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Exports and the Global Crisis:
Still Alive, though Not Quite Kicking Yet

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Contents

Abstract

This paper describes the severity of the declines of Asian exports during the recent global crisis and provides more detailed information on the hardest hit manufacturing and exporting industries. To do this, we use various sources of data, including Industrial Statistics of the United Nations Industrial Development Organization as well as the latest monthly unemployment and exports data available from official sources. We find severe declines of exports across most product categories, and that the worst-hit sectors often consist of larger, more productive firms relative to other manufacturing sectors. Some of these sectors also employ higher percentages of women workers in countries such as Indonesia and Malaysia. Nonetheless, although official unemployment rose across developing Asia, the level has yet to reach that of OECD countries. In further contrast to the jobless recovery facing some OECD countries, employment shows recent signs of stabilizing and even increasing. Finally, we conclude with a discussion on the recent upward trends in exports. While we see cautious optimism in the revival of exports, data indicates that Asian workers are not clearly out of the woods yet.

I. Introduction

The current global economic crisis that began in 2008 has been dubbed as the "worst economic crisis" since the Great Depression. Even though the financial impact in Asia is not as severe as the correction in the United States (US) and in countries of the Organisation for Economic Co-operation and Development (OECD), the brunt of the crisis was prominently felt by most Asian countries in terms of the unprecedented and swift decline in exports. By the last quarter of 2008, the negative impacts on export-intensive Asian countries were apparently significant. The initial wave of the impact, through the steep drop in real demand, posed a large challenge for exporting enterprises in developing Asian countries with large export sectors. As exports continued to decline due to weak demand especially from the developed countries, workers in developing Asia are also greatly affected. Given that these exporting sectors hire a considerable portion of the total labor force, a decline in export demand also translated into job losses, hours or wage cuts, and/or reduction of employment benefits.

The objective of this paper, which is a background paper to the Special Chapter of *Key Indicators for Asia and the Pacific 2009* (ADB 2009b), is to describe the severity in the declines of Asian exports and to provide more detailed information on the hardest hit manufacturing and exporting industries. To do this, we employ various sources of data, including Industrial Statistics of the United Nations Industrial Development Organization (UNIDO) and the latest monthly exports data available from official sources. Given that the actual impact will not be known until individual-level data is collected and surveyed, we use several alternative methods to glean the potential impact of the global downturn on workers and firms, especially those potentially worst affected. This is achieved through an analysis using various labor force surveys, calculations of the historical elasticity of employment with respect to exports, and formulation of an index of exports vulnerability. Finally, the paper concludes with a discussion on the recent trends in exports, as reflected in the most recently available data.

II. Declining Exports in Asia

For the past two decades, many developing Asian economies have pursued an export-led growth strategy, resulting in a steady increase in the degree of openness of their economy. Perhaps the most remarkable case is the People's Republic of China (PRC), whose tentative foray into globalization only began in the late 1980s but already became the world's largest exporter today. While the export-led strategy had been successful for many Asian economies, this high degree of openness also rendered these countries highly vulnerable to fluctuations in demand for their exported products. As may be seen from Figure 1, the biggest exposure to an export slowdown would be in Singapore and Hong Kong, China; followed by Malaysia; Thailand; PRC; Republic of Korea (henceforth Korea); and Viet Nam.[1]

Figure 1: Importance of Manufactured Exports for Asia (percent of GDP)
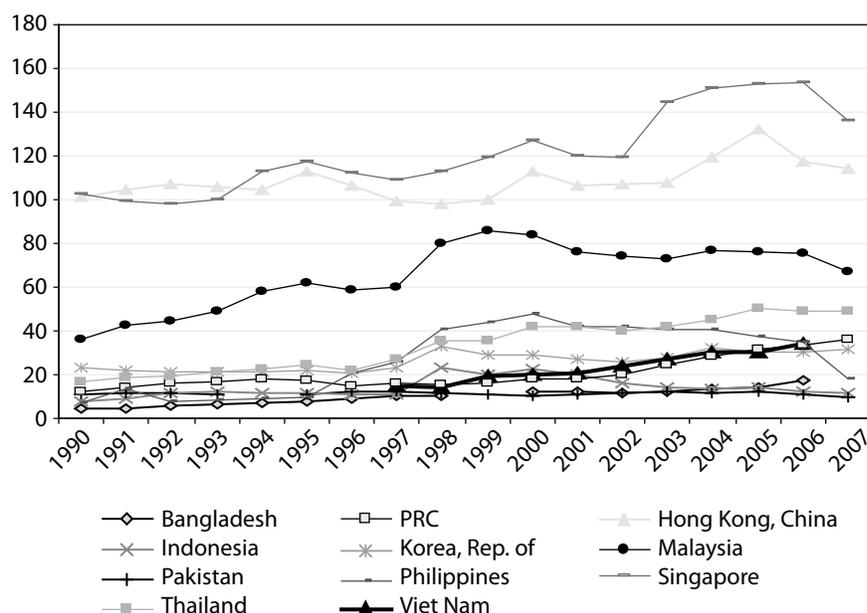
Source: World Development Indicators online database, downloaded 30 September 2009.

A.   How Severe was the Decline in Exports?

World trade volume peaked in July 2008, and has decreased dramatically between then and now. Within a short span of 6 months between mid-2008 till early 2009, exports of many countries around the world tumbled sharply, exceeding 50% in countries such as the PRC and the US (see Table 1). Globally, the top 10 export products that declined the most, in declining order of change in US dollar export value, were electrical machinery

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[1]   Here we note that trade exposure is based on the total manufactured merchandise exports over gross domestic product (GDP) ratio.

and equipment, mechanical machinery and equipment, vehicles, optical and photographic instruments, organic chemical, iron and steel, plastics, ores, precious metals and stones, and pharmaceutical products.

This decline in export demand has significant impacts on Asian enterprises, especially since exports of manufactured goods constitute a large component of total exports in Asia—above 70% for Philippines, Malaysia, Korea, and Singapore. Unfortunately, while some signs of easing are emerging, the downward trend of exports is expected to continue at least for another year. The projected decline in real exports in 2009 is almost $80 billion for the region; $28 billion for the PRC alone for 2009 (ADB 2009a).

Table 1: Top 10 Economies with Largest Export Declines between July 2008 and January 2009

Economy	$US million	Percent
PRC	−98229	−50.0
Japan	−43844	−45.2
US	−42606	−70.6
Switzerland	−24729	−35.0
Korea, Republic of	−22239	−55.0
Germany	−19547	−43.2
Brazil	−18321	−37.3
Taipei,China	−16681	−26.6
Australia	−14835	−83.9
Thailand	−11149	−43.0

Source: ADB staff using TradeData International data, April 2009.

While not all products saw a dramatic drop in export demand, perhaps more pertinently, total export value of many Asian countries have declined more than 30% compared to the year before. The decline in exports value of the PRC exceeded $22.1 billion between February 2008 and February 2009. In percentage terms, the weakening demand for exports that began after mid-2008 clearly plummeted by early 2009 as shown by Figure 2. Total exports value declined over one third in January 2009 compared to the same month in the previous year for Taipei,China; Korea; Philippines; Singapore; and Indonesia.[2]

Although there seems to be some improvement from February to March 2009 (and there were some exports that showed better performance such as tobacco exports from the PRC), total exports still lag far behind the levels of the previous year and seemed to perform worse in March than in February. From Figure 2, we clearly see that up until September 2009, real export growth continued to be negative. One possible reason for this steep decline in exports is the weakening demand for the exported products from Asian economies. The decline of import demand from the US and European Union (EU)

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[2] The decline in total exports value in the PRC is by far the largest in developing Asia. In percentage terms, the year-on-year decline is 25.8% for March 2009.

have affected the export-oriented Asian countries significantly across most categories of manufactured exports. However, as have been pointed out by many observers (ADB 2009a, IMF 2009, World Bank 2009), the severity of the impacts of this weakening export demand varies across industrial products.

Figure 2: Real Export Growth (percent, year-on-year changes)
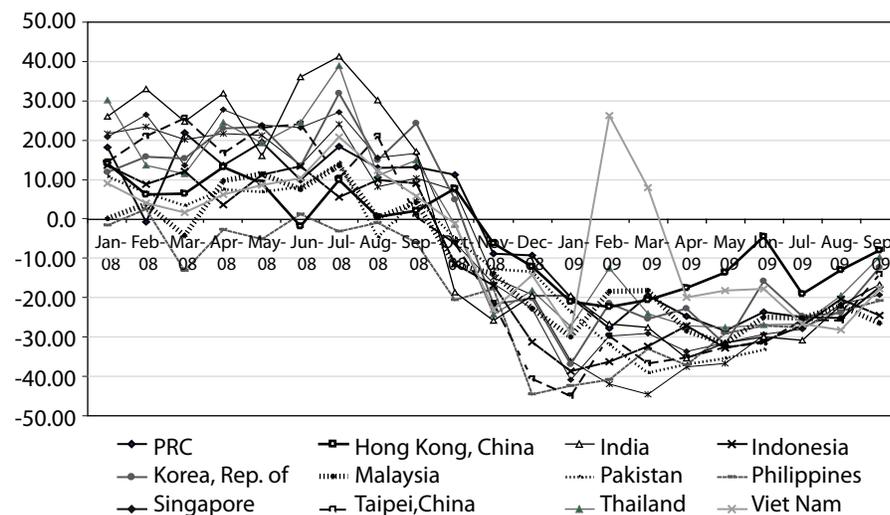
Sources: CEIC Data Company Ltd., downloaded 30 November 2009; authors' estimates.

B. Which Sectors have been Hardest Hit?

What are the products that are affected the most in the region? As have been documented in other studies (ADB 2009a etc), garments, textiles, footwear, computing equipment, electrical, and nonelectrical machineries have been some of the worst affected exports, constituting a disproportionate share in the top five affected products across various countries.[3] Figure 3 shows the growth of imports of the US, EU, and Japan from Asian economies for selected commodities namely chemicals, clothing, computers, electrical machinery, footwear, office machines, plastics and plastic products, road vehicles, rubber and rubber products, and toys. Notably, these countries constitute around 60% of the final demand for Asian exports. It is evident that most of the major commodities being imported by the US, Japan, and EU fell sharply during the last quarter of 2008 up to the first quarter of 2009. Exporters of rubber and rubber products were the biggest losers, suffering from as much as 22–66% decline in export demand from these economies. Office machines, computers, electrical machinery, and road vehicles follow with declines ranging from 20% to 40%. Import demand remained weak during the second quarter of 2009 albeit better economic forecasts although there are fledging signs of recovery in the third quarter of 2009 (see Figure 2). Import growth year-on-year remained negative for most of the products, with rubber and rubber products still posting the biggest decline.

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[3] Electrical machineries refer to categories 293, 312, 313, 314, 319, 321 in ISIC Rev.3, and category 383 under ISIC Rev.2 (PRC and Hong Kong, China).

Figure 3: Import Growth of EU, Japan, and US for Selected Commodities (year-on-year, percent)

US Import Growth (selected Asian economies)

EU 27 Import Growth (selected Asian economies)

Japan Import Growth (selected Asian economies)

■ 2007   ▨ 2008   ▩ Jan–March 2009   ▢ Apr–June 2009
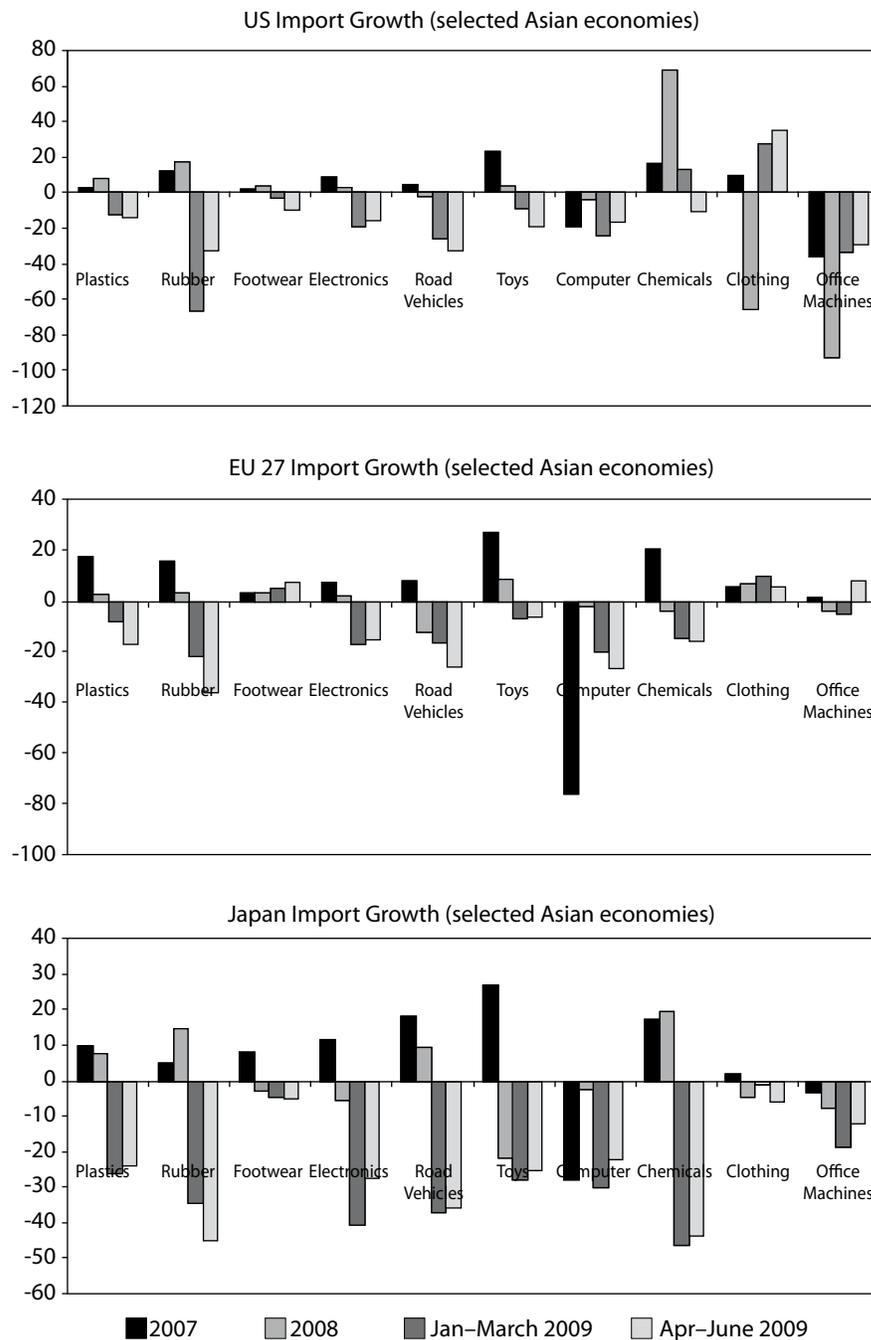
Note: The selected Asian economies include PRC; Hong Kong, China; India; Indonesia; Japan; Korea; Philippines; Singapore; Taipei,China; Thailand; and Viet Nam.

Sources: Authors' estimates based on Eurostat, available: http://epp.eurostat.ec.europa.eu/; Ministry of Finance, Trade Statistics of Japan, available: http://www.customs.go.jp/toukei/srch/indexe.htm; and USITC Interactive Tariff and Trade DataWeb Version 3.0.0, available: http://dataweb.usitc.gov. Downloaded 12 October 2009.

Next, we attempt to provide more sectoral information for the hardest hit sectors by matching UNIDO Industrial Statistics (3-digit level) and the latest monthly exports data available. First, we use the merged data to identify the top five export declines in the following economies: PRC; Hong Kong, China; Indonesia; India; Korea; Malaysia; Philippines; Singapore; and Viet Nam. The top five declining exports were determined based on the largest absolute decline of exports value year on year given the latest export data available as of May 2009.[4] In this way, the top five declining exports also capture a sense of importance of that export within the country. We retain this ranking for updated export data through Q3 2009. In Table 2, for each economy in our sample, we provide the year-on-year percentage changes for the top five declining manufacturing exports, sorted by the largest amounts of absolute decline of year-on-year export values. The list of exported goods excludes petroleum products.

Examining the product-level data, as presented in Table 2, it is immediately evident that the decline in exports is severe for the most affected products, often exceeding 50% in year-on-year changes, even in economies where total exports as a whole was only mildly affected. The declines in exports are large, both in percentage terms and in absolute terms. For example, PRC exports of nonelectrical machineries alone declined by $6.3 billion in February 2009. This represents a 21.7% reduction in total exports of nonelectrical machineries compared to the same month in the year prior. Wearing apparel and footwear declined by 76.55% in March for Hong Kong, China representing the highest export decline for March 2009 versus the same month of the previous year. Electrical machinery and appliances declined by 29.15% and 44% for Korea and Philippines, respectively. These products were the worst performing exports for these two countries and among the top five for PRC; Hong Kong, China; Indonesia; and Singapore. Exports of more labor-intensive products, such as garments, textiles, and footwear, weakened severely in PRC; Hong Kong, China; India; Indonesia; Philippines; and Viet Nam.

After identifying the most severely affected export products, it is also crucial to determine whether the crisis has different impacts on firms and workers. If the affected export sectors vary in their labor and capital intensity, this would have different implications on which types of workers and firms would be most negatively affected by the crisis. It is interesting to know whether smaller firms are disproportionately affected and if younger or better educated workers bear the brunt of this crisis or not. In the next section, we take up some of these issues using publicly available industrial and labor force statistics.

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[4] For some countries the dates differ depending on data availability: November 2008 for India; January 2009 for Indonesia and Viet Nam; February 2009 for the PRC and Philippines; and March 2009 for Hong Kong, China; Malaysia; Korea;and Singapore.

Table 2: Top Five Declining Exports in 2009

(a)	Exports (USD billion)		Absolute Change (USD billion)		Percent Change		
	(b)	(c)	(d)	(e)	(f)	(g)	(h)
	2008	2009	2007–2008	2008–2009	2007–2008	Q1 2008–Q1 2009	Q3 2008–Q3 2009
China, People's Republic of							
Nonelectrical machinery	28.88	22.6	3.25	−6.28	13	−22	−13
Wearing apparel including footwear	8.27	5.51	−1.15	−2.76	−12	−33	−7
Electrical machinery and apparatus	10.6	8.12	1.4	−2.49	15	−23	−9
Textiles	3.95	2.64	−0.01	−1.31	0	−33	−5
Professional and scientific equipment	3.32	2.07	0.92	−1.25	38	−38	−2
Other manufacturing	30.56	22.56	0.49	−8	2	−26	−22
Hong Kong, China							
Wearing apparel including footwear	0.21	0.05	0.01	−0.16	4	−77	−87
Iron, steel and nonferrous metals	0.11	0.04	0.05	−0.07	106	−64	−73
Nonelectrical machinery	0.11	0.09	−0.04	−0.03	−27	−24	12
Plastic products	0.08	0.06	0.02	−0.02	28	−26	6
Electrical machinery	0.07	0.05	−0.03	−0.02	−27	−24	−21
Other manufacturing	0.35	0.26	−0.02	−0.09	−7	−27	−24
India							
Jewelry and related articles	1.51	1.09	0.42	−0.42	38	−28	12
Basic iron and steel	0.38	0.21	−0.08	−0.17	−17	−44	−61
Grain mill products	0.3	0.19	0.14	−0.12	87	−39	−30
Textile yarns, fabrics and made-up articles	0.44	0.34	0.05	−0.1	11	−23	−37
Casting of iron, steel and nonferrous metals	0.13	0.05	0.1	−0.08	458	−63	−60
Other manufacturing	4.95	5.32	1	0.36	25	1	−16
Indonesia							
Basic precious and nonferrous metals	1.42	0.56	0.48	−0.86	52	−60	−8
Produced, processed and preserved meat, fish, fruit, vegetables, oils and fats	1.58	0.76	1.16	−0.82	245	−52	35
Basic chemicals, rubber and plastics products	0.61	0.32	0.11	−0.29	27	−47	−42
Electrical machinery and apparatus	0.38	0.22	0.03	−0.16	8	−42	−6
Textiles	0.35	0.23	0.02	−0.12	5	−34	−12
Other manufacturing	4.07	3.40	0.34	−0.49	10	−15	−19
Korea, Republic of							
Electrical machinery and apparatus	4.38	3.1	0.24	−1.28	6	−29	16
Telecom, sound recording, and reproducing apparatus	4.66	3.42	1.07	−1.23	30	−26	−18
Basic chemicals, rubber and plastics products	3.84	2.82	0.8	−1.02	26	−27	−14
Special purpose machinery and equipment	1.60	0.94	0.37	−0.66	30	−41	−11
Road vehicles	7.15	6.56	0.64	−0.57	10	−8	3
Other manufacturing	11.27	9.18	1.23	−2.09	12	−19	−7
Malaysia							
Processed and preserved meat, fish, fruit, vegetables, oils and fats	1.58	1.12	0.78	−0.47	97	−30	−27
Basic chemicals, rubber and plastics products	1.2	0.75	0.16	−0.45	15	−37	−25

Table 2: *continued.*

Metal manufactures and general industrial nonelectrical machinery	0.87	0.51	0.22	−0.36	35	−41	−24
Telecom, sound recording, and reproducing apparatus	1.07	0.72	−0.05	−0.35	−4	−33	−36
Office accounting and computing machinery	1.94	1.61	−0.08	−0.33	−4	−17	−25
Other manufacturing	5.81	6.09	−0.73	0.28	−11	5	−15
Philippines							
Electrical machinery and apparatus	1.9	1.07	−0.01	−0.84	0	−44	−14
Office accounting and computing machinery	0.49	0.28	0.03	−0.2	6	−42	−2
Road vehicles	0.3	0.21	0.13	−0.1	72	−32	−24
Clothing, leather products, and footwear	0.19	0.15	−0.02	−0.04	−8	−20	−36
Processed and preserved meat, fish, fruit, vegetables, oils/ fats, beverages	0.19	0.16	0.06	−0.03	49	−17	−16
Other manufacturing	0.56	0.39	0.08	−0.17	16	−31	−6
Singapore							
Other food products / tobacco products	4.88	2.63	1.67	−2.25	52	−46	−35
Electrical machinery and apparatus	2.99	2.13	−0.06	−0.86	−2	−29	−13
Basic chemicals, rubber and plastics products	1.6	1.18	−0.37	−0.43	−19	−27	−8
Office accounting and computing machinery	0.59	0.4	0.08	−0.19	15	−33	−22
Metal manufactures and general industrial nonelectrical machinery and equipment	0.51	0.34	0.08	-0.17	18	−33	−21
Other manufacturing	2.95	2.64	−0.14	−0.31	−5	−11	17
Viet Nam							
Food and beverages	0.81	0.64	0.05	−0.16	6	−20	−21
Leather, leather products, and footwear	0.54	0.42	0.11	−0.12	25	−23	−25
Textiles	0.84	0.74	0.22	−0.1	36	−12	−1
Rubber and plastics products	0.19	0.1	0.04	−0.09	24	−47	−33
Wood products (excluding furniture)	0.28	0.2	0.06	−0.08	26	−30	−3
Other manufacturing	0.35	0.38	0.07	0.03	24	8	−2

Note: The top five declining exports were determined based on the largest absolute decline of exports value year on year given the latest data available as of May 2009.
Column (b) refers to exports on November 2007 for India; January 2008 for Indonesia and Viet Nam; and February 2008 for the PRC and Philippines. March 2008 is for Hong Kong, China; Korea; Malaysia; and Singapore.
Column (c) refers to exports on November 2008 for India; January 2009 for Indonesia and Viet Nam; and February 2009 for the PRC and Philippines. March 2009 is for Hong Kong, China; Korea; Malaysia; and Singapore.
Column (d) refers to year-on-year changes in exports: November 2006 and November 2007 for India; January 2008 and January 2009 for Indonesia and Viet Nam; and February 2007 and February 2008 for the PRC and Philippines. March 2007 and March 2008 are for Hong Kong, China; Korea; Malaysia; and Singapore.
Column (e) refers to year-on-year changes in exports: November 2007 and November 2008 for India; January 2008 and January 2009 for Indonesia and Viet Nam; and February 2008 and February 2009 for the PRC and Philippines. March 2008 and March 2009 for Hong Kong, China; Korea; Malaysia; and Singapore.
Column (g) refers to the percentage year-on-year changes.
Column (h) refers to percentage year-on-year changes for the most recent monthly data available: March 2008 and 2009 for India, and August 2008 and August 2009 for Indonesia. September 2008 and September 2009 are for PRC; Hong Kong, China; Korea; Malaysia; Philippines; Singapore; and Viet Nam.
Source: Exports data downloaded from CEIC Data Company.

III. Effect of the Global Crisis on Enterprises

In order to describe some of the characteristics of firms in the industries hardest hit by the crisis, we combine data from various sources to match export values with establishment information. Appendix 1 describes the data and procedures we use.

As noted earlier, it is still too early to determine the impact of the slowdown in exports on enterprises and workers in a rigorous manner given the lack of large-scale data on enterprises and workers since the crisis began.[5] To get around this problem we use data from existing industrial and enterprise surveys (UNIDO industrial database, World Bank Enterprise Survey data) carried out *prior* to the crisis to infer the probable impacts on different types of enterprises and workers. Though certainly not ideal, what makes our exercise meaningful is that we have detailed information on which manufacturing sectors have been hit most adversely in terms of declining exports.

A.   Firms Potentially Affected

In Table 3, we provide more details on the manufacturing sector (broken down into top 5 worst affected exports and the rest of the manufacturing sector) by country. In particular, we include some rough measures of characteristics of firms, including average firm size and percentage of total firms. Average firm size refers to the average number of workers employed by firms in those industries while percentage of total firms refers to the share of the total establishments reported for the sector over the total number of manufacturing establishments reported for the whole country, regardless whether these firms are exporting or producing for the domestic markets only.

In general, we can see from Table 3 that firm sizes tend to be smaller in the more industrialized economies such as Korea and Hong Kong, China. In these economies, average imputed firm size is less than 100 workers. On the other hand, average firm sizes in developing countries such as PRC, Philippines, and Indonesia are well above 100.[6] However, we note that this is because Industrial surveys in the lower-income DMCs often do not cover smaller enterprises that tend to operate in the informal sector. Were those informal firms included in the data, we would see that most firms in the lower-income DMCs are dominated by very small enterprises.

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[5]   Some rapid assessment surveys have been carried out by various agencies, especially the International Labour Organization. Additionally, more in-depth survey work is also ongoing and being planned. For example the Asian Development Bank and International Labour Organization are collaborating on a study that will assess the impact of the crisis on workers in several countries, including the electronics sector in the Philippines, furniture production in the PRC, the garment sector in Cambodia, and car accessory production in Thailand.

[6]   The exception within this sample is India, where the average firm tends to be smaller in size.

Table 3: Firms Producing the Top Five Declining Export Products vs. Other Manufacturing Firms (excluding petroleum products)

Economy	Average Firm Size	Percent of Firms
China, People's Republic of		
Nonelectrical machinery	178	12.46
Wearing apparel including footwear	289	4.72
Electrical machinery	342	9.60
Textiles	243	9.15
Professional and scientific equipment	242	1.47
Other manufacturing	211	62.60
Hong Kong, China		
Wearing apparel including footwear	15	8.33
Iron, steel, and nonferrous metals	38	0.30
Nonelectrical machinery	5	10.30
Plastic products	5	3.62
Electrical machinery	48	1.84
Other manufacturing	11	75.61
India		
Gems and jewelry	111	0.65
Iron and steel	113	2.76
Grain mill products	23	9.83
Textiles, except garments	95	10.32
Ferro-alloys and residual engineering items	49	1.63
Other manufacturing (nonfuel)	63	74.81
Indonesia		
Basic precious and nonferrous metals	193	0.40
Produced, processed and preserved meat, fish, fruit, vegetables, oils and fats	209	5.29
Basic chemicals, rubber and plastics products	215	8.89
Electrical machinery and apparatus	456	2.00
Textiles	307	9.07
Other manufacturing	185	74.35
Korea, Republic of		
Electrical machinery and apparatus	54	6.01
Telecom, sound recording and reproducing apparatus	53	2.29
Basic chemicals, rubber and plastics products	26	8.49
Special purpose machinery and equipment	20	6.96
Road vehicles	65	3.34
Other manufacturing	20	72.89
Malaysia		
Produced, processed and preserved meat, fish, fruit, vegetables, oils and fats	72	3.15
Basic chemicals, rubber and plastics products	108	7.48
Metal manufactures and general industrial nonelectrical machinery and equipment	35	12.49
Telecom, sound recording and reproducing apparatus	630	0.55
Office accounting and computing machinery	1,216	0.24
Other manufacturing	49	76.09

continued.

Table 3: *continued.*

Philippines		
Electrical machinery and apparatus	610	4.58
Office accounting and computing machinery	1,293	0.69
Road vehicles	186	1.93
Clothing, leather products and footwear	182	15.10
Produced, processed and preserved meat, fish, fruit, vegetables, oils and fats, and beverages	160	6.94
Other manufacturing	109	70.77
Singapore		
Other food products / Tobacco products	28	7.39
Electrical machinery and apparatus	225	3.80
Basic chemicals, rubber and plastics products	58	8.03
Office accounting and computing machinery	1,193	0.28
Metal manufactures and general industrial nonelectrical machinery and equipment	35	20.18
Other manufacturing	37	60.31
Viet Nam		
Food and beverages	84	21.15
Leather, leather products and footwear	950	2.42
Textiles	180	4.36
Rubber and plastics products	78	6.07
Wood products (excluding furniture)	67	7.12
Other manufacturing	120	58.88

Source: Authors' estimates based on *Yearbook of Industrial Statistics* (UNIDO 2007 and 2008).

Naturally, the average firm size within each product sector in each country would be correlated to the average size of other domestic firms. For instance, in Table 3 our imputed average firm producing electrical machinery in Hong Kong, China would employ around 48 workers, in line with the smaller average firm sizes in the country. On the other hand, expected number of workers employed in similar industries in the PRC, where average firm size is larger, would be over 300 workers. Nevertheless, there is significant heterogeneity of firm sizes across industrial products within the same country. Computer makers, for example, tend to hire more than 1,000 workers in each plant regardless whether they are located in Malaysia, Philippines, or Singapore.[7]

Within each country, are the sectors most affected by the demand slump different from the others that are affected less? Figure 4 shows the average firm size of the worst hit manufacturing industries compared to the other manufacturing industries. Overall, the industries that are the most devastated tend to have an average firm size that is larger than other manufacturing industries within the countries. In Malaysia and Singapore for example, the average number of workers for firms producing office accounting and computing machineries is especially large relative to the rest of the manufacturing sectors' average firm size.

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[7] We note though that these numbers are based on industrial statistics, which tend to be more representative of formal firms. Firms subcontracting with these formal large enterprises tend to be smaller.

Figure 4: Relative Average Firm Size of Top Five Worst Hit Manufacturing Industries (other manufacturing industries=1)

PRC	Nonelectrical machinery	0.84
	Professional and scientific equipment	1.15
	Textiles	1.15
	Wearing apparel including footwear	1.37
	Electrical machinery	1.62
Hong Kong, China	Nonelectrical machinery	0.46
	Plastic products	0.47
	Wearing apparel including footwear	1.37
	Iron, steel, and nonferrous metals	3.36
	Electrical machinery	4.26
India	Grain mill products	0.37
	Ferro-alloys and residual engineering items	0.78
	Textiles, except garments	1.50
	Gems and jewellery	1.77
	Iron and steel	1.79
Indonesia	Basic precious and nonferrous metals	1.04
	Produced, processed, and preserved meat, fish, fruit, vegetables, oils and fats	1.13
	Basic chemicals, rubber and plastic products	1.17
	Textiles	1.67
	Electrical machinery and apparatus	2.47
Korea, Republic of	Special purpose machinery and equipment	1.01
	Basic chemicals, rubber and plastic products	1.30
	Telecom, sound recording and reproducing apparatus	2.66
	Electrical machinery and apparatus	2.73
	Road vehicles	3.30
Malaysia	Metal manufactures and general industrial nonelectrical machinery and equipment	0.71
	Produced, processed, and preserved meat, fish, fruit, vegetables, oils and fats	1.46
	Basic chemicals, rubber and plastic products	2.21
	Telecom, sound recording and reproducing apparatus	12.82
	Office accounting and computing machinery	24.74
Philippines	Produced, processed and preserved meat, fish, fruit, vegetables, oils and fats, and beverages	1.47
	Clothing, leather products and footwear	1.67
	Road vehicles	1.70
	Electrical machinery and apparatus	5.59
	Office accounting and computing machinery	11.86
Singapore	Other food products / tobacco products	0.75
	Metal manufactures and general industrial nonelectrical machinery and equipment	0.97
	Basic chemicals, rubber and plastic products	1.59
	Electrical machinery and apparatus	6.12
	Office accounting and computing machinery	32.48
Viet Nam	Wood products (excluding furniture)	0.55
	Rubber and plastic products	0.65
	Food and beverages	0.70
	Textiles	1.49
	Leather, leather products and footwear	7.88

Source: Authors' estimates based on *Yearbook of Industrial Statistics* (UNIDO 2007 and 2008).

Table 4: Marginal Effects from Probit Estimates of the Probability of Being Top Five Worst Affected Industries

	(i)	(ii)
Log(firm size)	0.056	0.063
	(0.016)***	(0.032)***
Log(productivity)	0.059	0.010
	(0.016)***	(0.003)***
Country dummies		YES
Observations	254	254

* significant at 10%; ** significant at 5%; *** significant at 1%.

Note: Standard errors in parentheses. The top five worst industries are as outlined in Table 2.

We further estimated the relationship between the worst hit industries and firm size by fitting a probit equation on the probability of being one of the five worst hit sectors in the country. The sector-level data is presented in Table 4 and contains 254 observations across our sample of nine Asian economies. The results confirm that the worst hit industries are composed of larger firms (see Table 4). In addition, the industries that are worst hit tend to be associated with higher labor productivity. This is true even after we control for country characteristics using country-dummy variables.

B.   Who are the Exporters?

It bears repeating that the discussion above concerns *all* firms in the sectors affected by serious declines in exports, not just those firms that actually export. However, to understand which firms are bearing the primary brunt of the crisis, it is crucial to know who the exporters are. What are the firm size distributions of exporters?

To answer this, we turn to the World Bank Enterprise Survey, which provides firm-level data on a total of 15 manufacturing industries in 13 Asian countries. We find that smaller enterprises are less export-oriented, less likely to use imported inputs, and more likely to sell their output to other small firms or directly to consumers. This supports our earlier conjecture that the initially worst hit firms would more likely be the larger firms. In particular, the average larger firms employing more than 100 workers would likely be exporters, while small firms with less than 20 workers have less than 20% probability of being exporters. All of these tendencies are more pronounced for South Asia than East Asia (see Figure 5).

Figure 5: Export Orientation of Enterprises in Asia
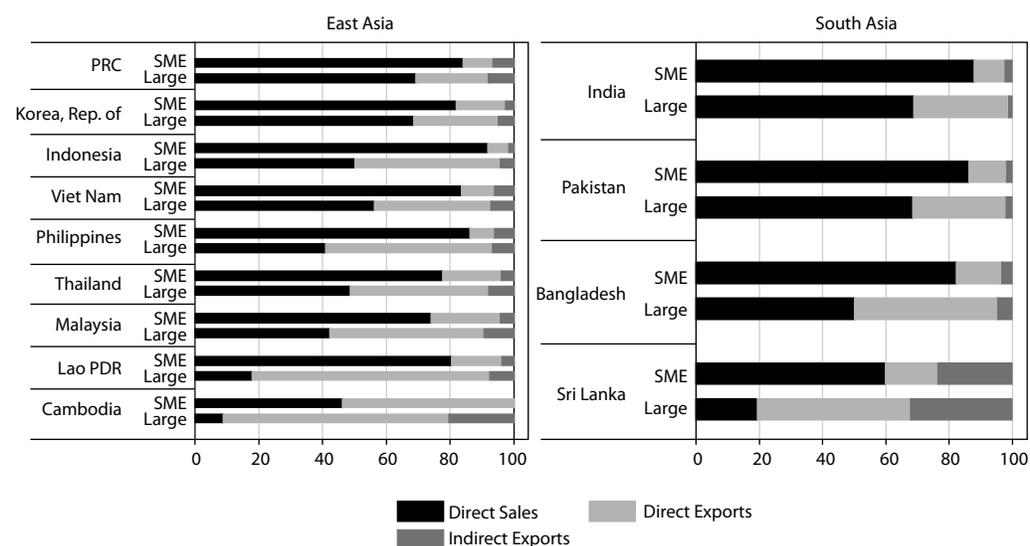
SME = small and medium enterprise.
Note: Small firms: 5–49 employees; medium: 50–199 employees; large: above 200 employees.
Source: Staff estimates based on World Bank Enterprise Survey data.

IV. Effect of Global Crisis on Workers

Similar to the analysis of firms, we have information on the number of workers associated with each product sector. In this section we use two primary sources of data: industrial statistics and labor force surveys. In the first part of the discussion the data are based on annual industrial statistics published by UNIDO similar to that outlined in the discussion of the firms above. While we are unable to distinguish those workers working directly in exporting firms from others who are working in domestically oriented firms, we could approximate the share of workers affected by calculating the share of total output that is exported. Thus we could infer some information on the percentage of workers that may be affected in the crisis. In addition, we could get a sense of which types of workers may be affected more than others.

A.   Workers Potentially Affected

It is imperative to do this analysis at the sector level, since worker characteristics vary greatly across various manufacturing products, and are often greater than differences in labor institutions across countries. From Table 5, column 2 we can infer that the top five worst hit industries account for a large percentage of total manufacturing employment. In Singapore and Viet Nam for example, the top five worst hit industries represent around 40% of total manufacturing employment. The PRC's top five account for 37% of the total manufacturing workforce, while for the rest of the sample economies, they represent 25–30% of the total manufacturing workforce.

Table 5: Worker Characteristics per Industry

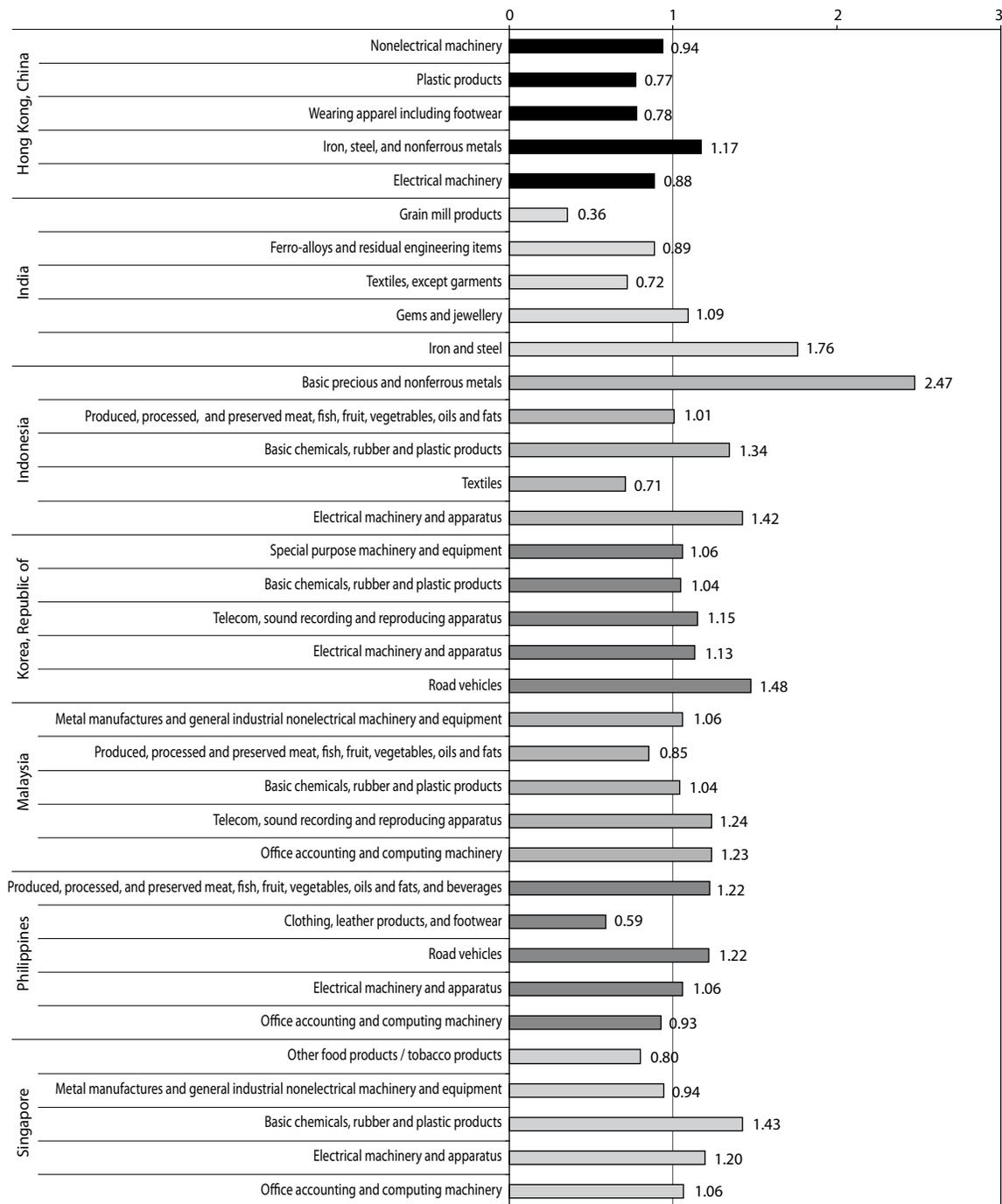| Economy	Percent of Total Manufacturing Employees	Productivity (value added per employee, in USD)	Average Wage (in USD)
China, People's Republic of			
Nonelectrical machinery	9.78	12,464	-
Wearing apparel including footwear	6.02	6,091	-
Electrical machinery	14.50	16,144	-
Textiles	9.81	8,076	-
Professional and scientific equipment	1.58	12,288	-
Other manufacturing	58.31	15,630	-
Hong Kong, China			
Wearing apparel including footwear	11.18	25,533	16,146
Iron, steel and nonferrous metals	1.00	66,342	24,374
Nonelectrical machinery	4.59	50,599	19,478
Plastic products	1.66	25,902	16,066
Electrical machinery	7.65	53,767	18,381
Other manufacturing	73.92	39,193	20,792
India			
Gems and jewelry	1.13	5,748	1,794
Iron and steel	4.89	25,503	2,887
Grain mill products	3.58	2,255	583
Textiles, except garments	15.32	3,407	1,179
Ferro-alloys and residual engineering items	1.25	4,187	1,455
Other manufacturing	73.82	7,218	1,640
Indonesia			
Basic precious and nonferrous metals	0.37	29,631	3,437
Produced, processed and preserved meat, fish, fruit, vegetables, oils and fats	5.40	15,159	1,400
Basic chemicals, rubber and plastics products	9.32	12,068	1,865
Electrical machinery and apparatus	4.45	9,821	1,980
Textiles	13.58	4,796	988
Other manufacturing	66.88	9,772	1,391
Korea, Republic of			
Electrical machinery and apparatus	13.20	145,245	26,363
Telecom, sound recording and reproducing apparatus	4.89	159,870	26,709
Basic chemicals, rubber and plastics products	8.87	114,144	24,277
Special purpose machinery and equipment	5.66	77,658	24,590
Road vehicles	8.85	131,147	34,369
Other manufacturing	58.54	94,616	23,269
Malaysia			
Produced, processed and preserved meat, fish, fruit, vegetables, oils and fats	3.87	19,622	4,950
Basic chemicals, rubber and plastics products	13.86	23,530	6,040
Metal manufactures and general industrial nonelectrical machinery and equipment	7.47	13,424	6,141
Telecom, sound recording and reproducing apparatus	5.93	16,557	7,189

Table 5: *continued.*

Office accounting and computing machinery	4.94	27,776	7,176
Other manufacturing	63.93	14,040	5,821
Philippines			
Electrical machinery and apparatus	17.89	10,469	3,104
Office accounting and computing machinery	5.71	11,855	2,719
Road vehicles	2.29	16,736	3,583
Clothing, leather products and footwear	17.57	3,139	1,723
Produced, processed and preserved meat, fish, fruit, vegetables, oils and fats, and beverages	7.11	16,433	3,585
Other manufacturing	49.43	11,850	2,937
Singapore			
Other food products / tobacco products	4.26	39,269	18,510
Electrical machinery and apparatus	17.84	111,888	27,724
Basic chemicals, rubber and plastics products	9.78	280,690	33,027
Office accounting and computing machinery	6.97	101,841	24,665
Metal manufactures and general industrial nonelectrical machinery and equipment	14.94	43,299	21,806
Other manufacturing	46.21	49,706	23,169
Viet Nam			
Food and beverages	13.81	-	-
Leather, leather products and footwear	17.78	-	-
Textiles	6.08	-	-
Rubber & plastics products	3.69	-	-
Wood products (excluding furniture)	3.68	-	-
Other manufacturing	54.96	-	-

Sources: Authors' estimates based on UNIDO Industrial Statistics and CEIC Data Company Ltd.

Are workers in the worst hit industries more productive than in the rest of the manufacturing sector? Do these workers receive higher wages? Figures 6 and 7 give us a clearer picture. Labor productivity is measured by the total value added in the industry divided by the total number of workers within that industry, while average wage is measured by the total wage in the industry divided by the total number of workers. Across the samples, majority of the workers in industries being hit receive higher wages compared to the rest of the manufacturing sector. In terms of productivity, there seems to be some degree of heterogeneity across the economies in our sample. For Indonesia, Korea, and Malaysia, majority of the industries being hit are relatively more productive than the other industries. However, this case is not true for the PRC and India.

Figure 6: Relative Average Wage in Top Five Worst Hit Manufacturing Industries (other manufacturing=1)

	Industry	Value
Hong Kong, China	Nonelectrical machinery	0.94
	Plastic products	0.77
	Wearing apparel including footwear	0.78
	Iron, steel, and nonferrous metals	1.17
	Electrical machinery	0.88
India	Grain mill products	0.36
	Ferro-alloys and residual engineering items	0.89
	Textiles, except garments	0.72
	Gems and jewellery	1.09
	Iron and steel	1.76
Indonesia	Basic precious and nonferrous metals	2.47
	Produced, processed, and preserved meat, fish, fruit, vegetables, oils and fats	1.01
	Basic chemicals, rubber and plastic products	1.34
	Textiles	0.71
	Electrical machinery and apparatus	1.42
Korea, Republic of	Special purpose machinery and equipment	1.06
	Basic chemicals, rubber and plastic products	1.04
	Telecom, sound recording and reproducing apparatus	1.15
	Electrical machinery and apparatus	1.13
	Road vehicles	1.48
Malaysia	Metal manufactures and general industrial nonelectrical machinery and equipment	1.06
	Produced, processed and preserved meat, fish, fruit, vegetables, oils and fats	0.85
	Basic chemicals, rubber and plastic products	1.04
	Telecom, sound recording and reproducing apparatus	1.24
	Office accounting and computing machinery	1.23
Philippines	Produced, processed, and preserved meat, fish, fruit, vegetables, oils and fats, and beverages	1.22
	Clothing, leather products, and footwear	0.59
	Road vehicles	1.22
	Electrical machinery and apparatus	1.06
	Office accounting and computing machinery	0.93
Singapore	Other food products / tobacco products	0.80
	Metal manufactures and general industrial nonelectrical machinery and equipment	0.94
	Basic chemicals, rubber and plastic products	1.43
	Electrical machinery and apparatus	1.20
	Office accounting and computing machinery	1.06

Source: Authors' estimates based on *Yearbook of Industrial Statistics* (UNIDO 2007 and 2008).

Figure 7: Relative Labor Productivity in the Top Five Worst Hit Manufacturing Industries (other manufacturing=1)

	Industry	Value
PRC	Nonelectrical machinery	0.80
	Professional and scientific equipment	0.79
	Textiles	0.52
	Wearing apparel including footwear	0.39
	Electrical machinery	1.03
Hong Kong, China	Nonelectrical machinery	1.29
	Plastic products	0.66
	Wearing apparel including footwear	0.65
	Iron, steel, and nonferrous metals	1.69
	Electrical machinery	1.37
India	Grain mill products	0.31
	Ferro-alloys and residual engineering items	0.58
	Textiles, except garments	0.47
	Gems and jewellery	0.80
	Iron and steel	3.53
Indonesia	Basic precious and nonferrous metals	3.03
	Produced, processed, and preserved meat, fish, fruit, vegetables, oils and fats	1.55
	Basic chemicals, rubber and plastic products	1.24
	Textiles	0.49
	Electrical machinery and apparatus	1.01
Korea, Republic of	Special purpose machinery and equipment	0.82
	Basic chemicals, rubber and plastic products	1.21
	Telecom, sound recording and reproducing apparatus	1.69
	Electrical machinery and apparatus	1.54
	Road vehicles	1.39
Malaysia	Metal manufactures and general industrial nonelectrical machinery and equipment	0.96
	Produced, processed, and preserved meat, fish, fruit, vegetables, oils and fats	1.40
	Basic chemicals, rubber and plastic products	1.68
	Telecom, sound recording and reproducing apparatus	1.18
	Office accounting and computing machinery	1.98
Philippines	Produced, processed, and preserved meat, fish, fruit, vegetables, oils and fats and beverages	1.39
	Clothing, leather products and footwear	0.26
	Road vehicles	1.41
	Electrical machinery and apparatus	0.88
	Office accounting and computing machinery	1.00
Singapore	Other food products / tobacco products	0.79
	Metal manufactures and general industrial nonelectric machinery and equipment	0.87
	Basic chemicals, rubber and plastic products	5.65
	Electrical machinery and apparatus	2.25
	Office accounting and computing machinery	2.05

Source: Authors' estimates based on *Yearbook of Industrial Statistics* (UNIDO 2007 and 2008).

Another important issue is the effect of the crisis on women. To shed light on this, we also use the UNIDO industrial statistics to describe which groups of women are being affected. We identified the percentage of women working in firms producing the major export products of selected countries namely: Malaysia, Korea, Japan, and Indonesia. The data show that the percentage of female workers involved in producing clothing and garments is higher than 70%. Malaysian and Indonesian firms producing toys, office machines, and electrical machinery also have higher percentage of female than male workers. On the other hand, women are much less likely to be involved in producing road vehicles in these four countries (see Figure 8).

Figure 8: Prevalence of Female Workers in Various Manufacturing Industries (percent)
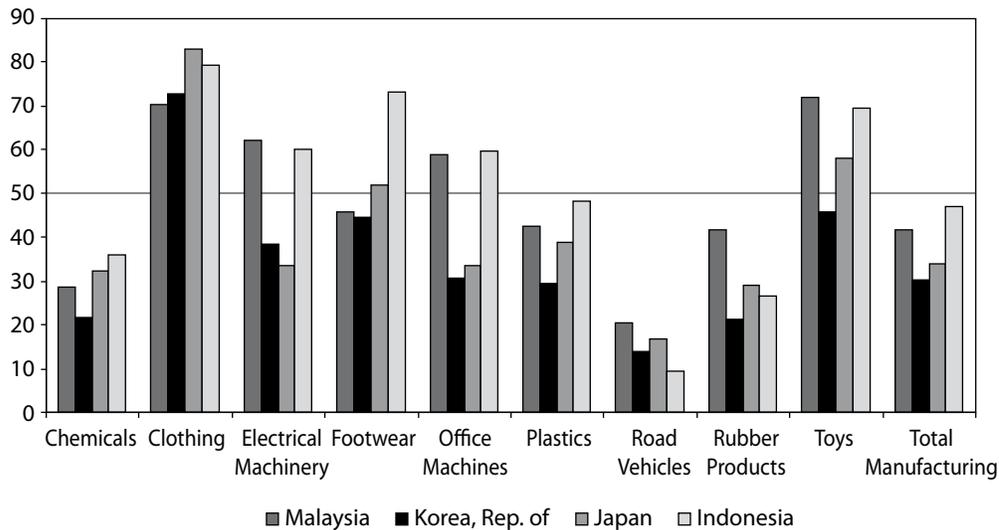
Note: The data refers to the most recent year available in the UNIDO dataset.
Sources: UNIDO data, staff estimates.

B.   Individual Level Information from Labor Force Surveys

We now turn to the use of labor force surveys. The labor force surveys conducted by the countries' national statistics offices provide a more in-depth analysis of worker characteristics in the worst affected manufacturing industries. Table 6 presents information on average years of schooling, location, type of employment, age, and percentage of female workers in India, Indonesia, Philippines, and Thailand across various manufacturing sectors. We can see that generally, workers from industries worst hit by the crisis are more educated, having finished a greater number of school years than the rest of the manufacturing sector. Except for Thailand, more than 50% of the workers in the top five worst hit industries work in firms located in the urban areas. In Indonesia and the Philippines, majority of the workers in the worst hit sectors are regular wage workers. Generally, workers in the top five worst hit industries are younger than those in the other manufacturing industries. However, the difference in age is not that significant. Only in the Philippines did we find more women working in the top five most affected sectors among the four countries we examined.

Table 6: Labor Force Surveys: Characteristics of Workers in the Worst Affected Manufacturing Industries

Economy	Years of Schooling		Percent Urban		Percent of Regular Wage Workers *		Age (mean)		Percent Female	
	Top 5	Other Mfg	Top 5	Other Mfg	Top 5	Other Mfg	Top 5	Other Mfg	Top 5	Other Mfg
India	6.4	6.3	52.70	45.45	33.40	34.10	32.7	33.4	24.80	25.70
Indonesia	9.3	8.5	63.90	59.01	77.40	59.50	31.7	33.7	47.60	38.50
Philippines	11.3	10.2	71.40	62.80	59.60	50.00	33.0	34.8	52.70	35.20
Thailand**	8.9	7.8	44.50	40.35	81.90	82.80	32.5	33.4	35.10	59.10

Mfg = manufacturing.
* Regular wage workers as a share of total regular wage workers, casual wage workers, and the self-employed.
** Thai data refers to all wage workers, since the survey does not distinguish casual from regular employees.
Sources: Authors' estimates based on Labor Force Surveys: 2007 for Philippines, 2005 for Thailand, 2007 for Indonesia, and 2005–2006 for India.

In Table 7, we present the estimated marginal effects of a probit model predicting the probability of working in the worst affected sectors. Results confirm the patterns in the descriptive statistics presented in Table 6. In India, workers in affected sectors tend to be the younger ones. They are predominantly men, and better educated.[8] In the Philippines, the workers in the top five declining sectors are more likely to be younger, female, and have a higher percentage possessing college degrees than other Filipino workers. In Thailand, the workers tend to be male, and better educated. However, one should mention that except for Thailand, even when women are not majority of the workers in the worst affected sectors, the worst hit sectors and other types of manufacturing are where we find a higher percentage of women workers relative to the other domestic sectors such as construction and modern services. In Indonesia, the workers also tend to be better educated, however they are likely to be female unlike in Thailand.

Table 7: Marginal Effects from Probit Estimates of the Probability of Being in the Five Worst Affected Industries for Manufacturing Workers

	India	Indonesia	Philippines	Thailand
Age	−0.0084	0.0004	−0.0168	0.0015
	(0.0003)***	(0.0001)***	(0.0002)***	(0.0001)***
Age squared	0.0001	0.0000	0.0002	0.0000
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Female=1	−0.0079	0.0724	0.1870	−0.1734
	(0.0002)***	(0.0002)***	(0.0006)***	(0.0004)***
Years of education	0.0000	0.0060	0.0125	0.0089
	(0.0002)**	(0.0000)***	(0.0001)***	(0.0001)***
Urban=1	0.0641	−0.0135	0.0552	0.0154
	(0.0002)***	(0.0003)***	(0.0007)***	(0.0004)***
Casual worker =1	0.0224	−0.0956	−0.0436	n.a.
	(0.0002)***	(0.0003)***	(0.0008)***	n.a.
Self-employed =1	0.0277	−0.1021	−0.1284	0.0417
	(0.0008)***	(0.0002)***	(0.0008)***	(0.0006)***

* significant at 10%; ** significant at 5%; *** significant at 1%.
Note: Standard errors in parentheses. Included are workers who are between 15 and 65 years old and employed in manufacturing sectors (including the self-employed).

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[8]   In 2003, only approximately a quarter of workers in Indian manufacturing were women.

C.   Impact on Total Employment

Ultimately, we are concerned over the impact of the global crisis on total employment. While the immediate impact of the crisis will first hit the sectors in which real demand fell, ultimately the impact on total employment will depend on the dynamic relationship between various sectors of the economy. One of them is the degree of backward and forward linkages between the exporting sectors and the other sectors within the economy.

1.   Forward and Backward Linkage

Backward linkages in production refer to the sectors that supply to the exporting sector. Thus, a drop in demand for exports results in a negative shock not only to the exporting sectors, but also to those that produce inputs in other sectors. The extent of the links can be illustrated by data from input–output tables. Here we investigate the most recent input–output tables available for PRC, India, and Indonesia. We find that there are considerable linkages across various sectors within these economies. In wearing apparel, for example, a large chunk of final value added comes from intermediate goods and services. Thus a $1 drop in apparel exports implies a drop in intermediate manufacturing inputs of 53.6 cents in the PRC, 43.6 cents in India, and 46.9 cents in Indonesia.

2.   Employment Elasticity of Exports

We now turn to the elasticity of employment. Given a projection of future exports growth, this estimated elasticity would then enable us to estimate the magnitude of the impact of exports' decline on employment. We follow Kapsos (2006) in estimating the elasticity of employment with respect to GDP and exports. A more detailed discussion on the methodology used can be found in Appendix 2.

Our estimated employment elasticities relative to GDP are comparable to those calculated by other researchers (see Table 8). East Asian countries have the lowest employment elasticities with respect to GDP, whereas the corresponding elasticities are higher for countries in South and Southeast Asia. With respect to exports, the Philippines exhibits the highest employment elasticity at 0.84. Other countries have elasticities between 0.20 and 0.30, except for the PRC; Hong Kong, China; and Thailand, which have elasticities less than 0.10. In Sri Lanka, elasticity of exports is negative, suggesting that every percentage of growth in exports is associated with a 0.73 percentage decline in total employment. Pakistan, on the other hand, experiences a 2% growth of employment for every percent of growth in its exports.

Table 8: Employment Elasticities

Economy	Elasticity of GDP	Elasticity of Exports
PRC	0.09	0.04
Hong Kong, China	0.30	0.22
Korea, Republic of	0.21	0.08
India	0.47	-
Pakistan	0.88	2.01
Sri Lanka	0.39	−0.73
Indonesia	0.34	0.25
Malaysia	0.43	0.24
Philippines	0.55	0.84
Singapore	0.51	0.26
Thailand	0.18	0.07

We also estimated the projected changes in total employment in 2008, 2009, and 2010 based on projected GDP changes and export changes. Table 9 reports the projections on GDP and export growth, as calculated in the *Asian Development Outlook 2009* (ADB 2009a). All countries are projected to have lower GDP growth in 2009, with the more industrialized countries expected to have negative growth. It should also be noted that these countries were also the more export-oriented ones. In terms of export growth, all of them are expected to have negative growth in 2009. All of the countries are projected to bounce back in 2010, both in terms of GDP and exports. Only a few countries, however, will have their growth back at 2008 levels.

Table 9: Growth Rates in GDP and Exports for Selected Asian Economies, 2008–2010

Economy	GDP			Exports		
	2008	2009*	2010*	2008	2009*	2010*
PRC	9.0	7.0	8.0	17.3	−4.3	8.0
Hong Kong, China	2.5	−2.0	3.0	5.6	−5.0	8.0
Korea, Republic of	2.5	−3.0	4.0	14.3	−15.0	10.0
India	7.1	5.0	6.5			
Pakistan	5.8	2.8	4.0	16.5	−6.0	2.0
Sri Lanka	6.0	4.5	6.0	6.5	−22.0	4.6
Indonesia	6.1	3.6	5.0	18.0	−25.0	14.6
Malaysia	4.6	−0.2	4.4	12.8	−13.3	5.8
Philippines	4.6	2.5	3.5	−2.6	−8.4	14.6
Singapore	1.1	−5.0	3.5	13.1	−16.0	5.0
Thailand	2.6	−2.0	3.0	16.8	−18.0	8.0

* Projections by ADB (2009a).
Source: ADB (2009a).

Table 10 shows the estimated changes in employment in 2008, 2009, and 2010. Actual 2006 and 2007 employment changes are also shown in the table for comparison. As shown in the table, some countries are expected to already see a contraction in employment in 2008, such as Sri Lanka and Philippines. In 2009, all countries are projected to see a loss in employment (there is no available export projections for India).

For all countries except Sri Lanka, employment growth is expected to slowly return to positive territory by 2010.

Table 10: Employment Changes for Selected Asian Economies, 2008–2010

Economy	2006	2007	Projections on Percentage Changes in Total Employment, Based on Employment Elasticities with Respect to Exports		
			2008*	2009*	2010*
PRC	0.9	1.0	0.7	−0.2	0.3
Hong Kong, China	2.1	2.8	1.2	−1.1	1.8
Korea, Republic of	1.1	0.6	1.1	−1.1	0.8
Pakistan	7.2	4.1	33.1	−12.0	4.0
Sri Lanka	3.2	2.7	−4.8	−**	−3.4
Indonesia	1.4	4.5	4.6	−6.3	3.7
Malaysia	2.4*	3.0*	3.1	−3.2	1.4
Philippines	1.7	5.2	−2.2	−7.0	12.2
Singapore	2.5*	5.4	3.4	−4.2	1.3
Thailand	0.3	0.7	1.2	−1.3	0.6

* Projections from authors' estimates.
** The negative elasticity observed for Sri Lanka is likely to hold only during a positive exports growth period. It stretches the imagination to think that a decline in exports could actually dramatically increase employment in the country.

While the use of elasticities in estimating the adverse impact of global crisis on employment is attractive in its simplicity, there are several shortcomings in this methodology. First, estimated elasticities vary according to the time frame chosen. In particular, the point elasticities (measured as percentage change of employment over percentage change of exports every year) are notoriously unstable, though using a longer time series attenuates this problem. In addition, the methodology utilized here only takes into account information on employment, output, and exports. It is likely that the estimated employment elasticities will suffer from omitted variable bias. Other variables may influence employment, output, and exports, but they are not controlled for in the model. Nevertheless, the elasticities presented here provide a rough indication of what will happen to employment in the next 2 years.

3. Exports Vulnerability

In Table 5 we reported the percentage of industrial workers who are employed in the top five affected sectors.[9] The impact on workers would ultimately depend on both the labor intensity of the sector, the size of the sectors, and the magnitude of the relevant exports decline. For example, the textile industry in India employs close to 15% of all industrial workers in India, but contributes only about 5% of the total value of Indian exports. A 1% drop in sectors that are labor-intensive would affect more workers than a corresponding drop in less labor-intensive sectors.

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[9] Due to the aggregation of the products to 3-digit level, the percentage of workers employed in the top five declining exports sectors is rather large, including at least 40% of all industrial workers in these countries. Nonetheless, not all of them are involved in the exporting sector.

A potential way to impute the impact of the crisis on exporting workers and firms is to aggregate the impact of the crisis across all sectors to arrive at an approximation of the potential impact on the total economy (see Table 11). The mechanics of the index is outlined in Appendix 3. This indicator may be useful in trying to gauge the percentage of all industrial workers and firms vulnerable to the plunge in exports, should the decline morph into a permanent structural downshift of weakening demand. Based on recent monthly exports data as of May 2009 and the relevant industrial statistics for those sectors, the employment implications are significant. The recent decline in exports, should it become permanent, would directly affect about 10% of workers and firms in the PRC. In Indonesia, potentially 13.8% of workers and 10.6% of firms may be affected directly. However, this does not preclude the possibility of workers moving into other different industries and jobs. We also note that this projection is based on existing, older data on the industrial structure of each country.

Table 11: Estimated Export Vulnerability for Manufacturing (percent)

Economy	Potential Industrial Workers Directly at Risk	Potential Industrial Firms Directly Affected
PRC	10.4	10.2
India	6.2	5.8
Indonesia	13.8	10.6
Korea, Republic of	6.1	5.2
Malaysia	8.7	7.3
Philippines	20.8	13.7
Viet Nam	10.5	7.5

Sources: Staff estimates using industrial statistics from UNIDO and exports data from CEIC Data Company Ltd.

V. Exports Update and Unemployment

How have these projections on employment played out? Fortunately, the latest data on exports exhibited an improvement in demand (see Figure 2). Although total exports for most economies still remain below their respective levels a year ago, year-on-year changes of exports in the third quarter has clearly lifted above the nadir reached earlier this year.

Across the nine economies in our sample, the recovery of exports followed different trajectories. In most countries, the worst hit exports are still hobbled, relative to the rest of the manufacturing sector. However, in PRC, Indonesia, and Korea, the exporting sector that was worst hit at the beginning of 2009 have fared relatively well compared to the other sectors domestically (see Table 12). In the PRC, all worst hit exports are rebounding well relative to others, even though year-on-year figures may still be slightly negative. In Korea, the exports of electrical machinery and apparatus increased to 16.2% year-on-year by September 2009. For Indonesia, the worst hit exports are recovering,

led by exports of vegetable oils, which grew by 34.6% year-on-year by August 2009. In Singapore, although the top five worst hit exports have yet to return to positive growth, the other manufacturing exports registered a 17.3% year-on-year growth by September 2009. Here we note that figures from India, which still show a significant drop for all exports, refer to data available only up to March 2009. Hence, we may see an improvement as further data become available.

To see how unemployment has been affected, we turn to official releases of unemployment rates. While national statistics offices usually collect enterprise-related statistics only annually, they often collect labor force surveys quarterly. Data from early 2009 show that with a couple of exceptions, unemployment rose across developing Asia both year-on-year and compared to the last quarter of 2008 (see Table 13).[10] However, the unemployment rates in the third quarter of 2009 show signs of stabilizing. This positive trend is maintained through the fourth quarter for countries whose data are already available, such as Hong Kong, China; Korea; Philippines; and Taipei, China. However these unemployment rates still remain higher than that of a year ago. Thus, while full recovery has yet to arrive, at least the labor market impacts do not seem to be worsening.

Table 12: Percentage Changes in Total Exports (year-on-year, percent)

Economy	Top 5		Other Manufacturing	
	Q12008–Q12009*	Q32008–Q32009**	Q12008–Q12009*	Q32008–Q32009**
PRC	−26	−10	−26	−22
Hong Kong, China	−51	−48	−27	−24
Philippines	−39	−14	−31	−6
Malaysia	−29	−28	5	−15
India*	−32	−18	1	−16
Indonesia*	−52	−4	−15	−19
Korea, Rep. of	−22	−3	−19	−7
Singapore	−32	−24	−4	17
Viet Nam	−21	−15	8	−2

*Data refer to export value for September 2008 and September 2009 except for India, which refer to March 2008 and March 2009; and Indonesia, which refer to August 2008 and August 2009.
**Data refer to exports on November 2007 and November 2008 for India; January 2008 and January 2009 for Indonesia and Viet Nam; and February 2008 and February 2009 for the PRC and Philippines. March 2008 and March 2009 is for Hong Kong, China; ; Malaysia; and Singapore.
Source: Authors' estimates based on data from CEIC Data Company Ltd.

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[10] The exceptions are Indonesia and Philippines, where first quarter 2009 unemployment rates have actually declined slightly on a year-on-year basis. The most recent update from the Badan Pusat Statistik (Statistics Indonesia) shows that the number of jobs in February 2009 is still a few million more than in the previous year. In the Philippines, despite a sharp decline in exports, the unemployment rate declined from 8.0% in 2008 to 7.5% in April 2009, even while labor force participation rates increased slightly. In the PRC, the rise of official urban unemployment from 4.0% in 2008 to 4.3% in June 2009 brought it to its highest level in the last 5 years.

Table 13: Official Unemployment Rate

Economy	2008			2009			
	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Hong Kong, China	3.3	3.7	3.9	5.1	5.5	5.6	4.7
Indonesia*	-	8.4	-	8.1	-	7.9	-
Korea, Rep. of	3.1	3.1	3.1	3.8	3.8	3.6	3.3
Malaysia	3.5	3.1	3.1	4.0	3.6	3.6	-
Philippines*	8.0	7.4	6.8	7.7	7.5	7.6	7.1
PRC**	-	4.0	4.0	-	4.3	-	-
Singapore	2.8	1.9	2.4	3.0	4.1	2.9	-
Taipei,China*	4.0	4.3	5.0	5.8	5.9	6.0	5.7
Thailand	1.4	1.2	1.3	2.1	1.7	1.2	-

* Indonesian data refers to February and August data. Philippines data refer to quarterly data collected April, July, October, January. Taipei, China data refer to monthly data: March for Q1, June for Q2, September for Q3, and December for Q4.

** Unlike the other countries that reported national unemployment rate, data on the PRC refers to official urban unemployment rate, most recently updated on 24 July 2009, referring to the quarter ending June 2009.

Sources: Hong Kong, China: Census and Statistics Department (www.censtatd.gov.hk).
    Indonesia: BPS-Statistics Indonesia (www.bps.go.id).
    Korea: Korean Statistical Information Service (www.kosis.kr).
    Malaysia: Department of Statistics Malaysia (http://www.statistics.gov.my).
    PRC: National Bureau of Statistics of China (http://www.stats.gov.cn/english/).
    Philippines: National Statistics Office (www.census.gov.ph).
    Singapore: Ministry of Manpower (www.mom.gov.sg).
    Taipei,China: National Statistics (www.eng.stat.gov.tw).
    Thailand: National Statistical Office (www.web.nso.go.th).

VI. Conclusion

In this paper, we identified the manufacturing sectors worst hit by the global crisis in a subset of Asian economies. We found that the worst hit sectors are likely to have larger firm sizes and higher productivity than their local peers. This is consistent with observations that exporting firms tend to be more efficient. Using various industrial data and labor force surveys, we attempted to shed light on characteristics of workers in the worst hit sectors. Estimation of employment elasticities of exports suggests that the impact on workers will be less than the drop in export demand. Recent improvement in export performance seems to lend credence to the hypothesis that the worst is over for these Asian economies. However, sluggish reversal in unemployment rates suggests caution, and recovery is still uncertain.

Appendix 1: Analysis of Exports: Data Description and Definitions

As various sources of data are organized under different classifications, a prerequisite of merging two sources of data is to define the concordance between the classification systems. Our exports data come from the CEIC Data Corporation, which provides monthly figures on exports by SITC 2-digit categories. The rest of the data on employment and characteristics of the firm comes from the UNIDO database, which is categorized under ISIC Rev.3-4 digit classification, except for the People's Republic of China and Hong Kong, China, for which data is available only under ISIC Rev.2-4 digit classification. Included variables are total wage bills, total gross fixed capital, total output, total number of workers, and total value added. The data collected by UNIDO comes from industrial statistics reported by various countries, and may thus be subject to country-specific peculiarities.[11]

Potentially, monthly exports data are available up to SITC 6-digit granularity. However, a limitation for our exercise is that the most recent available monthly data accessible to us as of May 2009 is only until March 2009 and comes at only SITC 2-digit level, while the SITC 6-digit level data is available only up to 2008. Given that the serious decline of exports occurred only in Q1 2009, we decided to trade off granularity with a more accurate view of weakening export demand. This meant a broader aggregation of products. After merging, our resulting dataset contained 29 product groupings of all manufacturing exports. Appendix Table 1 reports the concordance table of the resulting dataset. Note that while the exports data is monthly data, the firm and employment data is annual data, and mostly available only up to 2006.

Once matched, we could thus compute the magnitude of declines of exports and discern which would be the hardest hit sectors. For the purpose of this exercise, our computations of export decline are based on year-on-year changes in total exported values, with the base month being the most recently available month as of May 2009. For the majority of countries, this would refer to the differences between exports of March 2008 and March 2009. However, for some countries such as India, the most recent available data is late 2008, a period slightly calmer before the more devastating decline seen in early 2009. Nonetheless, even by late 2008, data already shows a distinct decline in levels of trade.

Another potential issue for our analysis is that the list of worst-affected export sectors may change depending on the period selected. Year-on-year decline of exports in March 2009 is different from that in February or January 2009. For many products, February was the sharpest month of declines while March saw a reverse of the decline for some categories. To address this issue, we sort our exports data respectively using January, February, and March 2009 as our base month of comparison. We find that typically the list of top five declining exports remains similar regardless of the base month of our computation. In addition, the exports here are reported in nominal levels. Since our goal is to pinpoint the most affected sectors, deflating exports is immaterial to obtaining the sorted list of the top five export declines.

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[11] In this study, while we took great care to accurately merge the categories across the two classifications, we have not attempted any corrections in the actual values reported. Since we are concerned with employment and firms, we try as far as possible to preserve the groupings according to ISIC-4. However, the resulting product categories do vary slightly across countries, depending on the aggregation that exists in the UNIDO data. For example, UNIDO data on wearing apparel in the PRC includes data on footwear. Thus when we compute the exports data for wearing apparel, we add the corresponding export values on footwear as well.

Appendix Table 1: SITC and ISIC Concordance Table

Product Classification	SITC-2D	ISIC-3D
Produced, processed and preserved meat, fish, fruit, vegetables, oils and fats	01,03,05,21,22,29,41,4 2,43	151
Dairy products	02	152
Other food products	04,06,07,08,09	153,154
Beverages	11	155
Tobacco products	12	160
Textiles	26,65	171,172,243
Clothing	84	181
Leather products, except footwear	61,83	182,191
Footwear	85	192
Wood and wood products, except furniture	24,63	201,202
Pulp, paper, and other paper products	25,64	210,222
Coke, petroleum, and petroleum products	32,33,34	231,232
Basic chemicals, rubber and plastics products	23,27,51,52,56,57,58,62	233,241,251,252
Other chemical products	53,54,55,59	242
Nonmetallic mineral manufactures	66	261,269
Basic iron and steel	67	271
Basic precious and nonferrous metals	28,68,97	272
General industrial nonelectrical machinery and equipment	69,71,74	281,289,291,311
Special purpose machinery and equipment	72	222,292
Office accounting and computing machinery	75	300
Sanitary, plumbing, heating, and lighting fixtures	81	315
Electrical machinery and apparatus	77	293,312,313,314,319,321
Telecom, sound recording and reproducing apparatus	76	322,323
Professional, scientific and controlling instruments	87	331
Photographic apparatus and equipment and optical goods	88	332,333
Road vehicles	78	341,342,343,359
Other transport equipment	79	351,352,353
Furniture	82	361
Other manufactured products	89	221,369

Source: This table is based on the correspondence tables found in the UN Classification Registry (see http://unstats.un.org/unsd/registry) and RAMON Eurostat's Meta Data Server (http://ec.europa.eu/eurostat/ramon). The correspondence table is subsequently adjusted to match our combined UNIDO-exports categories.

Appendix 2: Determining the Effects of the Global Economic Slowdown on Employment Using Exports Elasticities

Methodology and Data Used

Following Kapsos (2006), the empirical relationship between employment and GDP was estimated using the following multivariate log-linear regression model:

$$\ln E_i = \alpha + \beta_1 * \ln Y_i + \beta_2 * (\ln Y_i * D_i) + \beta_3 * D_i + \mu_i$$

where E_i is total employment in country i, Y_i is GDP, and D_i are the country dummy variables. From the equation, the elasticity of employment with respect to GDP in country i is given as $\beta_1 + \beta_2$. The elasticity represents the change in employment associated with a differential change in output. β_2 varies for each country.

Employment elasticities to exports were also calculated using the same specification:

$$\ln E_i = \alpha + \beta_1 * \ln X_i + \beta_2 * (\ln X_i * D_i) + \beta_3 * D_i + \mu_i$$

E_i again represents employment in country i and X_i represents total merchandise exports. Thus, two types of elasticities are calculated: the elasticity of employment with respect to total output, and secondly, with respect to exports.

The regression is estimated for the most recent years (2003–2007) using data from 11 economies:

(i)   East Asia (People's Republic of China; Hong Kong, China; Korea)
(ii)   South Asia (India, Pakistan, Sri Lanka)
(iii)   Southeast Asia (Indonesia, Malaysia, Philippines, Singapore, Thailand)

Data on employment, GDP, and exports were taken from the World Bank's World Development Indicators Online (WDI). Official foreign exchange rates were downloaded from the WDI to convert exports to constant 2000 US dollars. Total employment is not available in WDI, but was instead derived using data on total labor force and total unemployment rate:

Employment = labor force * (1 – unemployment rate)

Once elasticities were calculated for each country, we could then estimate the projected changes in total employment in 2008, 2009, and 2010 based on projected GDP changes and export changes. The calculation for each country is simply:

% change in E_i = % change in Y_i * $(\beta_1 + \beta_2)$

Appendix 3: Estimating Export Vulnerability Index for the Manufacturing Sector

A question that is often raised during discussions of the crisis is whether we could identify and quantify the magnitude of the share of workers and firms that may be <u>directly</u> affected by the sharp decline in exports? Here we propose a parsimonious and straightforward methodology. Broadly, our strategy is as follows: we know the sectors that are affected, the percentage of the firms within the sector (as a share of total industrial firms), and the percentage of the workers in the sector as a share of total industrial workers. If we could estimate the share of firms and workers involved in exporting, we could thus derive an estimate of the share of workers and firms that may be affected by the decline of exports. In other words, this is a straightforward algebraic aggregation of the decline in exports weighted by the share of workers and firms, wherever appropriate.

Mathematically, let

l_{ij} = total workers producing good i in firm j

q_{ij} = production of product i by firm j

s_{ij} = share of exports of product i by firm j

X_i = total exports of product i

q_i = total production of product i

$s_i \cong x_i / q_i$ share of total exports of product i

v^L_i = labor vulnerability of product i

v^F_i = firms vulnerability of product i

ΔX_i = percent decline in exports of product i

Definition:

$v^L_i = \Delta X_i *(\Sigma l_{ij} /L)* s_i$

$V^L = \Sigma\, v^L_i$

Similarly,

$V^F = \Sigma\, v^F_i$

Properties of the Exports Vulnerability Index

1.   One desirable feature of this index is that it is intuitively simple: V ranges between 0 (no stress) and 1 (completely vulnerable). If there exists no exporting firm, then we see no vulnerability to exports at all and V=0. If all firms export, and exports collapsed 100%, then V=100%.

2.   Technically, $s_i = \Sigma \, s_{ij}$. However, we do not observe s_{ij}, so we approximate it by $s_i \cong X_i \, / \, q_i$

It is important to note that we are required to make two fundamental assumptions for the approximation to be feasible, given the lack of direct information on which firms are exporters and how much of their products they export. The first assumption is that we could estimate the share of exporting firms by obtaining the ratio of total exported value of the product over the total value of its production ($s_i \cong X_i \, / \, q_i$). Next we assume that workers and firms are distributed between exporting and nonexporting firms in proportion to the share of exports in the sector. Thus, if 50% of the output of product i are exported, then we assume that the percentage of exporting firms and percentage of workers involved in exports are 50% as well. Likewise, if exports decline by 50%, then 50% of the workers involved in exports would be vulnerable. We do not, however, imply that 50% of these workers will be retrenched. The impact on workers depends on whether the decline in the exports is temporary or a more permanent shift. If export demand shifts downward, the industry may respond by cutting work hours or putting workers on temporary leave rather than firing workers immediately.

These assumptions would be innocuous if firm sizes were identical within each industrial sector, and were there no technological differences between exporting and nonexporting firms. But in reality, exporting firms tend to be different from nonexporting firms, and are often found to be more productive and more efficient. How does this bias our measurement? If exporting firms are much more productive, then a relatively smaller proportion of workers and firms in the exporting sector could produce a larger share of output. Hence in a downturn, our equi-proportion assumption would overestimate the extent of vulnerable firms, $v^K{}_i$ and that of vulnerable workers, $v^L{}_i$. The bias could go the opposite direction as well. In countries where exporting firms tend to be larger (in terms of employment size) than nonexporting firms, our measurement error will bias the labor index downward, i.e., we are underestimating $v^L{}_i$, the true extent of vulnerability of labor. Nonetheless, given the lack of other hard data on the aggregate impact of the crisis on employment and firms, the vulnerability index could be a useful rapid assessment tool for gauging the potential impacts of changes in exports on workers and firms.

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About the Paper

Niny Khor and Iva Sebastian provide detailed information on Asian manufacturing and exporting industries hardest hit in the recent global financial crisis. They employ various sources of data, including Industrial Statistics of the United Nations Industrial Development Organization, labor force surveys, as well as data available from official sources. They find severe declines of exports across most product categories, and that the worst-hit sectors often consist of larger, more productive firms relative to other manufacturing sectors. Nonetheless, although official unemployment rose across developing Asia, the level has yet to reach that of countries of the Organisation for Economic Co-operation and Development (OECD). In further contrast to the jobless recovery facing the OECD countries, they note that the recent upward trends in exports have been accompanied by encouraging, though tentative, signs of revival in job growth.

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