fundamental basic labor right, and the Verite labor standards index (VERLS), though it combines four approaches, incorporates enforcement and effective recognition of four core labor standards, and thus also focuses on basic rights. Both these measures are suited to analyze the impacts of core labor protection on export performance, and these impacts appear to be positive. On its face, the third measure—the number of ILO ratifications—should also be an indicator of core labor rights, but, as explained earlier, it is a questionable measure of a country's actual commitment to improved working conditions.

Table 7.3: Impacts of labor standards on labor-intensive exports from developing countries

Variable	*Model 1 (1995)*	*Model 1 (1999)*	*Model 2 (1995)*	*Model 2 (1999)*	*Model 3 (1995)*	*Model 3 (1999)*
NAFTA	2.37***	3.53***	2.52***	3.62***	2.07***	2.86***
Political Freedom	-0.30***	-0.19***	-0.82***	-0.91***	-0.27***	-0.11**
East Asia	1.05*	3.13***	2.80***	4.28***	1.59***	0.05
South Asia	8.18***	5.46***	16.9***	6.11***	-0.09	-1.56
Latin America	2.37**	1.34	1.55*	6.18***	0.69	0.72
FA Rights	0.60***	0.66***				
	(1.37)	(1.59)				
FA Rights • East Asia	0.94***	-0.32				
	(2.13)	(1.32)				
FA Rights • South Asia	-2.42***	-1.52***				
	(0.71)	(1.15)				
FA Rights • Latin America	-1.18**	-1.03**				
	(0.27)	(0.57)				
VERLS			0.09***	0.14***		
			(5.28)	(8.22)		
VERLS • East Asia			0.01	-0.02		
			(5.41)	(7.81)		
VERLS • South Asia			-0.21***	-0.04		
			(3.31)	(7.94)		
VERLS • Latin America			-0.03**	-0.11***		
			(4.56)	(5.57)		
ILO-F					-0.16**	-0.52***
					(-0.62)	(-2.69)
ILO-F • East Asia					0.38***	0.42**
					(-0.10)	(-1.93)
ILO-F • South Asia					0.85***	0.71***
					(-0.23)	(-2.25)
ILO-F • Latin America					-0.19**	-0.27
					(-0.92)	(-3.27)
No. of Obs.	1700	1700	1700	1700	1700	1700
R-Squared	0.74	0.76	0.75	0.77	0.74	0.77

Notes: The coefficients come from gravity models of bilateral exports from 17 developing countries to 20 OECD importers listed below. Each equation is estimated as an augmented gravity model with controls for importer and exporter GDP, importer and exporter population, bilateral distance, and industry-fixed effects. Standard errors are robust to heteroskedasticity. *** indicates significantly different from zero at 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Figures in parentheses are elasticities calculated at sample means.

Export values are included for the set of labor-intensive industries listed below. The regressions include standard gravity variables (logs of importer and exporter GDP levels, logs of importer and exporter population levels, and a log of distance between trading partners), a dummy variable for NAFTA when the exporter is Mexico and the importer is either the United States or Canada, an index of political freedoms from the Freedom House Website, industry-fixed effects, regional fixed effects, a measure of labor standards, and interaction terms between labor standards and regional dummies. Data on GDP (in US$ billions in purchasing power parity terms) and population (in millions) are from the *World Development Indicators, 2001*. Distance is the number of kilometers (in thousands) between capital cities. The index of political freedoms is the simple average of the "political freedom" and "civil liberties" indicators from Freedom House (www.freedomhouse.org), rescaled so that an increase in the index here signifies an increase in political rights.

Labor-intensive industries are defined as ISIC 321, 322, 323, 324, and 390.

Exporters are Argentina, Brazil, Chile, Colombia, Mexico, Peru, Venezuela (Latin America); India, Pakistan (South Asia); China, Indonesia, Korea, Malaysia, the Philippines, Thailand (East Asia); Egypt, and South Africa.

Importers are Australia, Austria, Canada, Denmark, Finland, France, Germany, Greece, Japan, Ireland, Italy, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Turkey, United Kingdom, and United States.

The policy message that emerges is that East Asian developing countries need not delay the introduction of CLS. Doing so will not reduce their competitiveness in labor-intensive manufactured exports and could well increase it. However, caution might be urged in terms of implementing stronger measures that could limit flexibility in formal labor markets.[33]

Environmental protection: Background and institutions

It is beyond the scope of this chapter to attempt a comprehensive review of environmental regulatory regimes. All the major East Asian economies have some form of regulatory regime and institutions aimed at protecting the environment or promoting sustainable resource use. But these regimes vary considerably in terms of resource commitments, enforcement capacity, and regulatory mechanisms.[34]

Did the onset of the economic crisis affect environmental use and policy in the region? Reports suggest that the crisis did alter various indicators of environmental damage, though in different ways. In many cities, the short-term impact of economic collapse was to improve air quality as industrial production slackened and vehicles were used less, in reaction to lower product demand and, in some cases, sharply higher fuel prices.[35] By 1999, however, air pollution indexes were regaining and perhaps exceeding their previous levels. Water quality is relatively insensitive to short-term changes in industrial activity and household consumption, and water quality measures changed little. Sanitation conditions deteriorated markedly in many locations because increasing amounts of industrial and toxic waste were not properly disposed of. Industrial pollution worsened somewhat in a number of countries, perhaps because of weaker regulatory control and reduced compliance by firms. In some countries such as Indonesia, the economic crisis encouraged some urban dwellers to return to the countryside, placing more stress on natural resources and farming communities. The collapse also seemed to speed deforestation in Indonesia and Vietnam, though a reduction in export demand in Japan and Korea offset this problem initially.[36] Finally, there are indications that fishing stocks and coral reefs have come under greater stress as a result of rising unemployment, though most such pressures are long term rather than cyclical.[37]

As in the case of labor standards, there is little indication that governments actively reduced their legislated or formal environmental regulation in the crisis period. Since the start of the crisis, some economies have in fact adopted stricter regulation or greater incentives for conservation, as described below.

- China tightened its industrial point source pollution control and deforestation regulations in the late 1990s[38] and has increased pollution discharge fees to levels at least as high as treatment costs.[39]

[33] Hasan and Quibria (2002) reach a similar conclusion though their focus is on the determinants of poverty reduction rather than trade competitiveness.
[34] Esty and Cornelius (2002).
[35] World Bank (1999).
[36] World Bank (1999); World Bank (2001b); Marinova (1999).
[37] World Bank (1999); World Resources Institute (2002).
[38] World Bank (2001c).

- Hong Kong is subsidizing projects to develop green production technologies, develop new waste treatment systems, and promote ISO 14000 environmental standards. Vietnam has announced a reforestation program.[40]
- Korea's Ministry of Environment has expanded its programs for pollution prevention, including certification of enterprises, and has begun requiring compliance with certain OECD standards; it has also expanded tax incentives and procurement policies for recycling.[41] Korea adopted a new law in December 1998 revising the Waste Management Act, which clarifies and increases landowners' liabilities for abandoned waste, which has become a significant and costly problem to clean up. There was no easing of Korean regulations in the textile dyeing industry by 1999, despite a large drop in output. However, perhaps related to the crisis, Korea decided to delay revision of some air quality standards in 1997. And recently the government has shifted toward deregulation of onerous mandates and self-certification and voluntary compliance by businesses.
- Thailand recently implemented a series of plans for enhancing and conserving national environmental quality.[42] This approach includes both tighter pollution control, implementing the "polluter pays" principle, and programs to promote the development of new technologies.

However, in the countries affected strongly by the slowdown, the associated fiscal problems have reduced public expenditures on environmental protection.[43] This has been a significant problem in Indonesia, the administrative and regulatory framework of which does not encourage sustainable environmental use. Forest loss has continued, land-use management problems remain severe, and inadequate wastewater treatment and the dumping of hazardous wastes have not abated. Some commentators view Indonesia's ongoing devolution of administrative authority to local governments as damaging for environmental protection, as these governments may not have effective capacities or budgets for the job and may be particularly prone to weak and nontransparent enforcement. In the Philippines, fiscal stringency has had a mixed effect on incentives for environmental resource use[44]; environmental budget cuts were reported, but fiscal pressures also signified reductions in subsidies to coal production and fuel consumption, with associated increases in user prices.

Remarkably little research has been done on the relationships among the environment, the fiscal crisis, and trade in East Asia. The following research agenda, which could be pursued by national authorities, international organizations, or research institutions, would substantially improve our understanding of the processes at work:

- How the Asia crisis affected the use of environmentally damaging agricultural inputs and whether changes in such use were needed to sustain trade flows

[39] APEC (2001).
[40] World Bank (2001c).
[41] World Bank (2000).
[42] APEC (2001).
[43] World Bank (1999, 2001c). In Korea, the government reduced its environmental expenditures from 2.5 percent of total expenditures in 1997 to 2.3 percent in 1998, though this reduction was not especially severe in relation to those for other programs. World Bank (2000)
[44] World Bank (1999).

- Whether exchange-rate changes associated with the crisis altered demand for imported inputs that might have limited toxic discharges
- Whether multinational firms had a greater or lesser propensity than domestic firms to ignore cost-increasing environmental regulations.

Evidence on environmental protection, trade, and competitiveness

The links between declines in economic activity and environmental degradation are complex and not easily predicted. The same is true for the links between openness to trade and FDI and environmental use. These impacts presumably work in both directions and depend on circumstances.

How does openness affect environmental protection and use?

Grossman and Krueger (1993) describe the impacts of changes in an economy's fundamental variables—endowments, prices, technologies, and policies—on the aggregate use of the environment.[45] Drawing on their framework, I use the word "emissions" to proxy for all forms of environmental use, including air and water pollution, deforestation, habitat destruction, and waste deposits. In the simplest terms, the amount of emissions an economy generates depends on three essential factors: the size of the economy, the share of output that is produced by emission-intensive ("dirty") sectors, and the degree of emissions intensity in those sectors.

This means that any change in pollution emissions can be decomposed into three effects. The *scale effect* refers to an increase in emissions associated with a larger GDP, holding constant the relative mix of outputs and pollution intensities across sectors. That is, a 10 percent increase in all productive factors, everything else held constant, should raise pollution by 10 percent.[46] The *composition effect* refers to a change in the share of dirty goods in GDP, which may come about because of a price change. With a constant scale of the economy and no change in emissions intensities per industry, a rise in the share of dirty goods would increase total pollution. The *technique effect* refers to a change in the amount of emissions per unit of output across sectors (an "emissions-intensity" change)—for example as producers change technologies in response to a higher pollution tax.[47] This typology can be used to analyze the impacts on the environment of trade liberalization and FDI.

[45] Copeland and Taylor (2001) provide a clear presentation of this framework.
[46] This assumes that net output (total output less resources devoted to pollution abatement) is produced with constant returns to scale.
[47] One important reason that a government would increase the pollution tax (or generally increase environmental regulation) is that voters demand a cleaner environment as incomes rise, justifiably assuming that environmental health is a normal good. Thus, in the applied literature, the term "technique effect" generally refers to the idea that anything that raises per capita income generates an endogenous increase in environmental taxes, thereby reducing the pollution intensity of production. However, it also refers to autonomous improvements in environmental technologies.

Trade liberalization reduces impediments to imports and exports[48] and affects environmental use through its effects on prices, which then filter through to production and consumption. For example, suppose that an East Asian developing economy is labor-abundant and therefore has a comparative advantage in labor-intensive goods. Freeing up trade would raise the price of labor-intensive goods in this economy and shift capital and labor into production of these goods. If these goods are produced with cleaner technologies on average, overall emissions will fall as the composition of output shifts away from dirtier goods. (Note that emissions could rise if the goods that a country exports are dirtier; comparative advantage is an important factor.) The shift in the composition of output following trade liberalization raises the aggregate productivity in the economy, and thereby raises real GDP. The scale effect of trade liberalization is thus to increase pollution. Finally, as aggregate and per capita incomes rise as the result of freer trade, so does the demand for a cleaner environment.[49,50] Thus, the technique effect of trade liberalization is to improve the environment by reducing emissions per unit of output.

The same framework can be used to assess the effects of an increase in FDI on environmental quality. If multinational firms exist disproportionately in dirtier industries, their arrival in a country has an effect like an increase in the capital stock that worsens the environment through the composition effect. But if they exist disproportionately in cleaner industries, their arrival can improve the environment. By expanding economic activity, multinational firms would generate a scale effect that increases environmental use.[51] Perhaps most fundamentally, the operations of multinational firms can generate beneficial technique effects. For a variety of reasons, they are likely to transfer cleaner technologies, developed in their home economies, to recipient countries.[52] If they pay higher than average wages without generating offsetting unemployment, the impact would be higher per capita incomes and an induced demand for stronger environmental protection. Thus, even if multinational firms do not alter the composition of output much, one would expect their operations to improve environmental stewardship. In this context, economies that are more open to FDI, other

[48] It could also mean domestic deregulation of services and changes in other policies, such as intellectual property rights, the effects of which are left aside here.
[49] Per capita income would be higher despite changes in the distribution of income.
[50] Three comments are relevant here. First, the impacts of openness to trade are less clear when account is taken of input flows. Since inputs themselves may be dirty or clean, there is an additional comparative advantage effect to consider. (For example, if trade liberalization raises access to imported coal and petroleum, the net impact may be to expand output of dirty final goods even if there is a direct comparative disadvantage in them; moreover, tariff cuts could expand the consumption of cheaper imported fuels.) Second, many analysts suggest that as incomes rise there will be an incentive to improve environmental technologies endogenously, as a result of the higher demand for environmental protection that is associated with rising incomes. One direct means by which this could come about is that more open economies have greater access to foreign technologies. In this context, trade openness provides an endogenous technique effect that could be decisive in improving environmental stewardship. Third, for the standard technique effect to operate, citizen demand for a cleaner environment must be mediated effectively through an increase in the cost of polluting the environment. In some cases this mediation takes place through informal pressures (Wang and Wheeler, 1999), but generally, the government must respond to citizen preferences and raise environmental charges as incomes grow. Again, therefore, the openness and efficiency of the political process matter for environmental policy, as they do for labor standards. Barrett and Graddy (2000) find that increases in political freedoms significantly improve environmental quality.
[51] Not all would agree that FDI expands economic activity as much as it eliminates domestic competition.
[52] Moran (2002).

things being equal, would tend to have stronger environmental standards and cleaner technologies. This is an empirical issue.

Important evidence is available on the effects of trade liberalization on the environment, and what follows is only a selective and brief review.

The most prominent study is by Antweiler and others (2001), covering the effects of trade liberalization on air pollution in 44 countries.[53] They find that international trade generates relatively minor changes in concentrations of air pollution when it alters the composition of output, but that the associated technique and scale effects reduce pollution. Overall, they find that within their sample, greater openness to trade actually reduces air pollution on average.

Beghin and others (2000) considered relationships between trade liberalization and pollution in Chile. In their computable general equilibrium model, unilateral liberalization substantially worsens air pollution by providing cheaper and dirtier energy sources. But if this trade policy were combined with an appropriate tax on emissions, Chile would reap significant welfare gains.[54]

Dean (2002) analyzed the impacts of trade liberalization on water pollution in Chinese provinces during 1987-95, a period in which there were both an extensive pollution levy system and a significant opening to trade. She found that trade liberalization has aggravated environmental damage, because China has a comparative advantage in pollution-intensive goods, but that greater openness has also raised per capita incomes, mitigating the environmental costs through stronger regulation. She also found that emissions per unit of industrial output in China would have been much higher without trade reform, so that China's opening to trade was beneficial for the environment overall.

Arunanondchai (2001) assessed the impacts of cuts in tariffs and export taxes in logging and timber products on Indonesian and Malaysian exporters. She found that trade liberalization would not necessarily raise log production, because it might not raise net producer prices, but that foreign tariff cuts in plywood and sawn lumber would generate significant gains for Indonesia. She also found that removal of export taxes on logs would reduce world log prices, tending to worsen the joint welfare of exporting nations.

APEC (1999) assessed the effects of selected nontariff restraints on trade in forest products. The authors found that multilateral removal of taxes and subsidies would generate some gains for timber exporters, but they claim that data were insufficient to assess the environmental impacts of such liberalization.

[53] Using data on sulfur dioxide concentrations in 293 sites in 44 countries from the Global Environment Monitoring Project over the period 1971-96, they decompose emissions into scale (GDP), composition (capital-labor endowment ratios), and technique (real income) effects, interacting each with a measure of openness to trade.
[54] This insight underscores an important observation about the nexus between trade policy and environmental policy. In general, if environmental distortions are internalized efficiently, open trade enhances welfare.

To sum up, the literature suggests it is not possible to predict the implications of trade liberalization for environmental use and economic welfare in general, but the balance of econometric and empirical evidence suggests that it can be beneficial.

Studies of the effects of FDI impacts on environmental damage are surprisingly scarce.[55] Moran (2002) provided some anecdotal evidence that multinational firms are associated with improvements in environmental use, though this depends on the industry.

Evidence on environmental standards and competitiveness

The "pollution haven hypothesis" has attracted much study. What is the evidence that weak environmental protection either generates an export advantage or attracts FDI? In principle, one might expect a stronger identification of weak regulation with trade performance and FDI in the environmental area than in labor standards; unlike workers, the environment cannot complain or shirk when it is treated badly, so the ability to exploit it without regulation could reduce costs, at least up to the limits from congestion.

Past evidence

This prediction is borne out in a 24-country study of environmental standards and trade by Wilson and others (2002).[56] Their results suggest that more stringent environmental laws reduce net exports of pollution-intensive goods and, thus, weak environmental regulation is associated with higher trade performance. Moreover, they find that a hypothetical trade agreement to harmonize environmental protection laws at levels higher than those in developing countries would reduce trade by up to 11 percent a year.

Their paper is unique in its findings, however. Earlier studies discovered no evidence that a country with stricter environmental standards would have lower exports of pollution-intensive goods.[57] Most observers have concluded that, because environmental controls typically amount to a small percentage of total costs, they are relatively unimportant in determining trade patterns.

Levinson and Taylor (2001) find that in the United States during the 1970s and 1980s, those industries experiencing the largest increases in environmental control costs had the largest relative increases in net imports. Thus, trade flows do react to such regulation. Unfortunately, there are no comparable measures in developing countries to see if this result holds more widely.

The literature gives little support for the hypothesis that FDI responds to international variations in environmental costs. For example, Eskeland and Harrison (1997) find almost no evidence that multinational firms investing in developing countries are attempting to escape higher environmental costs in their home countries. They also find that foreign-owned plants

[55] It is possible they exist, but I could not locate any.

[56] They regressed net exports in 5 pollution-intensive industries on measures of factor endowments and environmental laws in 24 countries (6 OECD countries, including Korea, and 18 developing countries) over the period 1994-98.

[57] Tobey (1990); Low and Yeats (1993); and Xu (1999). Grossman and Krueger (1993) found no contribution of US pollution intensity to US imports from Mexico.

in developing countries are less polluting than comparable domestic plants. Wheeler (2001) discusses why the "race to the bottom" idea in environmental standards makes little sense in terms of attracting FDI. He finds that indexes of air pollution actually improved markedly in the major cities in China, Brazil, and Mexico during an era of extensive investment inflows. Smarzynska and Wei (2001) examine firm-level data in 24 transition economies, controlling for corruption levels, and find little support for the pollution haven idea.[58] Levinson (1996) finds no evidence that differences in environmental standards across states affect the location choices of manufacturing plants.

This view is not universal, however. Lucas and others (1990) claim that increasingly strict environmental regulations in OECD countries led to the displacement of pollution-intensive industries. List and Co (1999) found that FDI in the United States was negatively related to regulatory expenditures per firm. Mani and others (1997) indicate that in India, spending on environmental damage abatement was higher in more pollution-intensive industries and was a factor in plant location decisions. Keller and Levinson (2002) point out problems with endogeneity in such measures. The issues are inherently empirical.

Evidence from East Asia

Available measures suggest that environmental protection regulations are not very stringent in East Asia. Table 7.4 lists two indexes of environmental regulation in several developing countries. The first is an environmental sustainability index, which is a compilation of several categories involving resource use, pollutant concentrations, and infrastructure. The correlation of environmental sustainability with per capita GDP is positive and significant at 0.37, but well below unity. The environmental sustainability index is correlated positively with the political freedom ranking in Table 7.2, but only weakly. The second environmental policy index measures the stringency of environmental regulations. This index, too, is positively correlated with per capita GDP, but it is not correlated with the measure of political freedom.

We might expect a reduction in costs resulting from weaker, or more weakly enforced, environmental standards to be reflected in increases in the share of pollution-intensive goods in manufactured exports for East Asian economies.

To investigate further the relationship between environmental protection and exports of pollution-intensive goods, I undertook an econometric analysis based on models whose essential structure is the same as those applied to the labor standards above.[59] The two measures of environmental standards used are the environmental sustainability index and the environmental regulatory regime index shown in Table 7.4. Also included are the index of political freedom, a dummy for joint importer-exporter NAFTA membership, and regional fixed effects. Results are shown in Table 7.5.

Overall, it is difficult to reach any confident conclusions from the results of the numerical analysis. From the changes in export shares by country (Appendix table 11.2), it appears that those countries that were hardest hit by the Asian crisis tended to shift more output and

[58] See also Jaffe and others (1995).
[59] Details of this analysis are in the appendix to this chapter, at http://www.worldbank.org/eaptrade.

exports into pollution-intensive sectors. On the other hand, the econometric analysis provides little evidence that weaker environmental standards are associated with higher exports of pollution-intensive goods. At best, there is no strong or systematic indication that the crisis significantly augmented exports based on pollution havens in East Asia.

Environmental protection and the Doha Round

The Doha Round of multilateral trade negotiations at the WTO, scheduled to begin late in 2003, will be the first round to consider linkages between environmental protection and trade. Many developing countries have raised concerns about the potential implications for their trade opportunities. This section reviews the environmental provisions of the Doha Declaration and the scope of the upcoming negotiations, and comments on potential obligations for East Asian economies.

Table 7.4: Environmental policy indexes

Country	*Environmental Sustainability Index, 2001*	*Environmental Regulatory Regime Index, 2001**	*PPP per capita GDP, 1999*
Argentina	62.9	-0.732	12,258
Brazil	57.4	-0.077	7,130
Chile	56.6	0.177	8,720
Colombia	54.8	-0.416	5,821
Peru	54.3	-0.722	4,626
South Africa	51.2	-0.029	8,994
Venezuela	50.8	-1.079	5,586
Malaysia	49.8	-0.127	8,215
Egypt	46.4	-0.224	3,423
Turkey	46.3	NA	6,374
Mexico	45.3	-0.602	8,329
Thailand	45.2	-0.389	6,095
Pakistan	43.4	NA	1,813
Indonesia	42.5	-0.758	2,873
India	40.7	-0.759	2,250
Korea, Rep. of	40.3	-0.121	15,778
China	37.5	-0.348	3,620
Philippines	35.6	-1.014	3,803
Correlation with GDP per capita	0.37	0.41	
Correlation with Freedom House Index, 1998-99	0.17	-0.03	

* Most values are negative because the measure is scaled across all countries (including OECD members), to be zero for the average regime. NA = not applicable.
Source: The sustainability and regulatory regime indexes are from Esty and Cornelius (2002). GDP data are from World Bank, *World Development Indicators 2001*.

Table 7.5: Impacts of environmental standards on pollution-intensive exports from developing countries

Variable	*Model 1 (1995)*	*Model 1 (1999)*	*Model 2 (1995)*	*Model 2 (1999)*
NAFTA	2.38***	2.33***	2.33***	2.82***
Political Freedom	0.38***	-0.82	-0.35***	-0.08
East Asia	15.8***	25.7***	-2.12***	-1.25***
South Asia	-237.4***	-247.6***	0.18	-0.09
Latin America	21.2***	29.8***	-2.44***	-2.95***
Environmental Sustainability (ES)	0.46***	0.61***		
	(21.6)	(28.7)		
ES • East Asia	-0.30***	-0.51***		
	(16.1)	(19.3)		
ES • South Asia	5.85***	6.17***		
	(51.9)	(60.6)		
ES • Latin America	-0.46***	-0.64***		
	(13.2)	(16.9)		
Environmental Regime (ER)			16.0***	14.9***
			(8.32)	(7.75)
ER • East Asia			-16.3***	-14.1***
			(5.01)[a]	(4.44)[a]
ER • South Asia			-13.1***	-10.9***
			(7.57)	(7.00)
ER • Latin America			-14.2***	-13.9***
			(5.44)	(4.87)[a]
Number of Observations	2,880	2,880	2,880	2,880
R-Squared Term	0.55	0.58	0.56	0.58

Notes: Each equation is estimated as an augmented gravity mode, with controls importer and exporter GDP, importer and exporter population, bilateral distance, and industry-fixed effects. Standard errors are robust to heteroskedasticity.
*** indicates significantly different from zero at 1 percent level, ** at the 5 percent level, and * at the 10 percent level.
Figures in parentheses are elasticities calculated at sample means and those with a superscript are not significantly different from zero at the 10 percent level.
Pollution-intensive goods are ISIC 332, 341, 351, 352, 353, 356, 371, and 372.
Exporters are Argentina, Brazil, Chile, Colombia Mexico, Peru, Venezuela (Latin America); Bangladesh, India (South Asia); China, Indonesia, Korea, Malaysia, the Philippines, Thailand, Vietnam (East Asia); Egypt, and South Africa.
Importers are Australia, Austria, Canada, Denmark, Finland, France, Germany, Greece, Japan, Ireland, Italy, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Turkey, United Kingdom, and United States.

The Doha Declaration calls on countries to:

Clarify relationships between WTO rules and trade obligations under various multilateral environmental agreements (MEAs).[60] Further clarification is needed about whether trade

[60] One important MEA is the Convention on Biodiversity, whose commitments on the exploitation of genetic resources are at odds with rights established under the intellectual property agreement in the WTO. The Convention on Biodiversity does not itself implicate trade policy directly, but a recently added provision, the Protocol on Bio-safety, essentially permits countries to exclude imports on the basis of the precautionary principle. By permitting unilateral import restraints that could be more rigorous than those in the Sanitary and Phytosanitary Standards Agreement of the WTO, this policy could negatively affect exports of genetically

sanctions issued under the Montreal Protocol, the Convention on International Trade in Endangered Species, and other agreements are consistent with WTO obligations. To date, such sanctions have been effectively exempted from the WTO, and this is likely to become a formal interpretation in the Doha Round. It is conceivable that a broad interpretation could limit export opportunities in certain goods in the future, even as it gives East Asian countries greater scope to limit imports. However, according to the Doha Declaration, negotiations on such linkages must be undertaken without altering the WTO rights of countries that are not members of an associated MEA. Thus, there should be little reason for concern about facing trade restrictions by virtue of not joining MEAs.

As regards toxic waste disposal, developing countries need to know whether current or potential WTO rules allow them to ban imports of toxic wastes and products. A clarification of restraints under the Basel Convention and WTO obligations is needed. Under the Basel Convention, which had been ratified or acceded to by all major East Asian economies by 2000, transboundary movements of hazardous wastes or other wastes can take place only after prior written notification by the exporting country authorities to the competent authorities of the importing country and to countries through which they might transit; each shipment of hazardous waste must be accompanied by documentation or be deemed illegal. Exports of toxic wastes to certain countries are banned outright. Cross-border movements can take place, however, if the exporting nation lacks the capacity to manage or dispose of the hazardous waste in an environmentally sound manner. The Basel Convention clearly anticipates that importing governments may closely regulate the disposal of hazardous wastes because they must agree to the documentation and may monitor execution of the transaction. The convention falls short of permitting individual countries to ban such imports, though a proposed amendment provides for countries to ban exports. Whether importers could issue such bans presumably depends on a legal interpretation of GATT Article XX, which permits trade restraints in order to protect environmental and human health. However, such regulation must be consistent with national treatment, so that imported waste is not treated worse in the commercial sense than is domestic waste. In poor countries, waste treatment tends to be weakly regulated, suggesting that import limitations could be problematic under WTO rules.

Reduce or eliminate trade barriers to environmental goods and services. Such barriers raise costs to countries that must import technology if they wish to mitigate environmental problems. Obligations to cut import tariffs and open service markets may run into political-economy concerns, but they can be effective complements to domestic environmental policy.

Clarify rules on the effects of environmental regulatory measures on market access. This provision seems to be aimed mainly at efforts by developed and middle-income countries to restrict trade in order to achieve (indirectly) some environmental goal.[61] It remains to be seen whether such clarification would expand the scope of unilateral action to restrict trade or whether it would impose additional obligations on countries that limit imports.

---

modified foodstuffs from developing countries. For the East Asian countries, such exports are not significant, so this issue may be of limited importance unless the principle is extended to other forms of production processes.

[61] One example is the shrimp-turtle case, in which the United States threatened to limit imports of shrimp from certain Southeast Asian countries for failing to use turtle-excluder devices in their fishing fleets.

Identify cases where reducing trade restrictions and economic distortions would benefit the environment, trade, and economic development. Prominent examples would be subsidies to coal and other forms of carbon-based energy and to water use in agriculture. Reductions in such subsidies bear considerable promise for improving environmental use while raising market access to new technologies and agricultural products.[62] Negotiations on this point should give East Asian economies an opportunity to rationalize their trade policy with resource subsidies and other policies.

Clarify provisions of the intellectual property agreement in the WTO that could affect the trade and transfer of environmental technologies. There are concerns that stronger private property rights to exclude unauthorized use—including by governments—of technologies, products, and services that could reduce environmental problems might make environmental management more costly.

Consider the scope for environmental labeling requirements on products. Effective labeling requirements could be beneficial in restraining the use of blunter trade restrictions, though meeting the costs of labeling could be high.

Finally, the declaration pledges that *developed countries commit to increasing technical and financial assistance for meeting international environmental needs*.

This set of negotiating objectives aims to address existing inconsistencies and shortcomings of the trading system rather than to permit the introduction of extensive new trade control regimes. In that regard, East Asian developing economies should not be overconcerned about the introduction of environmental issues into the WTO, because these are already there in a number of ways. The scope of negotiations as set out above would not raise much concern about market access, though developing-country members should perhaps be particularly wary about labeling requirements.

Policy implications

The analysis in this chapter finds little evidence that East Asian governments have relaxed their standards on working conditions or on environmental stewardship. If anything, it finds a continuing trend toward stronger regulation. However, public expenditures devoted to social safety nets for workers and to enforcement of environmental laws suffered in some countries affected by the crisis, and there is anecdotal evidence of declines in working conditions and environmental protection during the crisis.

Unfortunately, it is quite difficult to trace whether these processes have boosted exports. Economic theory and evidence from past studies suggests that weak labor rights are not correlated with export performance, even in labor-intensive goods, and that they are negatively correlated with an economy's attractiveness to foreign direct investment. It also suggests that weak environmental regulations are not a significant determinant of exports or FDI in most circumstances. Given this background, it is not surprising that the econometric

[62] Anderson (1996).

work performed for this study finds no indication that weak labor rights or environmental standards are positively correlated with export performance. There is evidence on the labor side that stronger rights are associated with higher exports of labor-intensive goods, though that finding depends on the measure of labor standards used. Environmental protection indexes also seem to be positively but weakly correlated with East Asian exports in pollution-intensive goods. To sum up, while it is difficult to be confident about such inferences, the author could find no significant evidence in the data that weak labor rights or environmental standards boost East Asian exports.

If the results are taken seriously, important policy messages emerge. East Asian developing countries have weaker measured labor and environmental standards, relative to per capita income, than do other developing regions. To the extent that these policies have supported flexibility in labor markets, they may be beneficial for export competitiveness. However, these countries have considerable room for improving their protection of fundamental labor rights and environmental standards. Doing so would not reduce their ability to export labor-intensive goods or pollution-intensive goods; indeed, export growth can be compatible with raising core labor standards and environmental protection. In short, the developing economies of East Asia can feel comfortable in applying greater weight to social considerations in setting their policies, without significant fear of deterring export growth.

Appendix to Chapter 7: Trade and Competitiveness Aspects of Environmental and Labor Standards in East Asia

1. Do weak labor standards reduce costs and enhance competitiveness?

The theoretical proposition that weak labor standards reduce costs and therefore enhance competitiveness and exports is not necessarily correct. The idea that exports are promoted by weak labor standards rests on the presumption that labor standards act as an inefficient tax on labor use—and thus that weakening such standards would diminish this tax and output and exports would expand.[1]

The difficulty is that this view presumes that labor and product markets are otherwise undistorted. Really the link between weak labor rights and trade is more complicated.[2] Consider, for example, an economy in which firms are permitted to discriminate against women or ethnic groups by paying them wages below marginal revenue products. Firms may achieve cost savings directly on these workers but forgo potential profits by failing to hire more of them at higher wages. Put differently, in a discrimination equilibrium, firms hire fewer workers than optimal, making output (and exports) lower than would be the case in the non-discriminatory (and efficient) equilibrium. In brief, discrimination can be an obstacle to both economic efficiency and social development.[3]

Similarly, if a single firm hires workers in a monopsonistic fashion because of restraints on the ability of workers to organize and bargain collectively, that firm will hire fewer workers, albeit at a lower wage, than would be the case in a competitive labor market. As a result, output and exports would be diminished again. The introduction of freedom of association and bargaining rights would raise wages but could actually increase exports, depending on the union's bargaining strategy.[4]

As a final example, consider the failure of firms to provide their workers with information about the inherent occupational hazards of their jobs. Without such information, workers may accept wages that are too low to compensate them for uncertainty about accidents and may take excessive risks on the job site. Here is a case where price competitiveness is probably enhanced by weak labor rights, at least in the short run, particularly if employers do not need to cover accident compensation costs.

---

[1] Brown, Deardorff, and Stern (1996). Note that this view suggests that countries with weak labor standards suffer a terms of trade loss on their exports or, put differently, that they choose unilaterally to adopt regulations that are weaker than nationally optimal. See also Bagwell and Staiger (1999). Here is an initial reason to doubt that poor standards are economically efficient.

[2] Maskus (1997); Martin and Maskus (2001), arguing that improved worker rights can raise productivity by raising the "buy in" of employees to firm goals, and ILO (1998-99), arguing that collective bargaining encourages innovation and attracts FDI.

[3] OECD (2000).

[4] Trade economists often assume that labor unions will act to restrict employment and generate rents for those who retain jobs, in which case the interjection of union rights could increase inefficiency. However, there is little systematic evidence on this point in developing countries.

Over time, as workers come to understand these hazards, their wage-risk profile would reflect them more efficiently, unless employers can sustain the asymmetric information through hiring from an uninformed labor pool (e.g., new workers coming from the countryside). Employers would then expose themselves to additional training costs and to reduced attachment of workers to the firm, making the net long-term impact on competitiveness ambiguous.

These examples presume that standards are weak in the export sectors, which may be true in the case of labor-intensive manufactures, mining, and forestry. However, if poor working conditions exist predominantly in import sectors, non-traded goods and services, and the informal economy, and if this situation reduced costs and attracted labor, general-equilibrium pressures would end up reducing exports under many circumstances.[5] Some mixture of these conditions exists in most poor countries, implying that the implications for trade of strengthening labor rights are generally ambiguous.

A final relevant observation is that, empirically, countries in which labor standards are poorly developed and working conditions are abhorrent tend also to be countries in which democratic processes, transparency, openness, and clean governance are in short supply.[6] In this context, even if weak labor rights were thought to lower costs and improve competitiveness, it would be difficult to isolate these effects because the other problems could dominate. For many reasons, therefore, the empirical problem is difficult, even in theory.

2. Labor standards in individual East Asian economies[7]

China has ratified ILO Convention 138, calling for a minimum age at which work may be undertaken full time. China's law bans work for children under age 16 and there are particular provisions regulating work by those aged 16 or 17. China has ratified ILO Convention 100 calling for equal remuneration for equal work between men and women. However, China has not ratified the other conventions. Overall, therefore, China maintains an approach that is not supportive of union rights. It has only one officially recognized national union and applications to establish a union at the enterprise or professional level are denied. Because such unions are not recognized, their operations are illegal and leaders have at times been detained. China does not recognize the right to strike, though strikes do occur. Collective bargaining is not permitted within state-owned enterprises and the negotiation of collective agreements in other enterprises seems to be restricted.

Hong Kong (China) has long recognized the right to form and join unions, but the government does not encourage the use of collective bargaining. Employers may be fined if they prevent a worker from joining a union. There is a significant restriction on the right to strike, for employers may summarily discharge an employee who is absent from

[5] Maskus (1997).
[6] Moran (2002); OECD (2000).
[7] See OECD (2000) and Betcherman and Islam (2001). I was unable to find information on Cambodia and Vietnam. Cambodia adopted a general law governing labor relations in 1997.

work for this reason. However, if such discharges are seen as intimidating, the employers may be fined and subject to criminal proceedings.

Indonesia traditionally has recognized the right to form a union but placed significant conditions on unions, such as minimum number of workers per plant, number of provinces represented, and the like, before certification could be issued. Prior to President Suharto's resignation in 1998, only one trade union federation was recognized and the government heavily interfered in its activities. Since 1998, many such restrictions have been relaxed and numerous new unions and trade union confederations have been certified, though there remain problems with registration of workplace-level units. The unionization rate is still low at around five percent. The rights to strike are strongly limited by mediation and notification requirements, which prevent most strikes from being declared legal. Leaders of illegal strikes have often been detained. Despite a more pro-labor environment since 1998, there remain allegations of discrimination against union members and interference by employers with union activities. Finally, discharges from employment require approval by a committee of workers, employers, and government officials, and there are mandatory severance payments.

Korea's labor laws have become markedly friendlier to organized worker interests, in part to become more consistent with OECD practices.[8] Before 1997, the law in Korea permitted only one labor union per company and there were strict restraints on the formation of national confederations. New legislation in 1997 and 2002 established a more liberal environment in which labor union pluralism is recognized and a number of national federations have emerged. Public workers have rights, though limited, to form representative associations. The rights to strike remain prohibited for government workers and are restricted for workers in essential services. In other areas the rights to strike are recognized, subject to notification requirements and cooling-off periods. Collective bargaining rights are now respected in the law and there is legal protection against retribution for participating in strikes. Korea implemented a law protecting workers from arbitrary dismissal in 1999 and there are mandatory severance payments for fired workers. For its part, the ILO (1998-99) described Korea's changes as a comprehensive set of economic and social measures to cope with the financial crisis.

Malaysia retains significant restraints on union formation. Unions can be denied legal recognition if authorities think they may be used for "unlawful purposes or other reasons". Unions can only represent workers in similar industries or professions, precluding the emergence of national unions. These restrictions keep unionization low at around nine percent. The right to strike is heavily restricted by requirements for compulsory arbitration and government authorities can take disputes to court, an act that delays the onset of strikes. Strikes in a comprehensive set of essential services are illegal. Collective bargaining is protected by laws against anti-union discrimination, but enforcement is alleged to be weak. Workers in "pioneer" industries do not have full collective bargaining rights. Malaysia requires employers to give advance notification before firing workers, and mandatory severance payments, though this latter requirement has a relatively low compliance rate.

[8] OECD (2000).

The Philippines has a high rate of unionization, at around 27 percent of the workforce. To be registered, a union must represent at least 20 percent of the workers in a bargaining class, and there also are minimum representation requirements for establishing a national federation, but these restrictions do not seem particularly onerous. For a strike to be legal, there must be majority approval among workers, prior notification, and a cooling-off period, while authorities can declare strikes illegal in a broad set of strategic industries. Finally, legislation provides employees protection from arbitrary dismissal, though anti-union practices persist in an environment of weak enforcement. There are prior notification requirements and mandated severance payments. It is noteworthy that there have been marked improvements in labor relations within publicly managed export processing zones since the mid-1990s.[9]

Thailand permits freedom of association in order to establish unions in the private sector but the government retains restrictions on organization rights within large state-owned enterprises. The level of unionization is quite low at around two percent. Authorities can prohibit strikes in the private sector, while strikes by workers in state companies are illegal and are prohibited in essential services. The government sets wages in state enterprises, thereby significantly restricting collective bargaining. Anti-union discrimination is illegal in the private sector but encounters weak enforcement.

3. Econometric analysis: labor standards and labor-intensive exports

An econometric analysis was undertaken to test the hypothesis that labor standards affect East Asian exports of labor-intensive goods, and did so more strongly after the onset of the crisis. The underlying models are estimated for 1995 and 1999 to see if any differences may have arisen during the crisis in terms of the impact of standards on exports.

Three measures of labor standards are selected, corresponding to Models (1) through (3). The first (Model 1) is an index of the strength of freedom of association rights (FA rights) in the exporting countries in 1996 (applied to the 1995 data here) and 2000 (applied to the 1999 data here), developed by OECD (2000). This index takes on the values 1, 2, or 3 in our sample of exporters. In those countries with index value 1, such rights are "practically non-existent" (China, Indonesia, and Egypt in 1995 among the exporters included here). In those countries with index value 2, restrictions on FA rights are significant or it is difficult to form union confederations (Colombia, South Korea, Malaysia, Pakistan, Philippines, and Thailand in 1995).[10] In those countries with index value 3, some restrictions exist but it is possible to establish confederations (Argentina, Brazil, Chile, India, South Korea, Mexico, Peru, Venezuela, and South Africa).[11] The 2000 index values were the same as the 1995 values except that Korea and Indonesia were moved up one

[9] ILO (1998).
[10] Indonesia was raised to level 2 and South Korea to level 3 in the 1999 data.
[11] An index value of 4 exists for countries with strong FA rights. Because it applies to all the importers in this sample except Turkey, it could not provide much statistical discrimination among those countries in terms of how their labor standards affect trade. Thus, FA rights in the importer are excluded.

category. This suggests that measured freedom of association rights were not endogenous to the crisis in the sense of being weakened.

The second measure (Model 7) is the index of four labor standards developed by Verite (2002) that appears in Table 7.2 in the main text. A single value of this index exists only for each country in the late 1990s and is applied in both the 1995 and 1999 regression equations.

The third measure (Model 3) is the number of the eight fundamental ILO conventions (ILO – F) that were ratified by the exporting countries by 1995 or 1999. For reasons mentioned above, the number of ratifications is a questionable indicator of a country's actual commitment to strong labor rights, but these measures have been commonly used in the literature. Very few countries reduced the number of conventions they had ratified, though a number did ratify more during the crisis period, as noted earlier in this chapter. Again, these changes suggest that labor rights were not weakened due to the crisis.

It is impossible with available data to track the dynamics of changes in trade and labor standards over the crisis period, for there were very few legislated changes in labor rights and no useful data on enforcement. Rather, the intention underlying these regressions is to determine whether relative differences in the strength of labor standards across exporting nations generated stronger impacts on trade in 1999 than 1995. If weak labor rights were a factor raising exports of labor-intensive manufactures we would expect to find a negative coefficient in both years. However, if the negative coefficient were larger in 1999 than that in 1995, it would suggest that differential labor rights provided a stronger impetus to exports in the latter year. This is at best a partial and crude test of the notion that labor rights were effectively weakened during the crisis and that they helped boost exports in the post-crisis period.

Table 7.3 in the main text presents results for all variables used to augment the basic gravity equation.[12] As many be seen, Mexico's membership in NAFTA increased its labor-intensive exports above anticipated levels and this effect increased between 1995 and 1999. The regional dummies are generally significant and positive except in Model 3, where labor standards are measured by ratification decisions on fundamental ILO conventions.

The analysis incorporates the index of political freedoms in the exporting countries in order to control for the fact that differential labor standards may simply reflect weaknesses in the broader policy environment. As may be seen, an increase in the political freedom index exerted a significantly negative effect on bilateral exports of labor-intensive products in each model. This seems surprising, given that the equations control for market size and distance. It may well be that the index is picking up the

[12] Coefficients for the gravity equation variables (importer and exporter GDP, importer and exporter population, and bilateral distance) are available on request. These coefficients were consistent with standard gravity equation results. In some cases reported exports were zero, so I added the value one to all export flows before taking logs.

influence of comparative advantage; as economies become richer (and political freedoms tend to improve) their export bundles shift away from labor-intensive goods.

Looking next at the results for freedom of association rights in Model 1, across all developing countries in the sample, the average coefficient is positive and significant in both years. Thus, rather than finding that weak labor standards increase export performance, the opposite seems true. Note that because the dependent variable is the log of bilateral exports and the independent variable is an index in levels, the coefficient is not an elasticity. Accordingly, below each coefficient the table reports the associated elasticity computed at the sample mean for FA rights. These figures suggest that bilateral exports of labor-intensive goods respond elastically to marginal improvements in labor rights.

To isolate the impacts of freedom of association rights in East Asia, I include interaction terms for three regions. In 1995 the interaction coefficient for East Asia was significantly positive, suggesting that the direct response of exports from increased labor rights was even stronger in East Asia than on average. Indeed, the elasticity is 2.13, suggesting that a one-percent increase in union rights would expand the average bilateral export flow of East Asian developing countries by more than two percent.[13] However, this effect was smaller in 1999 and the East Asian coefficient is not significantly different from the average. This may provide some indication that stronger labor rights had a relatively smaller positive impact on exports of labor-intensive goods by the later year. However, it hardly supports a claim that weak labor protection was a source of export competitiveness.

The coefficient estimates on the South Asian and Latin American dummies are negative and significant, suggesting that lower labor standards were more positively associated with labor-intensive exports than average. However, to make a proper comparison across groups requires calculating the associated elasticities, which depend on the share of these countries in the sample of exporters.[14] As may be seen, these elasticities are positive for both South Asia and Latin America, suggesting that in all three regions an improvement in labor rights actually expands labor-intensive exports. However, while the elasticity estimates for South Asia are significantly bigger than zero, those for Latin America are not.[15] Interestingly, unlike the East Asian case, in both of these regions the elasticities became higher in 1999.

The second measure of labor standards is the Verite (2002) index. Across the whole sample its coefficient is significantly positive in both years, again suggesting that higher standards are associated with greater exports of labor-intensive goods. In this case the

[13] Treat this result with caution, as a "one percent" change in a discrete index is not a readily interpretable experiment, while to claim that a doubling of this index (say from 1 to 2) would expand exports by 213 percent is not very sensible. Such elasticities relate to marginal changes in policy.

[14] Specifically, if log (exports) = G + α(FARights) + β (FARights • DREG), where DREG is the regional dummy variable, then the elasticity of exports with respect to FA rights is (α + β • DREGBAR) • (FARightsBAR), where DREGBAR and FARightsBAR are sample means.

[15] These inferences come from t-tests using the standard errors of the relevant regression coefficients and of the dummy variables. These are approximate tests for I assumed all covariances to be zero.

estimated elasticities are quite high. The coefficients on the East Asian interaction term are zero, meaning that countries in that region do not behave differently from average. Finally, while the marginal coefficients on South Asia and Latin America are negative and usually significant, the estimated elasticities remain significantly positive. Again, using this measure there is no evidence that weak labor standards provide an advantage in labor-intensive exports.

The third measure of labor rights, the number of fundamental ILO conventions (of a maximum of eight) that a country has ratified, tells a different story. On average, the coefficients are negative and significant, suggesting that countries that have ratified more conventions tend to export a smaller volume of labor-intensive products. Table 11.1 in the main text shows that those countries with high ratification numbers tend to be among the smaller exporters of manufactured goods (Argentina, Colombia, Peru, Venezuela, and Egypt).[16] With respect to East Asia, it is interesting that the coefficients on the interaction terms are positive, suggesting that this inverse relationship is weaker in that region. In fact, the elasticity of exports with respect to ILO ratifications is not significantly different from zero in 1995 for East Asia, though it is in 1999.

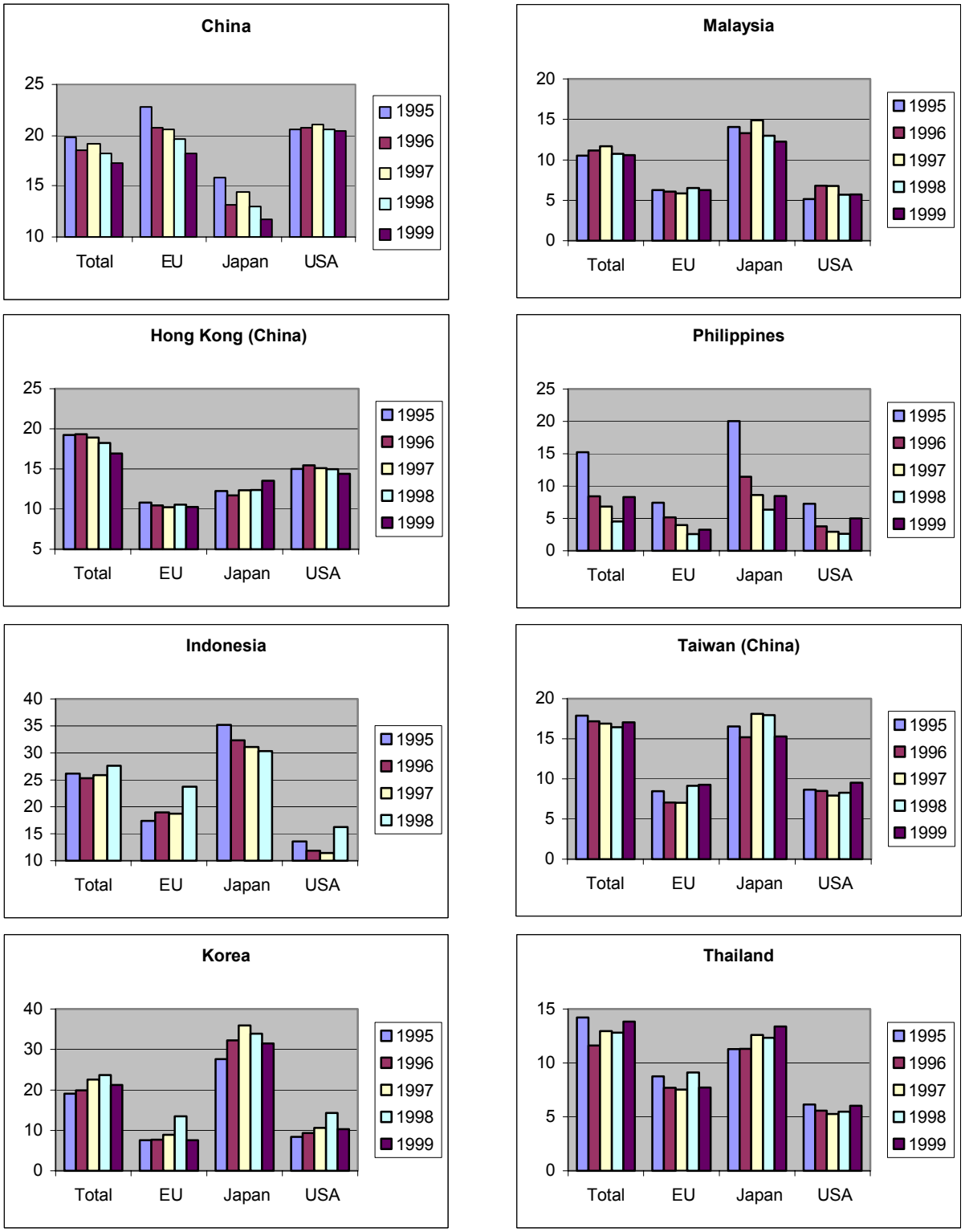
Why do the results using the third measure differ from those using the first and second? Close consideration of the three measures provides insight. The OECD measure of FA rights is directly keyed on a central and fundamental basic labor right. The Verite index combines four approaches but its incorporation of enforcement and effective recognition of four core labor standards makes it also focused on basic rights. Thus, both these measures are suited to analyze the impacts of core labor protection on export performance, which impacts appear to be positive. On its face, the third measure—the number of ILO ratifications—should also be an indicator of core labor rights. However, as explained earlier, it is a questionable measure of actual commitment to improved working conditions. Indeed, in the present sample of developing-country exporters, it may proxy for inflexibility in labor markets, since the highest ratification numbers exist in countries that have the strongest security and survival rights in the formal sector. Forteza and Rama (2001) developed an index of labor-market rigidity and found that among developing countries the average index was 0.18 in East Asia, 0.32 in Latin America and the Caribbean, and 0.27 in South Asia. Meanwhile, the total number of ILO conventions ratified (as opposed to the eight basic ones) on average was 9.35 in East Asia, 37.65 in Latin America and the Caribbean, and 23.71 in South Asia.[17]

4. Trends in pollution-intensive exports

We repeat the earlier exercises on labor-intensive goods for a set of high-pollution manufactured goods over the period 1995-99. Again, we might expect a reduction in costs from weaker, or more weakly enforced, environmental standards to show up in increases in the share of pollution-intensive goods in manufactured exports for East Asian economies. The shares of these industries in total manufactured exports are shown in Appendix Figure 7.1 for eight East Asian economies.

[16] The correlation between exports and ratifications is –0.44 in 1995 and –0.55 in 1999.
[17] Hasan and Quibria (2002).

Appendix Figure Error! No text of specified style in document.**1: Shares of pollution-intensive manufactured exports, 1995-99**



Note: Pollution-intensive industries are defined as furniture, paper and paper products, chemicals, petroleum products, plastic products, and basic metal products, i.e. ISIC categories 332, 341, 351, 352, 353, 356, 371, and 372.

The trends in the shares of pollution-intensive exports vary widely across these economies. In China the shares fell for all export destinations between 1995-99, though they rose in the US market between 1995-97. In Hong Kong (China) these shares were considerably smaller in exports to the EU, Japan, and the United States than in total exports. The percentage of pollution-intensive exports to Japan rose slightly over the period, while other export shares were stable.

Indonesia provides the most straightforward support for the idea that the economic crisis generated a composition effect toward pollution-intensive sectors. Indonesia showed a shift toward dirtier industries, in total exports and to the EU and the United States. This is consistent with the fact that output of dirty goods rose relative to that of other goods in Indonesia during the crisis.[18] This export share also rose in Korea from 1997-98 before falling again in 1999, and there is some indication of similar increases in the Philippines and Thailand in 1999.

It is noteworthy that those countries experiencing the greatest stress from the crisis—Indonesia, Korea, Thailand, and Philippines—registered these increases in export shares. This tendency was not evident in Malaysia and Taiwan (China). Again, such calculations are only suggestive because many factors other than declining environmental costs or weak environmental standards could explain such changes in export shares.

5. Econometric analysis: environmental regulation and pollution-intensive exports

Bilateral export data for the eight industries, comprising 18 developing country exporters and 20 developed country importers, are pooled for the eight pollution-intensive industries and a gravity equation is estimated for 1995 and for 1999. The gravity equations include the standard controls and fixed effects for each sector. The two measures of environmental standards used are the environmental sustainability index (ES) and the environmental regulatory regime index (ER). Also included are the index of political freedom, a dummy for joint importer-exporter NAFTA membership, and regional fixed effects.

The explanatory power is similar across both models, with an R-squared of around 0.56 (Table 7.3 in the main text). The coefficient on the NAFTA dummy is consistently positive and significant. However, the coefficients on the regional dummies are sensitive to the definition of environmental standards, which have different scales.

The results of including the two environmental protection indexes tell a consistent story. The average effect in both cases is again positive and significant, suggesting that stronger protection is associated with higher relative exports of pollution-intensive goods. The interaction term on East Asia is negative and significant in both cases, indicating that in this region the association is weaker than average. Nonetheless, in Model 1 the combined elasticity estimates are positive for East Asia and there is no indication that this impact

[18] World Bank (2001b).

was weaker in 1999 than in 1995. The combined trade-environment elasticities in Model 2 are insignificant for the region. Similar results are recorded for Latin America.

The findings suggest that, across East Asian developing country exporters, a country with stronger perceived environmental sustainability either would have higher exports of pollution-intensive manufactures or there would be no statistical difference. It is possible, for example, that the scale effect from recession and the composition effect from declining export prices (tending to improve environmental use) were offset by the technique effect of higher pollution intensities (tending to worsen environmental use). There is no indication in this framework that after the economic crisis the relationship between environmental protection and exports was stronger or more elastic.

Certainly such inferences need to be heavily qualified. First, aggregate trade data can mask significant variation for individual products and plants. It is possible that particular trade flows were more sensitive to variations in environmental protection than were aggregate sectoral flows. Second, the environmental indexes used here leave much to be desired. They are survey-based perceptions of overall environmental protection, which may miss numerous subtleties in standards for particular industries and localities. Moreover, they were defined for 2001 and may not have much relevance for export decisions that were made in 1995 and 1999, unless environmental standards changed slowly. Third, environmental protection is fundamentally endogenous to international trade (or, more accurately, to trade liberalization and changes in prices). The endogeneity bias may be significant but unfortunately no readily available instruments are available for dealing with this problem. Fourth, the analysis considers only pollution-intensive manufactured goods, while environmental costs may be more important in determining trade in agricultural goods and primary commodities.

Rachel Weaving
C:\My Documents\East Asia flagship\website material\Chapter11 supplementaryfindings 022403.doc
2/27/03 7:02 PM

References

Bagwell, Kyle and Robert W. Staiger (1999), “The Simple Economics of Labor Standards and the GATT,” in Alan V. Deardorff and Robert M. Stern, eds. *Social Dimensions of U.S. Trade Policies*, Ann Arbor: University of Michigan Press.

Betcherman, Gordon and Rizwanul Islam, editors (2001), *East Asian Labor Markets and the Economic Crisis*, Washington DC: The World Bank.

Brown, Drusilla, Alan Deardorff, and Robert Stern (1996); “ International Labor Standards and Trade : A Theoretical Analysis,” in Jagdish Bhagwati and Robert Hudec, eds., *Fair Trade and Harmonization : Prerequisites for Free Trade? Volume 1*; (Cambridge: MIT Press).

Forteza, A. and M. Rama (2001), "Labor Market Rigidity and the Success of Economic Reforms Across More than 100 Countries," The World Bank, Working Paper no. 2521.

Hasan, Rana and M. G. Quibria (2002), "Poverty and Patterns of Growth," Asian Development Bank, ERD Working Paper no. 18.

International Labor Organization (1998), *Labor and Social Issues Relating to Export Processing Zones*, Geneva: ILO.

International Labor Organization (1998-99), *Country Studies on the Social Impact of Globalization*, Geneva: ILO.

Martin, William J. and Keith E. Maskus (2001), "The Economics of Core Labor Standards: Implications for International Trade Policy," *Review of International Economics* 9: 317-328.

Maskus, Keith E. (1997), "Should Core Labor Standards be Imposed through Trade Policy?" World Bank, Policy Research Working Paper no. 1817.

Moran, Theodore H. (2002), *Beyond Sweatshops: Foreign Direct Investment and Globalization in Developing Countries*, Washington DC: Brookings Institution.

Organization for Economic Cooperation and Development (2000), *International Trade and Core Labor Standards*, Paris: OECD.

Verite (2002), "Report to California Public Employees Retirement System (CalPERS): Emerging Markets Research Project," manuscript (available at verite@verite.org).