PART II

CAPTURING CURRENT TRADE, INVESTMENT AND BUSINESS OPPORTUNITIES

CHAPTER 5

IDENTIFYING TRADE AND INVESTMENT OPPORTUNITIES

A. ASIA AND THE PACIFIC AS THE WORLD'S ENGINE OF GROWTH

The traditional developed economies of the Group of Three (G3) – the European Union, Japan and the United States – all face economic slowdown, and acceptance is growing that the Asia-Pacific region will be the world's next engine of economic growth. Developing economies in Asia and the Pacific are rapidly increasing their importance in the world economy, having performed robustly to make a quick recovery in 2010 and reach pre-crisis levels of economic activity while major industrial countries continue to struggle. According to the ESCAP (2011a), developing Asia is expected to continue its dynamic growth at the rate of more than 8% per annum throughout the first-half of this decade, while the world economy will grow on average by only 4% per annum.

The relatively quick recovery of developing countries in Asia, at a time when export demand from industrial countries has been drying up, can be explained partly by the region's unexpectedly strong domestic demand. As explained in part I of this report, the relative importance of the region, especially China, in world trade has grown, both in terms of exports and imports. The region's growing share of global imports has strengthened the expectation, particularly within the region itself, that it may be able to decouple itself from the vulnerabilities and deep impacts of business cycle fluctuations in other parts of the world.

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"With the expectation that demand by major economies for the Asia-Pacific exports will be sluggish in the long term, opportunities for export expansion will depend largely on the growth of intraregional demand"

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Although exports from Asia and the Pacific have been largely driven by globalization and the active participation of various economies within the region in globally fragmented production chains, it is expected that intraregional final demand will continue to grow and partially offset weak long-term demand from the G-3. Already, part of the region's exports has catered to intraregional final demand, especially that of China; however, many economies in Asia are still in the early stages of development. China and India, for example, are projected to gain almost 500 million new urban residents during the next 20 years (Iimi, 2005). This massive urbanization will provide plenty of opportunities for expanding production and exports of consumer and capital goods by the rest of the region.

With the expectation that demand by major economies for the Asia-Pacific exports will be sluggish in the long term, opportunities for export expansion will depend largely on the growth of intraregional demand. According to ESCAP (2011a) and the International Monetary Fund (2011a), exports and imports of developing countries in Asia

and the Pacific will continue to grow rapidly in real terms in 2011. This growth will remain strong throughout the first half of the decade despite an expected slowdown in demand by the rest of the world (see tables in part III). China's exports and imports, which account for almost 30% of the region's export and import values, are expected to grow by more than 15% per annum in real terms. India's exports and imports are projected to grow by more than 13% and almost 10% per annum, respectively.

Major trading economies in South-East Asia are also expected to strongly increase their exports and imports. When the more advanced Asian economies are included, the trade prospects of the region become even more promising. Although the growth of exports and imports by Japan and NIEs may not have been as dynamic as those of the large developing Asian economies, they still account for a significant share of Asian trade. (Japan accounts for about 14% of Asia's exports and imports, while NIEs, excluding Taiwan Province of China, account for about 22%.) In some cases, they are expected to witness robust growth in the future.

Although China currently dominates exports from the Asia-Pacific region, rapidly rising labour costs in

"Currently, the bulk of import demand from the region is confined to a small group of 12 economies"

that country could create opportunities for other developing economies in the region to catch up (see also Haddad and Shepherd, 2011). Industrial wage inflation in China is increasing due to the depletion of rural labour from the country's Central and Western provinces as well as to rising workers' demands for improvements in labour conditions. The resulting rising manufacturing costs could be an incentive for China's manufacturers to move up in the industrial value chain and source more components from low-cost neighbours. Such a transformation of China's industrial structure would further deepen the integration of China's production network with that of other Asian and Pacific economies and spur intraregional trade.

Currently, the bulk of import demand from the region is confined to a small group of economies. Just 12 economies account for more than 90% of total Asia-Pacific imports (table 12).[47] Thus, projections for the growth of imports by these 12 economies will

47 Excluding imports by Taiwan Province of China.

Table 12. Major Asia-Pacific importers
(Shares of total imports of Asia and the Pacific from the world)

(Percentage)

Importer	2009	Cumulative share for 12 observed economies	2010	Cumulative share for 12 observed economies
China	25.48	25.48	27.14	27.14
Japan	13.98	39.47	13.48	40.62
Hong Kong, China	8.92	48.39	8.60	49.22
Republic of Korea	8.19	56.58	8.27	57.49
India	6.52	63.09	6.28	63.77
Singapore	6.23	69.32	6.05	69.82
Russian Federation	4.86	74.18	4.83	74.65
Australia	4.19	78.37	3.92	78.57
Turkey	3.57	81.94	3.61	82.18
Thailand	3.39	85.33	3.55	85.73
Malaysia	3.14	88.47	3.20	88.93
Indonesia	2.28	90.75	2.56	91.50

Source: Import share calculated by ESCAP, based on WTO International Trade Statistics online, downloaded on 7 April 2011.

provide a strong indication of the prospects for exports of their partners, including those in the region. However, the expansion of imports by these economies would also require the presence of trade complementarities between potential partners. If these complementarities are not very good, the exporting economies of the region will not only have to increase competitiveness in their current export products but also transform their export structure to better match demand from the importing economies of the region. The next section explores these issues in more detail.

B. TRADE AND INVESTMENT OPPORTUNITIES FROM A RISING ASIA AND THE PACIFIC

As shown above, the demand in Asia and the Pacific comes mainly from a handful of importing economies. Those economies are relatively large and have been actively involved in the development of production networks with China and advanced East Asian economies. Other economies in the region play a minor role, and it is important for them to continue their reforms and present themselves as viable and valuable future trade and investment partners. This section considers several indicators that reveal the degree to which these economies could meet trade and, indirectly, investment demand among the large Asian and Pacific economies.

1.   Measuring trade complementarity[48]

To what extent can other Asia-Pacific economies meet the demand of the key Asia-Pacific importing economies identified in table 12? The trade complementarity index has been calculated based on the disaggregation of Asia-Pacific traded products into 277 groups at the 3-digit level of SITC Rev. 3 for 2008 (see figure V.1 in the annex to this

chapter).[49] On average, almost 50% of exports by Asia and the Pacific match its import demand (for subregional complementarities see more in ESCAP, 2011a). This implies a relatively good alignment of the current export supply specialization of Asia-Pacific economies and the region's import pattern.[50]

"On average, almost half of exports by Asia and the Pacific match the region's import demand"

(a) Import demand of major economies in the East Asian production network

The import demand of the major economies in the East Asian production network (China, Japan, the Republic of Korea, Singapore and Hong Kong, China) tends to exhibit greater complementarity with the exports of those same economies and of the developing ASEAN-5[51] than with the exports of other Asian and Pacific economies on average. These results show more variation at the level of the following individual economies.

China – On average, 41% of China's imports showed complementarity with exports from Asian and Pacific economies in 2008. China's import demand appear to have relatively more

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[48] The trade complementarity index shows to what extent a particular economy's import pattern matches the export pattern of another economy. The index is defined as 100 $(1-\sum_i | m_{ik}-x_{ij}|/2)$, where m_{ik} is the share of good i in global imports of country k and x_{ij} is the share of good i in all exports of country j. The index is zero when no goods overlap and 100 when imports of a country of interest perfectly match the export structure of another country of interest.

[49] Trade data for 2009 have not been used in the analysis in order to avoid the possibility that during the global economic crisis and resulting trade contraction such data could distort actual trade complementarities. The index is calculated using the World Integrated Trade Solution platform of trade indicators.

[50] A major limitation of using current import demand structure to assess trade opportunity is that the future trade pattern could be different from what is projected today based on past data, especially if the region has changed from external demand-dependent to intraregional demand-dependent. Ideally, to incorporate this concern, imports of parts and components used in the production of final goods exported outside the region should be excluded from the dataset. Unfortunately, since such information is unavailable at the aggregate level, data on Asia's imports from the world – which cover imports for consumption in the region, imports of intermediate inputs and raw materials used in further production for serving final demand both within and outside the region – have to be used.

[51] This group comprises Indonesia, Malaysia, Thailand, the Philippines and Viet Nam.

complementarity with the export pattern of the advanced Asian-Pacific economies, major ASEAN economies, and some resource exporting economies in North and Central Asia, than with exports from the region as a whole on average. Only the following 11 economies appeared to match more than 50% of China's import demand:

- Hong Kong, China (59%);
- Macao, China (54.5%);
- Indonesia (54%);
- Kazakhstan and the Russian Federation (53% each);
- Japan (52.5%);
- Australia (52%);
- Thailand (51%);
- New Zealand, the Republic of Korea and the Philippines (50% each).

Japan – About 44% of Japan's import pattern was matched by exports by Asia and the Pacific. Exports from 17 Asian and Pacific economies, including a few low-income developing economies, matched more than 50% of Japan's import demand in 2008. Japan's imports showed high complementarity with exports from:

- Thailand (63.5%);
- China (61%);
- Republic of Korea (61%);
- Turkey (60%);
- Indonesia and the Islamic Republic of Iran (59% each);
- Australia, Malaysia, Russian Federation and Singapore (57% each);
- Phillippines (55%);
- Brunei Darussalam and New Zealand (52% each);
- Bhutan (51.5%);
- India and Viet Nam (51% each);
- Uzbekistan (50.5%).

Republic of Korea – On average, 43.5% of the Republic of Korea's imports show complementarity with exports from Asian and Pacific economies. Only 12 economies appeared to match more than 50% of the Republic of Korea's import demand in 2008:

"The import demand of the major economies in the East Asian production network tends to exhibit greater complementarity, on average, with the exports of those economies and of developing ASEAN-5 than with exports by other Asian and Pacific economies"

- Indonesia (63%);
- China (59%);
- Singapore (58%);
- Malaysia (57%);
- Turkey (55.5%);
- Viet Nam (55%);
- Philippines, Thailand and Hong Kong,China (54% each);
- Australia (52%);
- New Zealand (51%);
- Islamic Republic of Iran (50%).

Singapore – About 44% of Singapore's imports were matched by Asia-Pacific exports. Exports of 12 Asian and Pacific economies, including some low-income developing economies matched more than 50% of Singapore's import demand in 2008. Singapore's imports showed high complementarity with exports from:

- Malaysia (72%);
- Philippines (67%);
- Hong Kong, China (60.5%);
- Indonesia (58%);
- China (57%);
- Fiji, Thailand and Viet Nam (55% each);
- Solomon Islands (54%);
- Republic of Korea (53%);
- Myanmar and Nepal (51%);
- Timor-Leste (50%).

Hong Kong, China – Only 32.5% of imports by Hong Kong, China, showed complementary with exports from other Asian and Pacific economies on average in 2008. Exports from five economies in East and South-East Asia matched more than 50% of import demand from Hong Kong, China:

- Malaysia (54%);
- China and Singapore (52% each);

- Macao, China (51%);
- Philippines (50%).

The relatively lower complementarity between import structure of Hong Kong, China, and the export structure of other Asia-Pacific economies may be a reflection of the unique status of Hong Kong, China, as an import-export entrepôt. Its imports largely comprise finished and semi-finished goods from a small group of economies in Asian production networks for re-export, while imports of primary commodities and raw materials from Asian and Pacific economies generally account for a minor share.

(b) Major importing economies in South-East Asia

Indonesia, Malaysia and Thailand are the major importing economies in South-East Asia. Their trade complementarity patterns are detailed below.

Thailand – About 46% of Thailand's imports matched exports by other Asian and Pacific economies. The country's imports were found to fit well (more than 50%) with 19 economies in the region, including some least developed economies in the Pacific. The highest complementarity index was found for exports by:

- Australia (59%);
- New Zealand (57%);
- Philippines (56%);
- Malaysia (55%);
- Indonesia, Turkey and Hong Kong, China (53% each);
- French Polynesia, Japan and the Russian Federation (52% each);
- China, New Caledonia, Papua New Guinea and Singapore (51% each);
- Federated States of Micronesia (50.5%);
- Brunei Darussalam, the Islamic Republic of Iran, Viet Nam and Macao, China; (approximately 50% each).

Malaysia – About 44% of Malaysia's imports showed complementarity with other Asia-Pacific

exports, mostly from the advanced Asian and major ASEAN economies:

- Singapore (58%);
- Japan, the Republic of Korea and Thailand (57% each);
- China (55%);
- Hong Kong, China (54%);
- Philippines (53.5%);
- New Zealand (53%);
- Australia (51%).

Indonesia – Only 38% of Indonesia's imports fitted well with exports by other Asian and Pacific economies in general, and only Japan showed export complementarity of more than 50% with Indonesia's imports, at 54%. This indicates that the integration of Indonesia into the Asian and Pacific production networks is still at a relatively low level.[52]

"…most economies in the region need to transform their productive structure and current specialization to become viable trading partners of the large Asian importing economies"

(c) Major importers in South and South-West Asia

Major importers in South and South-West Asia are India and Turkey but their import complementarity patterns are very different from the rest of Asia and the Pacific.

India – About 44% of India's imports have complementarity with Asia-Pacific exports particularly those from low-income developing economies:

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[52] Evidence is found from 2007 trade data compiled by Athukorala (2010, table II.2). The relative share of production network exports in total exports from Indonesia is 38%, somewhat lower than that of the Philippines (87%), Malaysia (79%), Singapore (66.5%) and Thailand (63%). The shares on the import side show a similar pattern. The production network accounted for about 37.7% of Indonesia's imports, lower than that of the Philippines (79%), Malaysia (72%), Singapore (78%) and Thailand (48.5%).

- Sri Lanka (59%);
- Fiji and Nepal (58%);
- Myanmar, Samoa, Solomon Islands and Viet Nam (55% each);
- Indonesia (54%);
- Lao People's Democratic Republic (53%);
- Tonga (53%);
- Georgia (52%);
- Cambodia (51%).

Turkey – Of the imports by Turkey, 43% matched exports from Asia and the Pacific. Turkey's imports have tended towards complementarity with exports from resource-rich economies, especially land-locked developing economies and the Pacific:

- Tajikistan (55%);
- Australia, Azerbaijan, Mongolia and New Zealand (54% each);
- New Caledonia (52.5%);
- Kazakhstan, Lao People's Democratic Republic and the Russian Federation (52% each);
- Georgia and Macao, China (51% each);
- Armenia and Papua New Guinea (50% each).

These figures suggest that there is potential for Turkey to diversify its resource dependence away from the European Union to non-European Union partners.

(d) Major importers in the rest of Asia and the Pacific

Russian Federation – This is the only North and Central Asian economy that appears in the group of major Asian importers. Some 38% of imports by the Russian Federation have complementarity with exports of the region. The Russian Federation imports appear to have relative complementarity with exports by low-income developing countries, especially small Pacific and North-East Asian economies. Exports by the following economies had more than 50% complementarity with the Russian Federation's import demand:

- Tonga (61%);
- Solomon Islands (60.5%);
- Samoa (57%);
- Guam and Northern Mariana Islands (56% each);
- Mongolia (55%);
- New Caledonia (52%).

Australia – A total of 38% of Australian imports had complementarity with exports by Asian-Pacific economies, especially small Pacific economies such as:

- Kiribati (59%);
- Tonga (57%);
- Federated States of Micronesia and Solomon Islands (56% each);
- Vanuatu (53%);
- Cook Islands and Samoa (52% each);
- Niue and Timor-Leste (51% each);
- Papua New Guinea (50%).

Given the assumption that world demand will shift towards Asia and the Pacific, and China in particular, during the next decade, the above results imply that most economies in the region need to change their productive structure and current specialization in order to become viable trading partners of the large Asian importing economies as well as part of the dynamic Asian production network. This is especially true for the low-income developing economies.

2. Export diversification and market share of individual economies

Typically, exports of any economy can be expanded by increasing the number of different export products and services and/or increasing the quantity of each exported item, so-called expansion of "extensive margin" and "intensive margin" of exports (Hummels and Klenow, 2005).

In terms of opportunities to expand the type of export products (i.e. export diversification), countries that currently export relatively few products obviously have more room for diversification than those that already export a large

number of products. Based on the 4-digit SITC Rev. 3 export data for 2008, it was found that exports by most Asian and Pacific economies were quite diversified and covered a wide range of product groups. For example, exports of products by China and Thailand already cover more than

89% of the products exported globally. In contrast, exports by the low-income developing countries are much more concentrated, accounting for a smaller fraction of globally exported products. The index shows that the low-income developing Asia-Pacific economies would have more trade opportunities if they could diversify their exports (figure 31). Some emerging economies have been able to increase their export diversification during the past decade. Viet Nam, in particular, increased its export diversification by more than 20 percentage points between 2000 and 2008.

Figure 31. Scope of exports of selected Asia-Pacific economies in the world market, 2000 and 2008
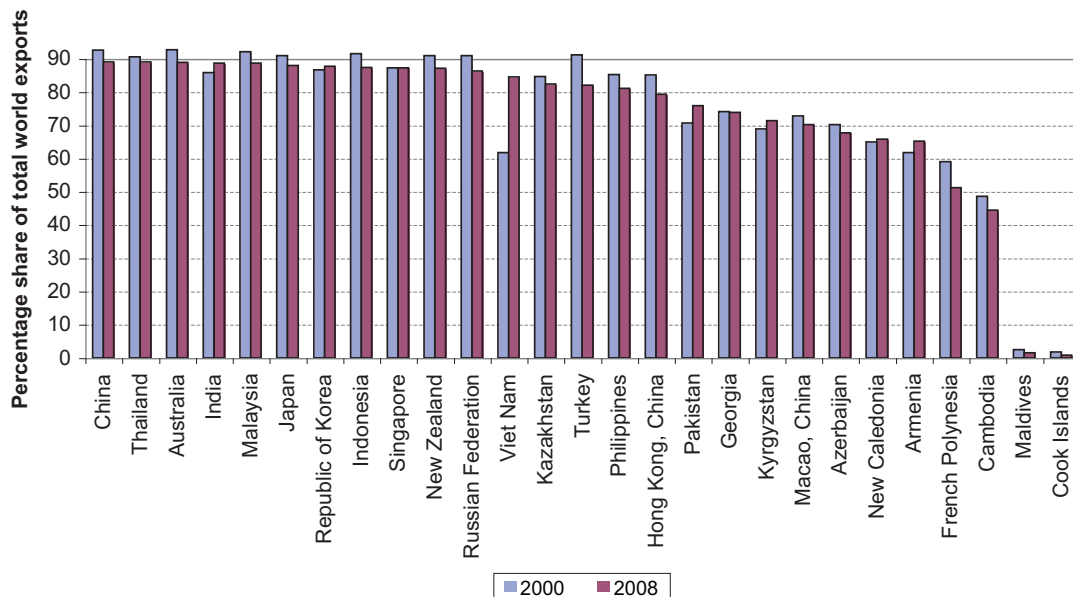
Source: ESCAP calculation, based on data from World Bank, WITS database, downloaded April 2011.
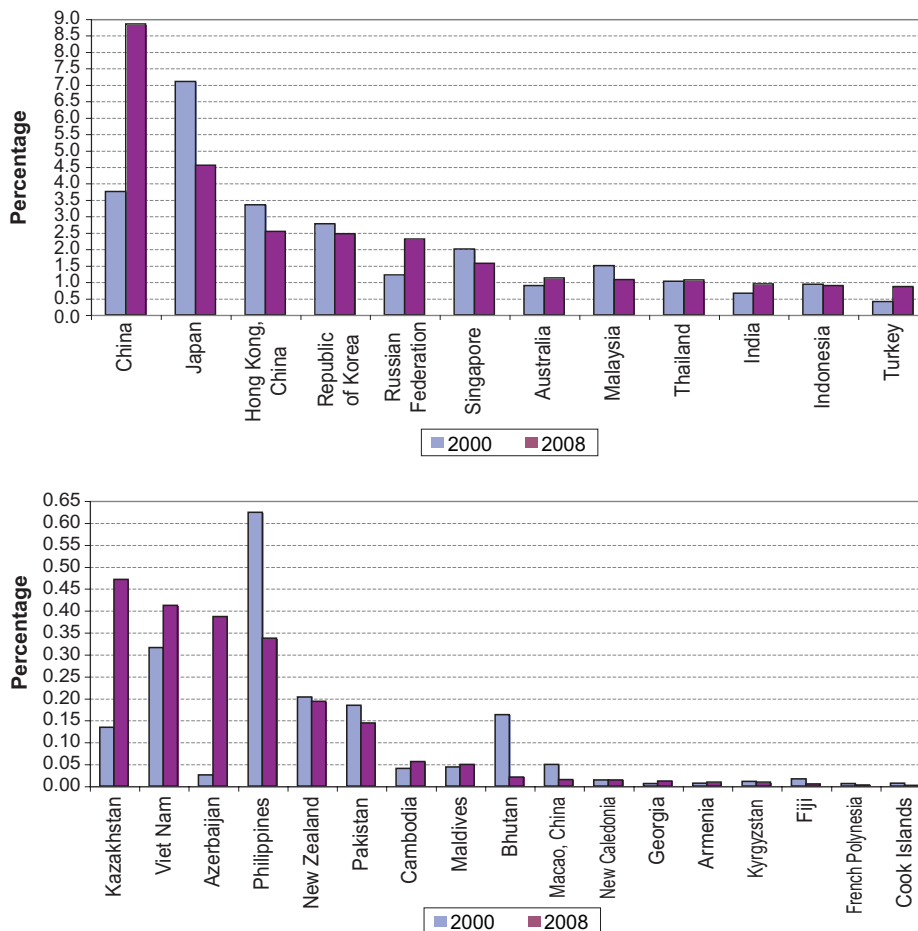*Note:* Measured by using an index known as the Hummels-Klenow (2005) (products) extensive margin, available from the World Integrated Trade Solution of the World Bank.

Most economies of the region still have considerable potential for expanding their exports through enhancing competitiveness of their current exports. Based on 4-digit SITC Rev. 3 export data for 2008, Asian and Pacific economies play a relatively minor role in world markets for products that they export, with a market share of no more than 9% (figure 32). Thus, enhancing compet-itiveness, through improved cost efficiency and

quality, of currently exported products is necessary in order to capture a larger share of world demand.

"Most economies of the region still have considerable potential for expanding their exports through enhancing competitiveness of their current exports"

Figure 32. Shares of selected Asia-Pacific economies in the world market, 2000 and 2008

Source: ESCAP calculation, based on data from World Bank, WITS database, downloaded in April 2011.
Note: Measured by using the Hummels-Klenow (2005) (products) intensive margin index, available from the World Integrated Trade Solution of the World Bank.

3. Specialization

Improving the competitiveness of exports has always been a key factor in enhancing export growth. The revealed comparative advantage (RCA) index can be used to gauge the current level of competitiveness of Asian and Pacific exports and is calculated on the basis of the 4-digit level of disaggregation of SITC Rev. 3 trade data. The index also may be used indirectly to reflect a degree of the relative attractiveness of a particular economy for FDI, particularly in export sectors. An index value larger than one (RCA >1) indicates that an economy features a larger share of a certain product in its exports than the world average export share in that product. In such a case, the economy is said to have a revealed comparative advantage in that product and is therefore a relatively attractive investment destination. RCA indices are also used to assess export potential.[53] In principle, the largest potential for inter-industry trade (i.e. trading of goods categories into different industrial sectors) is between economies that reveal quite different comparative advantages. In contrast, similar RCA

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[53] However, this would require a fairly disaggregated analysis.

"To enhance intra-industry exports, Asia-Pacific economies will need to build horizontal specialization in differentiated products or vertical specialization in different stages of the value chain"

values signal a narrow scope of potential inter-industry trade, but this does not exclude a potential for the intra-industry trade.

For economies in East Asia, RCA values greater than unity appear to be concentrated in industrial and manufacturing products (SITC sectors 5-8), indicating that the comparative advantage of that subregion in those products (table 13). The revealed comparative advantage of South-East Asia, which is more diversified, is dispersed across various sectors, and is relatively more prominent in industrial and manufactured products (SITC 6-8) as well as food products (SITC 0). In South and South-West Asia, India and Turkey lead the subregion in a number of competitive sectors, dominated by food products (SITC 0), manufactured goods (SITC 6) and miscellaneous manufactured articles (SITC 8). The North Asia, Central Asia and Pacific subregion have a relatively small number of product groups with revealed comparative advantage, especially if Australia and New Zealand are excluded. The comparative advantage of these subregions appears to be concentrated in food (SITC 0), fuel and mining (SITC 3), and manufactured goods (SITC 6).

Comparative advantage patterns, as discussed above, could suggest opportunities for inter-industry trade between economies within the region. For example, East Asia, which is the centre of the region's import demand, would continue to provide a potential market for exports of primary products, i.e. food, raw materials, fuel and mineral products. This does not mean that there are no opportunities to export industrial and manufactured goods to East Asia. It only indicates that to export non-primary products to East Asia, more attention should be given to the development of capacity for intra-industry trade. To enhance intra-industry exports, Asia-Pacific economies will need to build horizontal

specialization in differentiated products or vertical specialization in different stages of the value chain.

Opportunities for the rest of the region to export to developing South-East Asia and India tend to be more in intra-industry trade than inter-industry trade, because the revealed comparative advantage of those economies appears to be diversified across various sectors. On the other hand, exports of industrial and manufacturing products to South and South-West Asia, North and Central Asia, and the Pacific still have considerable scope for expansion because their specialization is quite different from the rest of the region even though the size of individual markets in those subregions is relatively small.

C. OPPORTUNITIES AND PROSPECTS FOR FOREIGN DIRECT INVESTMENT

Asia and the Pacific is leading the recovery of global FDI, and opportunities in the region for attracting FDI thus remain high. At the same time, various emerging developing economies in the region have increased their importance as FDI sources, both within and outside the region. In particular China, India, Indonesia, the Russian Federation, Singapore and Hong Kong, China, are expected to play an increasingly important role in terms of both inward and outward FDI in the region.

As developing economies in Asia and the Pacific are gaining importance as sources of FDI, opportunities for intraregional South-South FDI are emerging. South-South FDI would also facilitate technology and knowledge transfer, which in turn would enhance sustainable and inclusive development in the less developed economies of the region.

"FDI in high value-added industries and in services is expected to become increasingly important for Asia and the Pacific"

While many lower-income developing countries in Asia and the Pacific may have relatively small

Table 13. Patterns of revealed comparative advantage, by economy, 2008
(Number of product groups with RCA >1 at 4-digit SITC Rev. 3)

Economy	0 Food/ live animals	1 Beverages/ tobacco	2 Crude material excl. food/fuel	3 Mineral fuel/ lubricants	4 Animal/ vegetable oil/fat/wax	5 Chemicals/ products n.e.s.	6 Manufactured goods	7 Machinery/ transport equipment	8 Miscellaneous manufactured articles	9 Commodities n.e.s	Total
East and North-East Asia											
China	26	1	18	5	4	37	138	87	94		410
Hong Kong, China	6	1	10		1	16	66	48	84	1	233
Japan		1	12	2	1	42	57	111	30	1	257
Republic of Korea	3	1	11	2		30	69	52	14		182
Macao, China	4	5	3			7	32	15	49	1	116
Total	**39**	**9**	**54**	**9**	**6**	**132**	**362**	**313**	**271**	**3**	**1 198**
South-East Asia											
Cambodia	2	2	6		1	1	5	2	26		45
Indonesia	34	4	30	9	7	18	58	29	45	1	235
Malaysia	18	1	23	7	9	19	42	44	27		190
Philippines	22	5	17	2	2	9	24	23	33	1	138
Singapore	10	1	8	3	4	31	14	55	25		151
Thailand	42	1	18	2	4	24	70	51	38	1	251
Viet Nam	33	4	24	3	5	5	60	15	62		211
Total	**161**	**18**	**126**	**26**	**32**	**107**	**273**	**219**	**256**	**3**	**1 221**
South and South-West Asia											
Bhutan	6		5	1	1		3				16
India	40	4	49	5	6	42	93	33	44		316
Afghanistan	8		4				3		2		17
Maldives	10		2								12
Pakistan	29	2	27	1	2	6	47	4	39		157
Sri Lanka	28	4	19		4	5	37	11	44	1	153
Turkey	49	4	29	1	5	16	98	35	48	1	286
Total	**170**	**14**	**135**	**8**	**18**	**69**	**281**	**83**	**177**	**2**	**957**
North and Central Asia											
Armenia	19	7	13			6	33	9	10	1	98
Azerbaijan	9		2	1	4		2	1			19
Georgia	19	3	23	1	3	12	13	7	9	1	91
Kazakhstan	8		20	11	1	4	18	4		1	67
Kyrgyzstan	31	3	23	3	1	2	28	6	17	1	115
Russian Federation	5	1	19	7	1	11	25	6			75
Total	**91**	**14**	**100**	**23**	**10**	**35**	**119**	**33**	**36**	**4**	**465**
Pacific Island economies											
Australia	40	1	44	5	3	11	14	2	5	1	126
Cook Islands	3		1				2				6
French Polynesia	9	3	4		2	4	5	9	14		50
New Caledonia	5		6			1	1	5	1		19
New Zealand	60	2	33		4	14	35	20	14	2	184
Samoa	10	2	2		1		5	3	2		25
Total	**163**	**9**	**102**	**5**	**13**	**38**	**83**	**43**	**57**	**4**	**517**

Source: ESCAP calculation, based on World Bank, WITS database, downloaded in April 2011.
Note: n.e.s., not elsewhere specified.

domestic markets, they have relatively stable economies and political climates as well as low-cost (but typically unskilled) labour that help to generate business and investment opportunities. Some advanced developing economies, such as China, are losing competitive advantage in labour-intensive sectors, mainly due to increasing labour costs; less advanced economies could therefore capture emerging opportunities by taking over from China some of the production operations in regional and global value chains through South-South FDI. For example, some countries such as Bangladesh and Cambodia have already captured such opportunities in the apparel and garment sector.[54] Future prospects of South-South FDI in the region's less advanced economies depend on their ability to strengthen supply-side capacities, e.g. development of small and medium-sized enterprises (SMEs) and supporting industries, and provide an enabling environment for investment (see also chapter 7).

FDI in high value-added industries and in services sectors is expected to become increasingly important for Asia and the Pacific. Already, the global top three sectors attracting FDI comprise information and communications technology (ICT), business services and financial services. Most recently, FDI in the ICT and software sectors surpassed FDI in financial services, and in 2010 accounted for 11% of global projects (fDi Intelligence, 2011). This opens new opportunities for those countries that have competitive advantages in those sectors. Furthermore, economies with abundant natural resources will continue to attract FDI, especially if supported by domestic reforms and productivity growth (see box 5.1. for investment opportunities in Central Asia).

What are the prospects for FDI in China and India, the two largest emerging economies in Asia and the Pacific?

China is expected to remain a top FDI destination as transnational corporations (TNCs) eye China's

rapidly growing market and because China still relies on transfer of advanced technologies from developed economies. Despite the need for development in inland provinces in China, most FDI has so far targeted coastal provinces, mostly in sectors that cater to the domestic market, or acquisitions of domestic companies to establish a local presence rather than for exporting. China's recently released twelfth Five-Year Plan identifies new development objectives, motivated mainly by the need for climate change mitigation, and with the focus on seven strategic sectors, i.e. energy saving and environmental protection, next-generation information technology, biotechnology, high-end manufacturing, new energy, new materials and clean-energy vehicles. The Plan's objective is to raise the share of those sectors in GDP from the current 3% to 15% by 2020. Those sectors are expected to attract large inflows of FDI (Stern, 2011). FDI inflows would therefore grow and reach an average of $114 billion per year during 2011-2015 (Economist Intelligence Unit, 2011b). As for outward FDI, Chinese companies are expected to continue acquisitions of overseas assets at an accelerating level, particularly in the agricultural, minerals and energy sectors, to ensure a steady supply for the expanding home economy.

> *"China's recently released twelfth Five-Year Plan identifies new development objectives, motivated mainly by the need for climate change mitigation"*

India has yet to see inward FDI recovery. To change the trend, India is expected to relax restrictions on FDI in some key sectors (especially services such as retailing) in an effort to simplify FDI procedures and remove bottlenecks (Economist Intelligence Unit, 2011c). India is expected to continue strong growth of real GDP and further economic liberalization, resulting in a growing need for both public and private investment (especially in infrastructure and industrial development). Thus, a more investor-friendly climate needs to be established in order to attract higher FDI inflows, as was clearly indicated by the Doing Business Survey 2011 (World Bank, 2010a) in which India was again

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[54] However, those countries should strive to diversify their economies and decrease dependence on single commodities or export products. Such diversification efforts would also attract further South-South FDI from neighbouring developing countries.

ranked low at 134. Indian enterprises are also showing increasing interest in investing in foreign markets (fDi Intelligence, 2011).[55] India's FDI is therefore expected to grow in the mid- to long term, despite the country's decreases in FDI outflows in 2009 and 2010 (UNCTAD, 2011b).

It is apparent that corporate and industrial restructuring in the wake of the global economic crisis, coupled with ongoing development of international production networks or regional and global value chains, have created new investment opportunities for forward-looking enterprises in both developed and developing economies.

However, prospects for continued growth of outward FDI from the region are somewhat dimmed by rising risks, including "unpredictable global governance",

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[55] For example, India is currently emerging as an investor in selected outsourcing services in other Asian countries, such as the Philippines (box 5.2).

"The possibility exists that the weak recovery of FDI outflows may become even weaker during 2011"

uncertainties over domestic demand in developed countries, fiscal and financial vulnerabilities, sovereign debt crises, rising energy prices, inflation risks and currency volatility in addition to earthquake-related damage in Japan (cf. International Monetary Fund, 2011b). As a result, the possibility exists that the weak recovery of FDI outflows may become even weaker during 2011.

Finally, FDI opportunities could arise from the ever-increasing number of RTAs covering investment provisions in Asia and the Pacific (box 8.2). While such provisions are not a major determinant of FDI the overall package of some agreements, including deep commitments to, and wide coverage of industrial sectors, is expected to increase

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Box 5.1. Capturing investment opportunities: Central Asia[a]

Discussions on investment opportunities in the Asian and Pacific region frequently focus on economies that are growing rapidly on the basis of exports of manufactured goods and the development of production networks. However, Central Asia contains a group of economies with quite different characteristics but significant trade and investment potential. Although landlocked, they are relatively rich in natural resources. The opportunities in these economies are different from those in other Asian subregions.

The abundance of natural resources ensures a steady flow of foreign exchange to Central Asian economies. In addition to oil and gas, this subregion is also rich in gold and other precious metals such as silver and platinum, and some base metals such as copper, molybdenum, lead and zinc. As a result, the region is highly resource-dependent. In Azerbaijan and Kazakhstan, for example, hydrocarbons and minerals account for more than 50% of their exports, while oil and gas account for more than 25% of their fiscal revenue.[56] This resource abundance has attracted considerable FDI inflows to the region; a ninefold increase was recorded during 1993-2008, two thirds of which went to the energy sector (Organisation for Economic Cooperation and Development, 2011).

The Organisation for Economic Cooperation and Development (OECD) (2011) as workforce of the subregion is also part of its strength. Central Asian economies have a relatively young workforce and almost universal literacy rates (OECD, 2011). From 1993 to 2008, the productivity of the subregion grew nearly 5% faster than the world average.

These factors have contributed to a strong economic performance by the subregion during the past decade, resulting in an annual GDP growth rate of 8%.

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[56] Centrat Intelligence Agency (CIA), The World Factbook, 2011. Available from https://www.cia.gov/library/publications/the-world-factbook/fields/2011.html

Box 5.1 (Continued)

Central Asia labour productivity growth relative to world average, 1993-2008
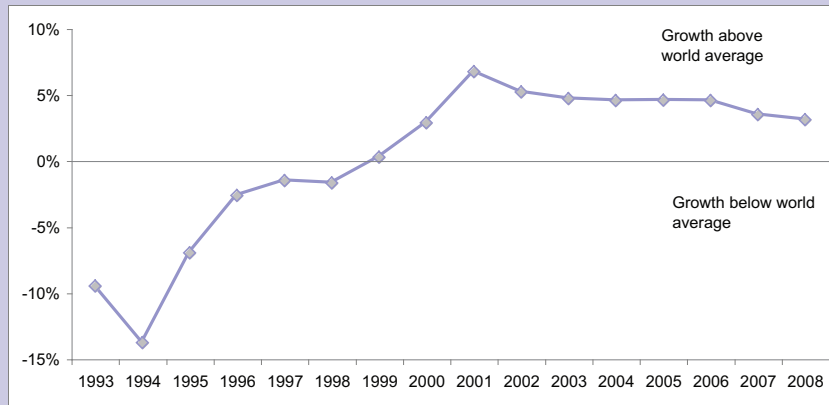
Source: OECD (2011).

The subregion presents not only great opportunities, but also challenges. Several economies in Central Asia are remote and landlocked, which leads to high trade costs, especially transportation, for traders and investors. The World Bank "Doing Business" database[b] covers six of the Central Asian Regional Economic Cooperation (CAREC)[c] members (Afghanistan, Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan). The average cost of importing a container to these six countries is around $3,000, compared with less than $1,000 in East Asia and $450 in Singapore. The costs of shipping a container from the United States east coast to Tajikistan can reach $9,000, with the leg from Georgia to Tajikistan accounting for two-thirds of this amount. The World Bank (2004) estimated that trade logistics costs amount to 23% of the value of Tajikistan's external trade and that total logistics costs, including domestic movement of goods, amount to 27% of GDP.

Because of these challenges, the subregion needs to improve its roads, rail system, pipelines and communications infrastructure to reduce trade costs. Trade facilitation measures are also a priority. Although tariff barriers in the region are quite low, analysts point to the presence of non-tariff (but man-made) barriers associated with customs clearance, transit fees, complicated systems of trade permits, "unofficial payments" and limited progress towards installation of modern information systems.[d]

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[a] ESCAP defines Central Asia as Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, the Russian Federation, Tajikistan, Turkmenistan and Uzbekistan.

[b] Available from www.doingbusiness.org/EconomyRankings/.

[c] The Central Asian Regional Economic Cooperation (CAREC) Programme is an Asian Development Bank supported initiative that was established in 1997 to encourage economic cooperation among countries in the Central Asian region. It currently has 10 participating members: Afghanistan, Azerbaijan, China, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Tajikistan, Turkmenistan and Uzbekistan. The CAREC Programme has, to date, focused on financing infrastructure projects and improving the region's policy environment in the priority areas of transport (especially road transport), energy (including the water-energy nexus), trade policy and trade facilitation (especially customs cooperation).

[d] See, for example, Asian Development Bank, 2006; Grafe, Raiser and Sakatsume, 2005; and Grigoriou, 2007.

intraregional FDI flows. Expectations are high for an increase in FDI flows between China and ASEAN countries and also between the members of the Asia-Pacific Trade Agreement (APTA), which are about to negotiate liberalization commitments on investment. The realization of the ASEAN Economic Community in 2015 is also expected to increase intra-ASEAN investment flows, which will benefit the less developed ASEAN members. At the same time, developing economies in the region, including least developed countries and landlocked developing countries, would benefit from membership in selected RTAs such as Economic Cooperation Organisation Trade Agreement and South Asian Free Trade Area. Such benefit would be in terms not only of trade but also of investment, provided that these RTAs are effectively implemented as well as expand their coverage, deepen their commitments and are willing to accept new members.

D. TRADE AND INVESTMENT OPPORTUNITIES IN CLIMATE-SMART GOODS AND TECHNOLOGIES

In response to the current long-term global economic downturn, proactive economic measures to promote new industries are necessary. Climate-smart goods and technologies (CSGTs) in particular are receiving considerable attention as a potential source of growth, as on a global scale such growth in environmental goods and services will create huge international business opportunities. In exploring CSGT trade opportunities within and outside the region, this section shows that there is an untapped trade potential in these promising sectors for Asia-Pacific countries, including intraregional trade.

1. What are climate-smart goods and technologies and how much trade in climate-smart goods and technologies is there?

CSGTs are defined broadly as products, components and technologies that tend to have a relatively less adverse impact on climate change (i.e. greenhouse gas emission) in particular and on the environment in general. CSGTs constitute low-carbon technologies such as solar photovoltaic systems, wind power generation, clean coal technologies and energy-efficient lighting. Trade and investment in CSGTs and climate-smart services have recently received much attention as a triple win scenario where trade, climate and environment, and development all benefit. In China, for example, 5.3% of its RMB4 trillion (about $585 million) economic stimulus package has been given

"Asia and the Pacific is the most dynamic region when it comes to trade in climate-smart goods, with China and Japan the top two exporting countries"

to an environment-related budget. In 2009, the Government of Japan allocated 10% of its ¥15.4 billion (around $165 billion) economic stimulus package to environmental measures. More recently, the nuclear disaster in Japan has triggered global awareness of the needs to seriously promote CSGTs. The achievement of low-energy con-sumption is now regarded as a key not only to solving climate-change problems but also to reducing reliance on nuclear power. Outside the Asia-Pacific region, the Government of the United States has introduced a $150 billion, 10-year renewable energy initiative, and the European Union has taken active measures to support the switch to low-emission vehicles.

Figure 33 shows that global trade in CSGTs is gradually rising.[57] The value of world CSGT exports was around $410 billion in the pre-crisis year of 2008, and exports and imports accounted for about 3% of global trade. Although most CSGT exporters are developed economies, some developing economies are also emerging as important players as will become more evident from the discussion below.[58]

Asia and the Pacific is the most dynamic region when it comes to trade in climate-smart goods, with China and Japan the top two exporting countries. In 2008, the Asia-Pacific region[59] accounted for about 31.9% of world trade in CSGTs. The value of CSGT exports and imports tripled during 2002-2008, with regional exports (mainly from China) increasing from $39.3 billion to $132 billion, or on average by 22.7% annually. Not surprisingly, Asia-Pacific trade in CSGTs with the world fell in 2009; exports and imports declined by 16.8% and 15.9%, respectively, from the previous year as a result of the global economic crisis.[60]

East and North-East Asia, and South-East Asia account for the largest share of total Asia-Pacific

Figure 33. Exports and imports of climate-smart goods and technologies in the Asia-Pacific region, 2002-2009

Source: ESCAP calculation, based on United Nations Comtrade data downloaded from World Bank, World Integrated Trade Solution (WITS) database, accessed on 14 September 2010.
Note: RHS, the right-hand side axis. LHS, the left-hand side axis.

CSGT trade, in terms of both exports and imports (more than 90%) and thus drive the CSGT trade of the whole region (figure 34). China and Japan are the region's largest exporting economies of CSGTs (table 14). China is also the leading importer of CSGTs, followed by the Republic of Korea. Regional exports and imports of CSGTs are geographically very concentrated, with China and Japan representing 67% of total regional exports, and China, the Republic of Korea and Japan absorbing 53.4% of regional imports.

The intraregional share of trade in CSGTs has remained relatively stable and accounts for some 50% of total trade of the region in these goods, except on the export side in 2010 (figure 35).[61] CSGT imports of the region show a strong bias towards Europe, which takes a quarter of the total CSGT imports. On the export side, the share of
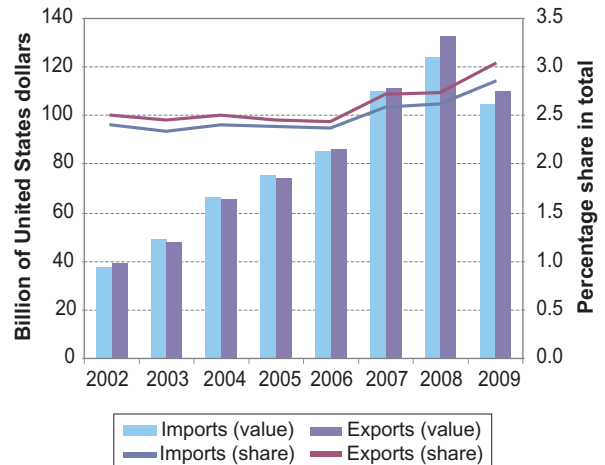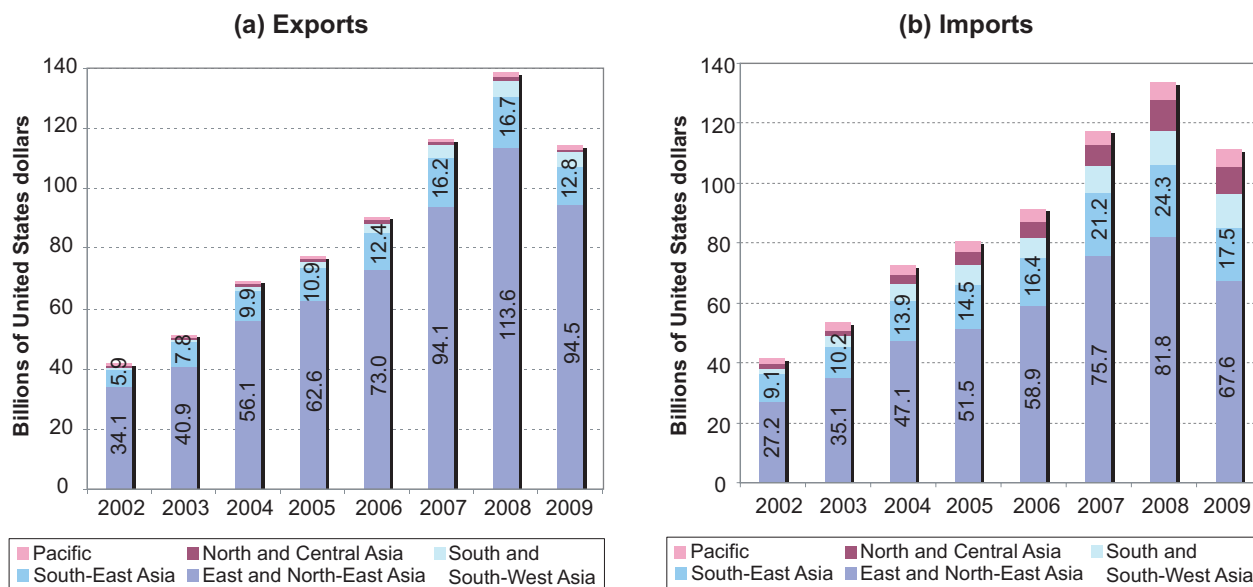
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[57] In a forthcoming ESCAP study on Trade, Investment and Climate Change (2011c, forthcoming), CSGTs cover the same 64 items under 6-digit HS 2002 codes. Following the World Bank (2008), the ESCAP study divides these 64 goods further into clean coal technologies (HS codes 840510, 841181 and 841182), wind energy (HS codes 848340 and 848360), solar photovoltaic systems (HS codes 850720, 853710 and 854140) and energy-efficient lighting (HS codes 853931). The study also considers "other codes" as the fifth group, which consists of all HS codes not considered in the four categories of renewable energies. All these 64 CSG items are considered as a single trade item in this report.

[58] See also ESCAP, 2011c forthcoming. The rise of developing economies is, in particular, in heat and energy management equipment, noise and vibration abatement, and environmental services such as air pollution control and solid waste management. For more details, see Jha, 2009.

[59] The Asia-Pacific region is defined as the regional members and associate members of ESCAP (see annex for more details and the list of economies in that group). However, data are not always available for all economies; therefore "Asia-Pacific" may have a slightly different coverage in different sections of this report.

[60] As trade data for 2009 were still not fully available at the time of preparing this report, the figures for 2009 should be considered as an estimate.

[61] Calculated based on data downloaded from United Nations Comtrade. However, Comtrade does not have data for a number of smaller Asia-Pacific economies. Inclusion of imputed data for those economies, provided by the Statistics Division of ESCAP, leads to shares of intraregional trade in CSGTs of more than 50% for all years and for shares of trade with the rest of the world in total trade in CSGTs ranging from 11% to 13% during 2002-2008.

Figure 34. Total exports and imports of climate-smart goods and technologies by the Asia-Pacific subregion, 2002-2008

(a) Exports

(b) Imports

Legend: Pacific, North and Central Asia, South and South-West Asia, South-East Asia, East and North-East Asia

Source: Calculation based on United Nations Comtrade data downloaded from World Bank, WITS database and on data provided by ESCAP Statistics Division.

Table 14. Top 10 traders of climate-smart goods and technologies, 2008

(Ranked by percentage share of total exports and imports of CSGTs by the ESCAP region)

Rank	Economy	Exports (%)	Economy	Imports (%)
1	China	36.1	China	30.0
2	Japan	30.9	Republic of Korea	13.2
3	Republic of Korea	7.4	Japan	10.2
4	Hong Kong, China	7.2	Hong Kong, China	7.5
5	Singapore	4.2	Russian Federation	5.7
6	Malaysia	3.1	Singapore	5.1
7	India	2.6	Thailand	4.3
8	Thailand	2.5	India	4.1
9	Turkey	1.4	Australia	3.8
10	Indonesia	1.2	Turkey	3.5

Source: ESCAP calculation based on United Nations Comtrade data downloaded from World Bank, WITS database.

Europe as a destination increased to reach almost 20% in 2009.[62] This was probably the result of the rapid adoption of climate-smart development legislation and policies in many European countries, such as feed-in tariffs during period under review.

"Intraregional share in trade of CSGTs accounts for some 50% of total Asia-Pacific trade in these goods"

The rest of the world, including many developing economies in, for example, Latin America, plays a much more significant role in Asia-Pacific exports of CSGTs than in their imports.

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[62] In 2010 this share was halved. However, the trade data are far from complete for 2010, and this result is just an early estimate.

Figure 35. Regional distribution of exports and imports of climate-smart goods and technologies, 2002-2010
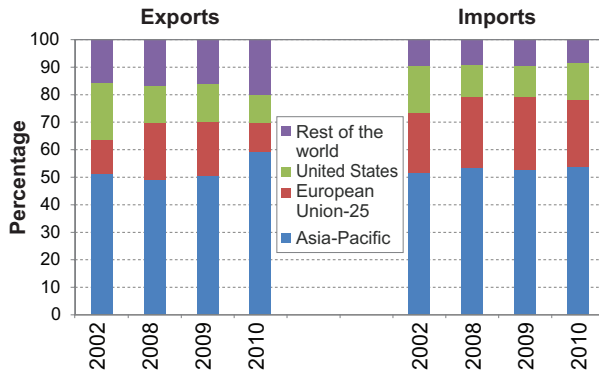
Source: Calculated from United Nations Comtrade data downloaded from World Bank, WITS database.
Note: ROW, rest of the world.

2. Exploring potential for trade in climate-smart goods and technologies for the region

Although China and Japan dominate CSGT exports, the analysis of the revealed comparative advantages at the sector level shows that some Asia-Pacific developing economies have the potential to become CSGT exporters in at least some of these products (table 15). The production of solar photovoltaic and efficient lightning appear to be both the most developed and most competitive as the largest number of economies feature in these two CSGT categories; China, Japan and Malaysia appear in almost all product categories, while India and Sri Lanka feature as potential leaders in South Asia. The wind power category is arguably the most challenging as only Japan reveals a comparative advantage in the production and export of these two products. Clean coal is associated with the production of generators and comparative advantage is found in New Zealand, Pakistan and Singapore.

A simple gravity model is used to estimate "trade potential" based on 2008 trade data.[63] The

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[63] The "trade potential" is the export gap defined as the difference between actual exports and the predicted value based on the gravity model (see annex to this chapter). A positive "trade potential" suggests that there is scope for an economy to increase its exports of climate-smart goods to a particular trading partner.

"Estimated export potential of climate-smart goods in Asia and the Pacific was $30 billion to $35 billion in 2008"

estimated export potential in 2008 for climate-smart goods in Asia and the Pacific was $30 billion to $35 billion. If Asian and Pacific economies were able to utilize this potential, their exports of CSGTs would increase by nearly $7.34 billion. Among these economies, India ($4.2 billion) was top, followed by the Russian Federation ($1.51 billion), Pakistan ($980 million), Hong Kong, China ($590 million), and Azerbaijan ($6.7 million).

Intraregional demand for CSGTs was also very high in 2008, but many economies could not fulfil the import demand. The actual level of intraregional imports was $61.2 billion during the observed period, and these economies could increase their imports of CSGTs by nearly $20 billion only through intraregional trade. The major economies with CSGT import potential were the Republic of Korea ($15.78 billion), Pakistan ($2.79 billion), Armenia ($7.37 million) and Bangladesh ($1.26 billion).

3. Investment opportunities in climate-smart goods and technologies

Economies that import CSGTs could possibly replace some of these imports – and even create export potential – by additional investment including FDI in the domestic capacity in these sectors. Unsurprisingly, China, Japan and the Republic of Korea are the biggest investors in CSGTs, but the potential for more investment in these and other economies is huge.

Gauging investment potential is even more complex than estimating trade potential. Data for FDI in CSGTs are virtually non-existent, but if investment is defined as total expenditure by the private and public sectors in development and production of CSGTs, some general observations can be made. Unfortunately, it is not possible to assess investment data for the group of 64 CSGTs that were the focus of trade analysis.

Table 15. RCA index for smart energy technologies, by individual economy, 2008

(actual value of the RCA index in brackets)

Group	HS 2002	Economy	RCA	Description
Solar PV	850720	Viet Nam	4.36	Other lead-acid accumulators
		China	3.36	
		Malaysia	1.16	
	853710	Malaysia	2.90	For a voltage not exceeding 1,000 V
		Japan	1.73	
		Thailand	1.63	
	854140	China	3.15	Photosensitive semiconductor devices, including
		Japan	3.04	photovoltaic cells whether or not assembled in
		Macao, China	2.50	modules or made up into panels; light emitting diodes
		Hong Kong, China	1.51	
		Malaysia	1.44	
		India	1.11	
Wind power	848340	Japan	1.90	Gears and gearing, other than toothed wheels, chain sprockets and other transmission elements presented separately; ball or roller screws; gear boxes and other speed changers, including torque converters
	848360	Japan	1.37	Clutches and shaft couplings (including universal joints)
Clean coal	840510	New Zealand	5.18	Producer gas or water gas generators, with or without their purifiers; acetylene gas generators and similar water process gas generators, with or without their purifiers
		Singapore	2.58	
Efficient lightning	853931	China	6.59	Fluorescent, hot cathode
		Sri Lanka	2.11	
		Macao, China	1.38	
		Thailand	1.07	
		Hong Kong, China	1.01	

Source: ESCAP calculations, based on United Nations Comtrade data downloaded from World Bank, WITS database on 19 May 2011.

It has been estimated that reducing emissions to the desired level (450 ppm CO_2 will require additional global investments of more than $1 trillion annually during 2010-2050. Approximately half of this amount is expected to be needed for the Asia-Pacific region, i.e. approximately $600 billion per year over and above current investment levels. China is expected to make up more than half of these mitigation-related investment needs in the region, followed by India and the remainder of the developing economies at around 17% each.

While these investment needs will imply large expenditures and thus a financing challenge for Governments, the private sector and consumers, they will simultaneously present a huge business

"Reducing emissions to the desired level (450 ppm CO_2) will require additional global investments of more than $1 trillion annually during 2010-2050"

opportunity. The exact scope of these business opportunities will naturally depend on the level of ambition of policymakers, the policy mix chosen and the degree of enforcement.

According to International Energy Agency (IEA), 2010 estimates, close to 50% of the required investments during 2010-2050 will be in the transport sector, followed by buildings (27%), and

power generation, transmission and distribution (a combined 21%) (International Energy Agency, 2010). Efficiency investments – primarily related to end-use efficiency – will form the majority of all energy-related investments, followed by renewables. Finally, in the services sectors, the market for energy-efficiency services should experience drastic increases, e.g. in relation to energy-efficiency consulting services for all the above services sectors, including process improvements in industry.

Several Asian and Pacific economies are already well positioned to benefit from the expected transformation towards climate-smart growth. With extensive manufacturing capabilities, China has established itself as a leader in the manufacture of a number of low-carbon energy technologies. In 2009, China produced 40% of the world's solar photovoltaic supply, 30% of the world's wind turbines (up from 10% in 2007), and 77% of the world's solar water collectors (REN21, 2010). Of the 10 major wind turbine manufacturers globally, two were in China and one in India. Among solar photovoltaic manufacturers, 4 out of 10 were in China.

With high capacity in automotive manufacturing, research and development, and a large export share, both Japan and the Republic of Korea should be able to benefit from the expected dramatic increases in low-carbon automobile sales, including electric, hybrid and plug-in hybrid vehicles. Likewise, with large internal markets for vehicle sales (Abe, 2010), expected increases in demand and already sizeable production capacities, China and India should be able to benefit. Other economies, such as Thailand, are currently implementing action to attract low-carbon vehicle production and should therefore also stand to benefit from this change.

While some economies have taken a clear lead in the development and utilization of CSGTs others can follow and integrate in regional climate-smart value chains. As the above analysis reveals, various economies have untapped CSGT investment and export potential at the aggregate level. Many lower-

income developing economies have opportunities to become suppliers of CSGT parts and components to the leading economies. Further analysis at the product and company levels would provide more details for explaining why this potential exists (e.g. due to cost advantage, availability of productive resources or knowledge and technology, and location). However, a supporting policy environment is essential to becoming market leaders in this area. In particular, trade and investment policies play an important role in helping economies to fully exploit their potential. These policies are explored in considerable detail by ESCAP (forthcoming, 2011c); the following subsection provides a brief summary.

4. Policies to promote trade and investment in climate-smart goods and technologies

Various policies exist for promoting trade and investment in CSGTs. Reducing tariffs on trade in CSGTs is important while imposing trade barriers to goods perceived to have a high carbon footprint are more controversial. Trade in CSGTs comprises mainly components trade (i.e. inputs to cleaner technologies). Cost efficiency of the whole CSGT value chain is highly sensitive to tariffs and other trade costs, because components have to be traded across borders several times at different stages of production.

While the imposition of trade barriers to products perceived to have a large carbon footprint may run afoul of international trade rules, trade policies can and should be adopted to promote trade in CSGTs and climate-smart services. For that reason, both at-the-border and behind-the-border obstacles to such trade need to be removed. As the negotiations on the liberalization of environmental goods and services are stalled at the multilateral level, unilateral liberalization, or liberalization under regional and bilateral trade agreements, appears to be the only solution. However, negotiations on the liberalization of trade in CSGTs and climate-smart services are generally hampered by a lack of consensus on the definition of an environmental or climate-smart good or service as well as on the modalities for reducing barriers to their trade. At the

bilateral or subregional level, the possibility is higher that such a consensus could be forged. In the meantime, various trade and transport facilitation measures could be introduced, such as paperless trade in all goods and the adoption of single windows, which would help in reducing carbon emissions associated with trade.

Investment policies play an important role, both in promoting domestic and foreign direct investment in the production of CSGTs and in the provision of climate-smart services. TNCs are at the forefront of developing CSGTs, and a conducive and enabling environment for such investment is therefore essential.[64] Such an environment includes an enabling regulatory framework, appropriate infrastructure and availability of local expertise, availability of incentives or privileges for climate-smart investment, and an appropriate level of intellectual property rights (IPR) protection. Investment promotion agencies could engage in specific targeting of climate-smart investment.

At the same time, the capacity of domestic SMEs in the area of CSGTs should be enhanced so that they can evolve into suppliers of low-carbon TNCs and effectively become integrated in low-carbon value chains. Countries should also ensure that regional or bilateral trade agreements or international investment agreements to which they are a party do not unduly undermine their policy for pursuing low-carbon growth, but instead are conducive to such growth.

Other policies related to standards and labelling, feed-in-tariffs, development of infrastructure as well as research and development capacity, technology development and transfer, financial mechanisms to promote trade and investment in CSGTs, and effective legislation are also important. These are discussed in more detail in ESCAP (forthcoming, 2011c). The development and transfer of climate-smart technologies, i.e. renewable energy technologies, assumes particular importance. However, in many developing economies a number of factors stand in the way of introducing effective

policies for deployment of cleaner technologies, such as: (a) insufficient technical knowledge and absorption capacity to produce technologies locally; (b), insufficient market size to justify local production units; and (c) insufficient purchasing power and financial resources to acquire innovative products (Jha, 2009).

"Given the cross-border nature of GHG emissions, regional cooperation is indispensable"

While national level actions and policies to mitigate climate change are important, climate change is most effectively tackled through international cooperation. Although various voluntary schemes related to the mitigation of climate change already exist in the context of subregional organizations – e.g. Asia-Pacific Economic Cooperation (APEC), ASEAN, the Pacific Forum Secretariat and the South Asian Association for Regional Cooperation (SAARC) – a region-wide approach is still lacking. Given the cross-border nature of greenhouse gas emissions, regional cooperation is indispensable. This report therefore proposes a "Regional Trade and Investment Cooperation Partnership/ Agreement for Mitigation of, and Adaptation to Climate Change". At the core of this Partnership would be a "Regional Trade and Investment Agreement on Mitigation of Climate Change". The regional partnership/agreement would include, inter alia, measures for:

(a) The liberalization and joint promotion of climat-smart trade and investment;

(b) Adopting regional climate-smart sectoral and industry standards and labels;

(c) Exploring the feasibility of a regional carbon tax and a regional emission trading system;

(d) Providing modalities for the effective joint development and transfer of climate-smart technology;

(e) Joint promotion and targeting of climate-smart FDI;

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[64] For a comprehensive overview of issues related to FDI in low-carbon goods, see UNCTAD, 2010a.

(f)   The development of the required supportive legal, institutional and physical infrastructure, expertise and establishment of a regional financial support mechanism for climate-smart SMEs and climate-smart growth in general, tapping at least part of the huge international reserves of selected economies.

E.   OPPORTUNITIES FOR EXPANDING SERVICES TRADE

Services are a key economic sector, and in many countries the largest contributor to GDP and employment, and an important provider of essential inputs to other economic activities. In 2009, at the peak of the global economic crisis, the share of exports of commercial services reached 20% of merchandise exports for Asia and the Pacific. Increasingly, services are considered to be an irreplaceable factor for further industrial development and for the expansion of merchandise trade, as they also play crucial role in supporting trade facilitation efforts (see chapter 6 of this report).

"Inefficiencies in the services sector of a developing economy have a negative impact on the export competitiveness of the agriculture and manufacturing sectors"

In addition to opportunities in more traditional tradeable services such as tourism, potential export opportunities are especially present in the infrastructure services sector.[65] The G-20 Seoul Summit (November 2010) endorsed a Multi-Year Action Plan on Development to reduce infrastructure deficits and bottlenecks in growth. Various stimulus packages of developing economies have targeted infrastructure development, and a part of this spending interlinks with the development of CSGTs. Globally, $400 billion (0.7%) of world GDP has already been allocated to support infrastructure services investment, with a

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[65] Also known as the ISS and comprising five subcategories: communication, transport, energy and water, financial services, and other related services.

major portion directed to clean infrastructure and technologies (UNCTAD, 2011c).

The growth of the infrastructure service sector is interlinked with opportunities for construction services, which are required for building infrastructure facilities. It also fosters growth of communications and financial services, including transport, which are at the core of developing logistics services deemed *conditio sine qua non* for improving overall trade efficiency. Inefficiencies in the services sectors of a developing economy have a negative impact on the export competitiveness of the agriculture and manufacturing sectors, and thus contribute to an unfavourable balance of trade. Furthermore, an efficient infrastructure service sector leads to lower service link costs, a key determinant in the development of production networks. Communications and logistic infrastructure are the two major factors making just-in-time production possible.

FDI plays a key role in the services trade, including trade in infrastructural services. It is a major source of capital, technology transfer and improved managerial skills in host developing economies. During 1990-2008, annual world FDI inflows to infrastructural services increased tenfold to $500 billion (48%) of global FDI inflows to the services sectors.

During 2006-2008, developing economies captured 22% of global FDI inflow to the services sectors, the vast majority of which targeted financial services (69%), followed by transport and communication services (23%), and electricity, gas and water (8%). South-South investment has risen in importance with the rise of TNCs from Brazil, China, the Republic of Korea, Malaysia and Hong Kong, China. The increase of South-South FDI in these sectors will also increase South-South trade and technology transfer between FDI home and host developing economies in the future.

The potential for services trade by Asia-Pacific developing economies is substantial, especially trade within the region (see box 5.2). In particular, developing Asia-Pacific economies have a comparative advantage in labour-intensive services.

"There is extensive scope for improving the efficiency of services trade through the implementation of properly designed regulatory reforms"

Box 5.2. India outsourcing business services to the Philippines

According to government sources in the Philippines and recent unofficial news articles quoting a report released by IBM in October 2010 (IBM Global Business Services, 2010), the Philippines has overtaken India as the global call centre of the world and is now the leading global player in the business back-office operations outsourcing market in terms of the number of people employed. The Government of the Philippines has predicted that the industry's revenues will hit $12 billion-$13 billion in 2011, rising to $100 billion by 2020 to account for about a 20% share of the global market. According to local sources, the Philippines had call centre revenues amounting to $5.5 billion in 2009 compared with $5.3 billion in India.

In 2009, the Philippines had more than 500,000 people working in call centres and related services compared with 330,000 in India. Indian companies, carrying out outsourcing work for many United States companies, were setting up call centres in the Philippines to take advantage of the latter country's cultural ties to the West and language more similar to the English spoken in the United States. For example, India's Tata Industry Services announced in early December 2010 that it had launched a business process outsourcing operation in Manila, its first in South-East Asia. While business process outsourcing has been dominated by call centres, the Philippines is gaining in other areas of services as well, such as logistics, finance, accounting and software research and programming, computer-aided design, animation and graphic design. While local industry groups concede that India still has a huge lead in the more complex outsourced services such as engineering, and software design and programming, the Philippines is gaining competitiveness in these areas as well.

Source: Agence France-Presse, "Philippines overtakes India as call centre capital", 6 December 2010.

They have an abundance of low- and semi-skilled labour, which is a major input to tourism, construction and transport services. However, regional cooperation in trade and related regulations, particularly South-South cooperation, needs to be promoted to exploit this potential. For developing countries, this is very challenging. Liberalization of trade in services by developing countries always lags behind general trade liberalization, although many preferential trade agreements signed among the economies in the region include services (see chapter 8). According to McGuire (2002) and Shepherd and Van Der Marel (2010), developing Asian-Pacific economies tend to have a relatively high level of trade restrictiveness in the services sectors[66] (figure 36). This leads to the conclusion that policy-related trade transaction costs are higher in Asia and the Pacific than in the world, on average. Therefore, there is extensive scope for improving the efficiency of services trade through the implementation of properly designed regulatory reforms.

However, many service providers, especially in the infrastructure services sector as discussed above, have been regarded as natural monopolies. Although privatization has reduced the role of governments in the services sectors, they often maintain substantial stakes in state-owned services providers, especially in developing countries (UNCTAD, 2011c). The resulting distortions in trade and investment, and often inefficient operations of those services providers, call for proactive comprehensive reforms to promote trade and investment in services in the region. Shepherd

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[66] The McGuire (2002) study includes seven countries members of ESCAP (India, Indonesia, the Republic of Korea, Malaysia, the Philippines, Thailand and Turkey) and seven countries outside the ESCAP region (Argentina, Brazil, Chile, Mexico, South Africa, Uruguay and Venezuela). The Shepherd and Van Der Marel (2010) study covers all APEC member economies.

Figure 36. World Bank trade policy index in services
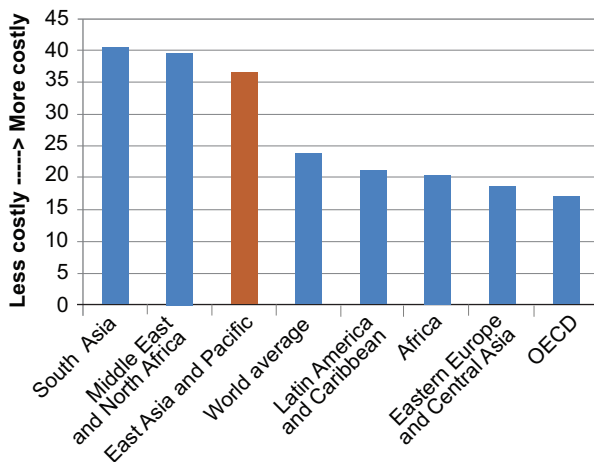
Source: Gootiiz and Mattoo (2009), as cited in Shepherd and Van Der Marel (2010), figure 3.2.

Note: The World Bank definition of East Asia and the Pacific includes Cambodia, China, Indonesia, Japan, Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, Pacific islands, Papua New Guinea, Philippines, Singapore, Republic of Korea, Thailand, Timor-Leste and Viet Nam. The World Bank definition of South Asia includes Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. In ESCAP, Asia and the Pacific also covers some countries in Eastern Europe and Central Asia (i.e. Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Russian Federation, Tajikistan, Turkmenistan, Turkey and Uzbekistan), and a country in the Middle East and North Africa group (Islamic Republic of Iran) as well as Australia and New Zealand (also included by the World Bank in the OECD group), Brunei Darussalam, Democratic People's Republic of Korea, Hong Kong, China and Macao, China.

(2010) emphasized the role of so-called backbone services sectors such as transport, retail/distribution and logistics, and telecommunications in facilitating services and trade in general.

F.   THE WAY FORWARD: REBALANCING SOURCES OF GROWTH

A key challenge for economies in Asia and the Pacific during the next decade is to maintain their dynamic export prospects that are key drivers of economic growth and employment generation of the region. The recovery of G-3 is expected to be sluggish, and it is increasingly recognized that the centre of global demand growth is shifting towards Asia and the Pacific. Many of the region's economies have been able to demonstrate a robust recovery and they still have tremendous potential to expand their domestic consumption. However, a key concern is whether the region's economies are capable of reducing dependence on the current export model (where exports are mostly determined by the level of final demand outside the region) and replacing it with a model that gives more weight to the importance of domestic demand in the region as a key driver of economic growth. Such a transformation would require major changes, both on the export and the import sides, but it would also offer opportunities for intraregional trade.

Many commentators have singled out China as the world's next consumption centre as well as the need for that country to expand domestic demand. However, this report argues that other economies in the region also need to reform and strengthen their positions as viable and valuable trading partners of China and other important regional economies that have potentially large import demand.

This report suggests several possible strategies that could be pursued simultaneously for maintaining the region's growth momentum. One involves enhancing trade complementarity among economies in the region. In this regard, special attention must be given to improving export specialization of countries in the region in order to match products that are demanded by the region. This does not mean that Asia and the Pacific should decouple from the global market and refocus just on intraregional markets. Domestic demand in major Asian importers can only partially offset demand from outside the region; in the foreseeable future the region's growth will still rely on extraregional final demand. Thus, the Asian and Pacific economies should develop synergies between the benefits of openness and diversification of their exports in order to capture emerging trade and investment opportunities in new markets and new export products. Export diversification is particularly important for the low-income and resource-rich Asia-Pacific economies, which have relatively high commodity export concentration.

FDI can be a key catalyst to export diversification, especially through links between TNC subsidiaries and domestic producers in the production network. FDI by export-oriented TNCs, especially those from the region, could generate spillovers within or between sectors. For example, if demand by TNC subsidiaries for intermediates creates viable variety and quality improvements, downstream local producers in the same or other sectors that share those inputs may also benefit from the improvement of input supply. Those local producers may enhance their production process to boost exports.[67] Furthermore, the presence of TNCs could generate information spillovers to host-country producers, especially those sharing a common marketing structure and export facilities, about new market opportunities and ways of lowering the costs of entering foreign markets. In this regard, FDI-attracting polices are conductive to export diversification. Among key activities, the priority should be: (a) removing trade and investment restrictiveness against foreign investment, by pursuing trade and investment liberalization in goods and services; (b) facilitating development of domestic intermediate input suppliers; and (c) the reduction of transaction costs that distort linkages along supply chains. Trade facilitation measures discussed in chapter 6 provide more details about some of these issues.

New export opportunities are driven by dynamic of consumer preference and technological changes. In this regard, focus should be on the promotion of trade and investment in climate-smart goods and technologies that could lead to a potential triple win generating benefits for trade, the environment and development. Tax- and subsidy-type policies can contribute to accelerating adaptation of new technologies that lead to "green trade". However, implementing such policies should not introduce

discrimination against trade partners, otherwise it will create new trade distortions in the global market (Wemelinger and Barnes, 2010). Services are another sector with great potential for trade and investment. This report highlights the infrastructural services sector as it provides additional value in enhancing the overall efficiency of a national economy.

"Regulatory reforms will be a key factor in effectively capturing emerging but unexploited trade and investment opportunities"

In support of the above-mentioned transformation process, regulatory reforms will be a key factor in effectively capturing emerging but unexploited trade and investment opportunities. Asia-Pacific economies should continue to reduce tariffs and non-tariff barriers, and associated trade costs with a view to promoting intraregional trade. Proactive measures to liberalize trade and investment in parts and components are necessary for the development of climate-smart goods and technologies in the region. In addition, liberalization of trade and investment in services needs to be moved forward, not only because of the many untapped trade and investment opportunities in the various services sectors, but also because services directly and indirectly contribute to strengthening an economy's international competitiveness. Such efforts need to be accompanied by measures for strengthening supply-side capacities. In this regard, trade facilitation and policies that strengthen the capacity of SMEs are particularly important. In addition, seeking regional alliances and forging stronger regional cooperation appears to be the only option available for achieving advances in some of the above areas. The following chapters will review these issues in greater detail.

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[67] Empirical research supports this argument. See, for example, Rodriguez-Clare, 1996 and 2007, and Kugler, 2006.

Annex

Figure V.1. Complementarity of Asia-Pacific economies with major Asia-Pacific importers, 2008

Malaysia

Percentage

Average Complementarity with Asia and the Pacific = 43.8%

Singapore
Japan
Republic of Korea
Thailand
China
Hong Kong, China
Philippines
New Zealand
Australia
Papua New Guinea
India
Kazakhstan
Indonesia
Turkey
Viet Nam
Solomon Islands
Pakistan
Macao, China
Maldives
Fiji
New Caledonia
Tonga
French Polynesia
Brunei Darussalam
Cook Islands
Timor-Leste
Kiribati
Sri Lanka
Samoa
Armenia
Vanuatu
Mongolia
Bangladesh
Uzbekistan
Micronesia (F.S.)
Georgia
Myanmar
Russian Federation
Azerbaijan
Bhutan
Iran, Islamic Rep. of
Afghanistan
Niue
Nepal
Turkmenistan
Tajikistan
Cambodia
Lao PDR
Palau
American Samoa
Guam
Northern Mariana Islands
Kyrgyzstan
Tuvalu
Marshall Islands

Singapore

Percentage

Average Complementarity with Asia and the Pacific = 44.0%

Malaysia
Philippines
Hong Kong, China
Indonesia
China
Viet Nam
Fiji
Thailand
Solomon Islands
Republic of Korea
Nepal
Myanmar
Timor-Leste
Georgia
New Zealand
Lao PDR
Australia
Tonga
Japan
Mongolia
Sri Lanka
Turkey
Samoa
New Caledonia
Maldives
French Polynesia
India
Cambodia
Afghanistan
Papua New Guinea
Macao, China
Pakistan
Cook Islands
Iran, Islamic Rep. of
Russian Federation
Vanuatu
Brunei Darussalam
Kazakhstan
Niue
Uzbekistan
Northern Mariana Islands
Bhutan
Guam
Azerbaijan
Armenia
Bangladesh
Tajikistan
Micronesia (F.S.)
Kiribati
Turkmenistan
Palau
American Samoa
Kyrgyzstan
Tuvalu
Marshall Islands

Indonesia

Percentage

Average Complementarity with Asia and the Pacific = 37.6%

Japan
Kiribati
Republic of Korea
Papua New Guinea
Samoa
Micronesia (F.S.)
Solomon Islands
Pakistan
Kazakhstan
Tonga
Cook Islands
Armenia
New Zealand
New Caledonia
French Polynesia
Macao, China
India
Mongolia
Thailand
Turkey
Northern Mariana Islands
Fiji
Vanuatu
Australia
Timor-Leste
Sri Lanka
Brunei Darussalam
Viet Nam
Niue
Guam
Myanmar
Bhutan
Bangladesh
Azerbaijan
China
Malaysia
Tajikistan
Philippines
Maldives
Russian Federation
Singapore
Cambodia
Nepal
Iran, Islamic Rep. of
Uzbekistan
American Samoa
Palau
Turkmenistan
Georgia
Hong Kong, China
Lao PDR
Afghanistan
Kyrgyzstan
Tuvalu
Marshall Islands

Thailand

Percentage

Average Complementarity with Asia and the Pacific = 45.7%

Australia
New Zealand
Philippines
Malaysia
Hong Kong, China
Turkey
Indonesia
Russian Federation
Japan
French Polynesia
Singapore
China
New Caledonia
Papua New Guinea
Micronesia (F.S.)
Iran, Islamic Rep. of
Viet Nam
Macao, China
Brunei Darussalam
Cook Islands
Afghanistan
Republic of Korea
Lao PDR
Maldives
Solomon Islands
Fiji
Armenia
Kazakhstan
Georgia
Kiribati
Vanuatu
Samoa
Mongolia
Timor-Leste
Tonga
Sri Lanka
Myanmar
Azerbaijan
Uzbekistan
Pakistan
Tajikistan
Palau
Bhutan
Cambodia
Nepal
India
Niue
Bangladesh
Turkmenistan
Northern Mariana Islands
Guam
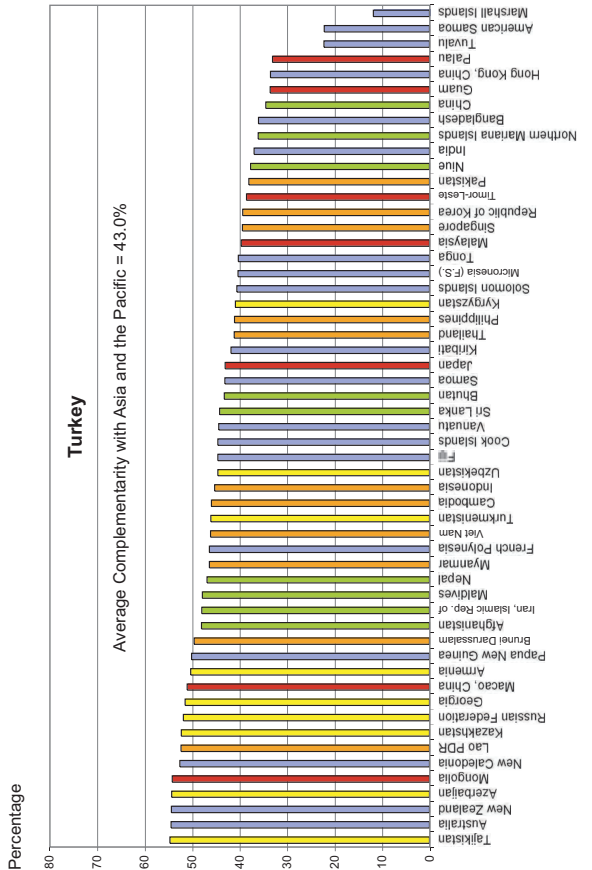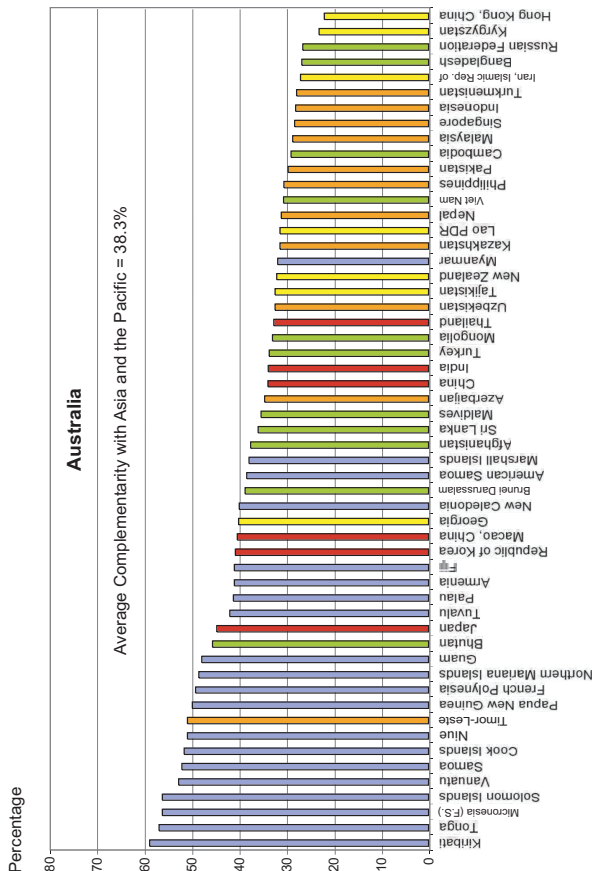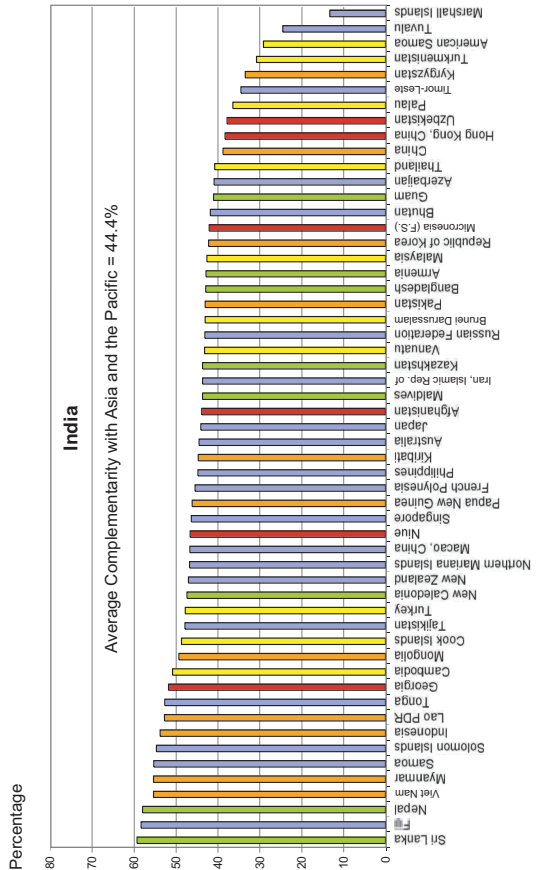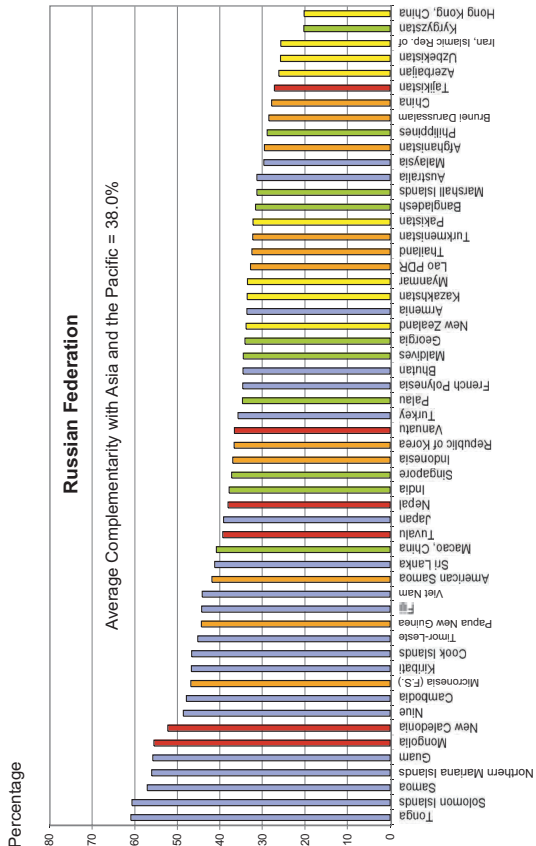Kyrgyzstan
American Samoa
Tuvalu
Marshall Islands

Table V.1. List of climate-smart goods and technologies compiled by ESCAP for the trade potential analysis

No.	HS 6 Digit (2002)	Definition
1	380210	Activated carbon.
2	392690	Articles of plastics and arts. of other materials of 39.01-39.14, n.e.s. in Ch. 39.
3	392010	PVC or polyethylene plastic membrane systems to provide an impermeable base for landfill sites and protect soil under gas stations, oil refineries, etc. from infiltration by pollutants and for reinforcement of soil.
4	560314	Non-wovens, whether or not impregnated, coated, covered or laminated, of manmade filaments; weighing more than 150 g/m^2 for filtering wastewater.
5	701931	Thin sheets (voiles), webs, mats, mattresses, boards and similar non-woven products.
6	730820	Towers and lattice masts for wind turbines.
7	730900	Containers of any material, of any form, for liquid or solid waste, including municipal or dangerous waste.
8	732111	Solar driven stoves, ranges, grates, cookers (including those with subsidiary boilers for central heating), barbecues, braziers, gas-rings, plate warmers and similar non-electric domestic appliances, and parts thereof, of iron or steel.
9	732190	Stoves, ranges, grates, cookers (including those with subsidiary boilers for central heating), barbecues, braziers, gas-rings, plate warmers and similar non-electric domestic appliances, and parts thereof, of iron or steel.
10	732490	Water-saving showers.
11	761100	Aluminium reservoirs, tanks, vats and similar containers for any material (specifically tanks or vats for anaerobic digesters for biomass gasification).
12	761290	Containers of any material, of any form, for liquid or solid waste, including municipal or dangerous waste.
13	840219	Vapour-generating boilers, not elsewhere specified or included, hybrids.
14	840290	Super-heated water boilers and parts of steam generating boilers.
15	840410	Auxiliary plants for steam, water and central boilers.
16	840490	Parts for auxiliary plant for boilers, condensers for steam, vapour power unit.
17	840510	Producer of gas or water gas generators, with or without purifiers.
18	840681	Turbines, steam and other vapours, over 40 MW, not elsewhere specified or included.
19	841011	Hydraulic turbines and water wheels of a power not exceeding 1,000 kW.
20	841090	Hydraulic turbines and water wheels; parts, including regulators.
21	841181	Gas turbines of a power not exceeding 5,000 kW.
22	841182	Gas turbines of a power exceeding 5,000 kW.
23	841581	Compression type refrigerating, freezing equipment incorporating a valve for reversal of cooling/heating cycles (reverse heat pumps).
24	841861	Compression type refrigerating, freezing equipment incorporating a valve for reversal of cooling/heating cycles (reverse heat pumps).
25	841869	Compression type refrigerating, freezing equipment incorporating a valve for reversal of cooling/heating cycles (reverse heat pumps).
26	841919	Solar boiler (water heater).
27	841940	Distilling or rectifying plants.
28	841950	Solar collector and solar system controller, heat exchanger.
29	841989	Machinery, plant or laboratory equipment whether or not electrically heated (excluding furnaces, ovens etc.) for treatment of materials by a process involving a change of temperature.
30	841990	Medical, surgical or laboratory stabilizers.
31	848340	Gears and gearing and other speed changers (specifically for wind turbines).
32	848360	Clutches and universal joints (specifically for wind turbines).
33	850161	AC generators not exceeding 75 kVA (specifically for all electricity-generating renewable energy plants).

No.	HS 6 Digit (2002)	Definition
34	850162	AC generators exceeding 75 kVA but not 375 kVA (specifically for all electricity-generating renewable energy plants).
35	850163	AC generators not exceeding 375 kVA but not 750 kVA (specifically for all electricity-generating renewable energy plants).
36	850164	AC generators exceeding 750 kVA (specifically for all electricity-generating renewable energy plants).
37	850231	Electric generating sets and rotary converters; wind-powered.
38	850680	Fuel cells using hydrogen or hydrogen-containing fuels such as methane to produce an electric current, through an electrochemical process rather than combustion.
39	850720	Other lead acid accumulators.
40	853710	Photovoltaic system controller.
41	853931	Discharge lamps, (ex ultraviolet), fluorescent.
42	854140	Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light-emitting diodes.
43	900190	Mirrors of other than glass (specifically for solar concentrator systems).
44	900290	Mirrors of glass (specifically for solar concentrator systems).
45	903210	Thermostats.
46	903220	Manostats.
47	700800	Multiple-walled insulating units of glass.
48	730431	Tubes, pipes and hollow profiles (excl. of 7304.10-7304.29), seamless, of circular cross-section, of cold-drawn/cold-rolled (cold-reduced) steel.
49	730441	Tubes, pipes and hollow profiles (excl. of 7304.10-7304.39), seamless, of circular cross-section, of stainless steel, cold-drawn/cold-rolled (cold-reduced).
50	730451	Tubes, pipes and hollow profiles (excl. of 7304.10-7304.49), seamless, of circular cross-section, of alloy steel other than stainless steel, cold-drawn/cold-rolled (cold-reduced).
51	840682	Steam turbines and other vapour turbines (excl. for marine propulsion), of an output not >40 MW
52	841012	Hydraulic turbines and water wheels, of a power >1,000 kW but not >10,000 kW.
53	841013	Hydraulic turbines and water wheels, of a power >10,000 kW.
54	850239	Electric generating sets n.e.s. in 85.02.
55	850300	Parts suit. for use solely/principally with the machines of 85.01/85.02.
56	850440	Static converters.
57	902830	Electricity meters, incl. calibrating meters therefore.
58	903020	Cathode-ray oscilloscopes and cathode-ray oscillographs.
59	903031	Multimeters.
60	903039	Instruments and app. for measuring/checking voltage/current/resistance/power (excl. 9030.31), without a recording device.
61	890790	Floating structures other than inflatable rafts (e.g. rafts [excl. inflatable], tanks, coffer-dams, landing-stages, buoys and beacons).
62	847989	Machines and mech. applications having individual functions, n.e.s./incl. in Ch. 84.
63	842129	Filtering/purifying mach. and app. for liquids (excl. of 8421.21-8421.23).
64	842139	Filtering/purifying mach. and app. for gases, other than intake air filters for int. comb. Engines.

Source: ESCAP secretariat.

Annex note: Estimation of export potential for CSGTs

ESCAP has created a simple gravity model to estimate the export potential trade of CSGTs in the Asia-Pacific region. The following gravity model was used for the analysis: $x_{ij} = \beta_0 + \beta_1 GDP_i + \beta_2 GDP_j + \beta_3 PCGDP_i + \beta_4 PCGDP_j + \beta_5 DT_{ij} + \beta_6 D_{contig} + \beta_7 D_{comlang} + \beta_8 D_{comlang\_ethno} + \beta_9 D_{colony} + \beta_{10} D_{comcol} + \beta_{11} D_{col45} + \beta_{12} D_{smctry} + \varepsilon_{ij}$

where x_{ij} denotes the value of country i exports to country j, GDP_i and $PCGDP_i$ denote the exporting country's GDP and per capita GDP, respectively; GDP_j and $PCGDP_j$ denote the GDP and per capita GDP of the partner of the exporting country, respectively; DT_{ij} denotes the distance between the exporting economy and its partner; D_{contig}, $D_{comlang}$, $D_{comlang\_ethno}$, D_{colony}, D_{comcol}, D_{col45} and D_{smctry}, are the dummy variables for contiguity, common language, colony, common colony, colony from 1945 and small

country, respectively. All of these variables (except for dummies) are in log values to overcome a heteroscedasticity problem.

Trade data for CSGTs (in value, thousands of United States dollars) is taken from the United Nations Comtrade data (www.comtrade.un.org) for 2008. GDP and per capita GDP data are taken World Bank Development Indicators (www.worldbank.org\data) for the corresponding year. Distance between countries and other dummy variables are taken from the dist_cepii.xls file of CEPII database (www.cepii.fr). Total observation is reduced after combining all the variables for each pair of trading partners.[68] This filtered data set is used in the empirical analysis. The estimated coefficients and their statistic results are presented in the following table.

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[68] This study considers fully-matched data only.

Results of the trade gravity model for the export of climate-smart goods in 2008

	Coefficients	Standard error	t	P-value
Intercept	**-49.2722[a]**	1.717189	**-28.6935**	6.7E-156
GDP_reporter	**1.605207[a]**	0.045923	**34.95458**	1.1E-216
GDP_partner	**0.940022[a]**	0.035135	**26.75493**	3.3E-138
pcgdp_reporter	**-0.28074[a]**	0.052835	**-5.31359**	1.17E-07
pcgdp_partner	-0.07698	0.051787	-1.48651	0.137275
distw	**-0.9346[a]**	0.105363	**-8.87032**	1.39E-18
contig	0.142705	0.439915	0.324391	0.74567
comlang_off	0.017709	0.356485	0.049675	0.960385
comlang_ethno	*0.576956[c]*	0.314579	1.83406	0.066769
colony	0.83704	0.786272	1.064568	0.287179
comcol	**0.689932[a]**	0.246621	**2.797538**	0.00519
col45	1.12345	0.947884	1.185219	0.236048
smctry	**2.995375[a]**	0.79718	**3.757463**	0.000176

[a] = 1%, [b] = 5% and [c] = 10%.

Considering only statistically significant coefficients the estimated export of CSG is:

$x_{ij} = -49.27 + 1.605\ GDP_i + 0.94\ GDP_j - 0.28\ pcgdp_i - 0.93\ DT_{ij} + 0.69\ D_{cmcl} + 2.99\ D_{smctry}$

This estimated gravity equation is then used to get the predicted export value of the reporting economy in the data period. The difference between the actual exports and the predicted value is considered as "trade potential" of the observed period. A positive trade potential suggests that scope for an economy to increase its exports of climate-smart goods and technologies with a particular trading partner during that period.