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MICRO

Micro-Economic Policy Analysis Branch Bulletin

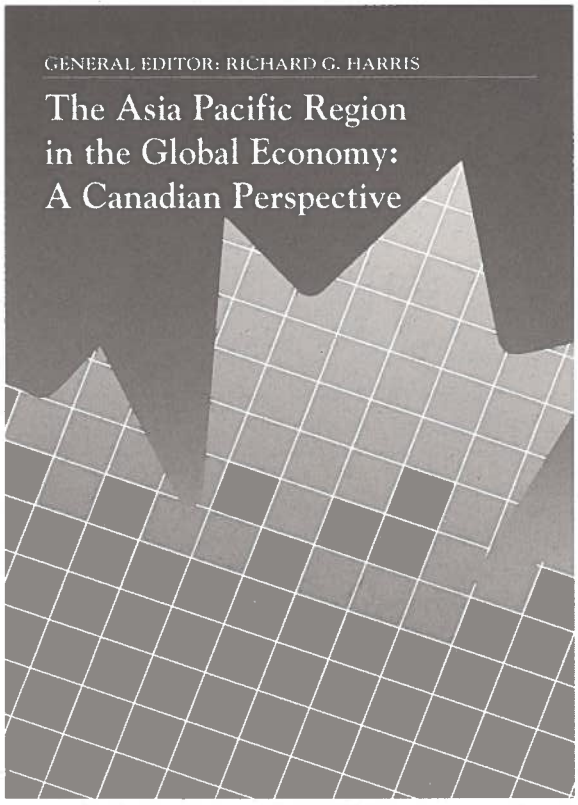
In this issue...

The Asia Pacific Boom: What's in it for Canada ?

The Asia Pacific region is one of the fastest growing in the world in terms of gross domestic product (GDP), trade and investment. Real GDP growth in the Asia Pacific Economic Cooperation (APEC) countries averaged 3.6 percent a year from 1980 to 1994, 80 percent higher than in the European Union (EU). Within the group, growth was much faster in the Asian economies than in the North American economies.

How can Canada benefit from the economic boom on the other side of the Pacific? Answers to this question are explored in *The Asia Pacific Region in the Global Economy: A Canadian Perspective*, the seventh in Industry Canada's research volume series, edited by Richard G. Harris of Simon Fraser University.

The experts contributing to this collection of essays hail from a variety of economic disciplines, ranging from macroeconomics to labour market analysis, and from environmental and public policy studies to business development.



A NEW YEAR - A NEW LOOK - A NEW APPROACH!

Beginning this issue, we are adopting a new concept for MICRO. Each issue will now feature a more in-depth treatment of selected Industry Canada research - for example, in the following pages we review a new ***Research Volume*** on the Asia Pacific boom and its implications for Canada, as well as a discussion of the Internet by Hal Varian, who visited as part of our ***Distinguished Speakers in Economics*** program. As before, we will also highlight recently released and forthcoming research publications, upcoming events, and research in progress. We would like to hear from you. Please send your comments and suggestions to P. S. Rao, Director, Strategic Investment Analysis, 5th Floor, West Tower, 235 Queen Street, Ottawa, Ontario K1A 0H5 or to rao.someshwar@ic.gc.ca via e-mail.

Micro

INDUSTRY CANADA RESEARCH AND PUBLICATIONS PROGRAM

RECENT RELEASES

INDUSTRY CANADA RESEARCH VOLUME

The Asia Pacific Region in the Global Economy: A Canadian Perspective, Richard G. Harris, ed.

WORKING PAPER SERIES

No. 13: *The Development of Strategic Alliances in Canadian Industries: A Micro Analysis*, Sunder Magun.

This study, based on an in-depth survey of Canadian companies with experience in business partnerships, examines the causes and consequences of the growing importance of strategic alliances in Canada.

DISCUSSION PAPER SERIES

No. 4: *Foreign Direct Investment and Market Framework Policies: Reducing Frictions in APEC Policies on Competition and Intellectual Property*, Ronald Hirshhorn.

This paper examines in some detail potential problems and possible solutions with the formulation of national market framework policies, especially competition and intellectual property protection, in the context of globalization.

OCCASIONAL PAPER SERIES

No.14: *The Human Factor in Firm's Performance: Management Strategies for Productivity and Competitiveness in the Knowledge-Based Economy*, Keith Newton.

This paper describes various kinds of human resource-based management strategies and is intended to be a launchpad for some new in-depth research in the area.

FORTHCOMING

INDUSTRY CANADA RESEARCH VOLUME

Capital Market Issues, Paul Halpern, ed.

Competition Policy, Intellectual Property Rights, and International Economic Integration, Rob Anderson & Nancy Gallini, eds.

WORKING PAPER SERIES

No.14: *Employment Performance in the Knowledge-Based Economy*, Surendra Gera and Philippe Massé.

OCCASIONAL PAPER SERIES

No. 15: *Payroll Taxation and Employment: A Literature Survey*, Joni Baran.

RESEARCH IN PROGRESS

INDUSTRY CANADA RESEARCH VOLUME

Gateway to the Twenty First Century

Collection of twelve vision papers, to assess recent trends and outline the likely developments over the next 10 to 15 years in a number of interrelated areas in the Canadian and global economies.

ANNOUNCEMENTS

UPCOMING DISTINGUISHED LECTURES

April 10, 1997: *International Productivity Comparisons*, Dale Jorgenson.

April 18, 1997: *Business Taxation*, Jack Mintz.

MICRO is a quarterly newsletter highlighting micro-economic research findings, published by the Micro-economic Policy Analysis Branch of Industry Canada. Abstracts of Industry Canada research volumes, working papers, occasional papers, discussion papers, and the full text of MICRO can be accessed via STRATEGIS, the Department's online business information site, at http://strategis.ic.gc.ca. For more information about our research publications, or to place an order, contact the Micro-Economic Policy Analysis Branch, Industry Canada, 5th Floor, West Tower, 235 Queen St., Ottawa, Ont., K1A 0H5. Telephone: 613-952-5704; facsimile: 613-991-1261. ISSN 1198-3558.

The Asia Pacific Boom: What's in it for Canada?

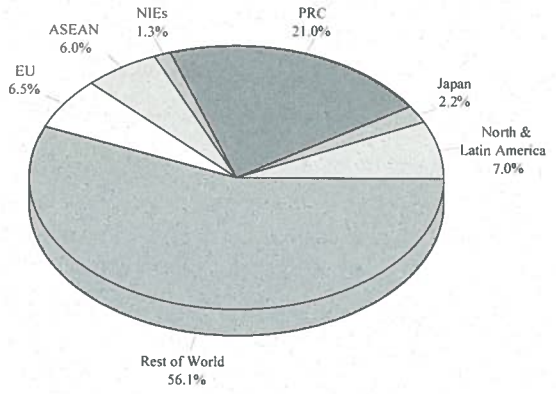
Industry Canada's most recent Research Volume focuses on Asia Pacific, a region that includes Japan, the People's Republic of China (PRC), the newly industrialized economies (NIEs) – Hong Kong, South Korea, Taiwan and Singapore, the members of the Association of South East Asian Nations (ASEAN) – Malaysia, Indonesia, Thailand, and the Philippines.

The book examines Canada's current and potential commercial participation in the region.

Economic Growth

More than one third of the world's population resides in the Asia Pacific region – a share nearly six times that of the EU. About 80 percent of the Asia Pacific total is in developing economies, which have a significant potential to increase their standard of living and per capita consumption.

World Population, 1995



Total World Population: 5.8 billion

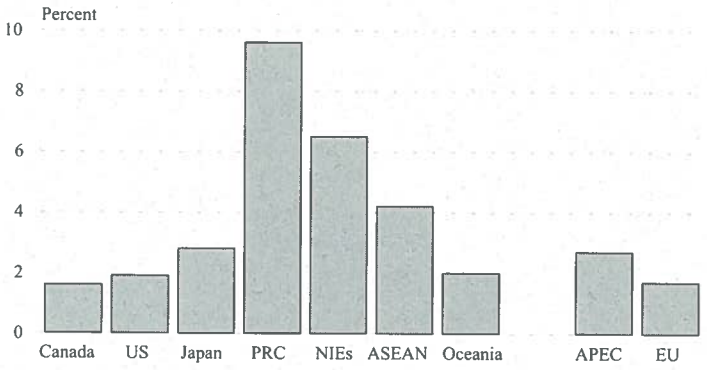
Source: Industry Canada compilations, using United Nations' data.

In per capita terms, the average level of GDP in the Asia Pacific region is still less than half the world figure, and the average for the Asian portion of APEC is only 30 percent that of the EU. The average GDP per capita is especially low in the PRC and the ASEAN group.

The rates of growth, however, tell a different story. In the new study, the highest growth rates in APEC were found in the PRC, the NIEs and the ASEAN countries.

It has been suggested by a number of commentators that Asia's growth can be explained in part by a set of cultural institutions that provide what has been termed a "social bond" or "trust." Some authors have constructed cross-country indexes of social values in an attempt to explain the spectacular growth of the region and have found a significant correlation between growth performance and such values as foresight, determination and hard work.

Real GDP Per Capita Growth
1980 - 1994



Source: Industry Canada compilations, using World bank, OECD and IMF data.

In this research volume, John Helliwell explores the performance of Asian economies during the 1980s and finds that the more open an economy is, the faster it grows. However, he concludes that it is too early to assess how social capital and cultural attitudes might affect economic growth.

China is an especially important market for potential Canadian growth. With over one-fifth of the world's population, this relatively undeveloped emerging mega-market can contribute to Canada's own economic growth and trade diversification. The PRC's real GDP per capita growth rate averaged 9.6 percent from 1980 to 1994. The NIEs were close behind at 6.5 percent, but they do not command the same market size. In contrast, the largest economies grew at significantly slower rates – 1.8 percent in North and Latin America and 2.8 percent in Japan. Canada's GDP grew by 1.6 percent over the same period. Trade and investment are the vehicles by which Canada

The growth of the Asia Pacific region offers Canadian business considerable trade diversification opportunities...

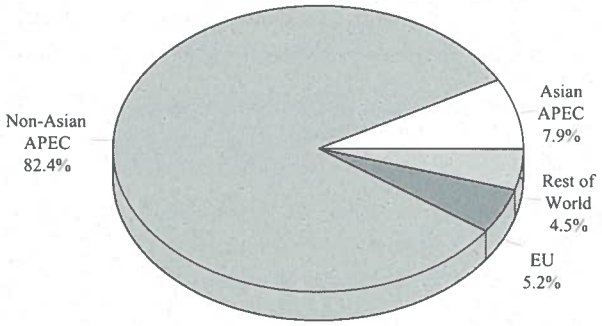
can tap the growing Asia Pacific market.

Trade Flows

The Canadian economy is increasingly dependent on trade for its growth. Canadian exports of goods and services grew from 27 percent of GDP in 1985 to over 41 percent in 1995. Similarly, imports rose from 25 percent of GDP in 1985 to over 41 percent in 1995. This dramatic increase in trade orientation mainly reflects the Canada-US Free Trade Agreement (FTA) and the North American Free Trade Agreement (NAFTA): almost 80 percent of Canadian trade is currently with the United States. On the other hand, not only was Canada's share of the dynamic Asian markets small to begin with, but it has been slipping since the early 1980s.

The Asia Pacific region offers Canada promising opportunities for trade diversification. Export markets in that region have developed relatively faster than elsewhere, and they are projected to continue their robust growth. The Asian economies are expected to expand by about 7 percent per annum over the next 10 years, compared to about 2.5 percent for North America. Imports of the Asia Pacific economies are forecasted to grow by more than 9 percent annually during that period.

Distribution of Canadian Merchandise Exports by Region, 1994



Total Merchandise Exports: $218 billion

Source: Industry Canada compilations using various sources.

Canada's trade relations with the Asian economies have grown significantly – although the base was limited in the beginning – and the Asia Pacific region has now passed the European Union as Canada's second-largest trading partner. But Canada has exploited only a tiny fraction of the trading potential in some countries; in others, it is losing ground and seeing its market share erode.

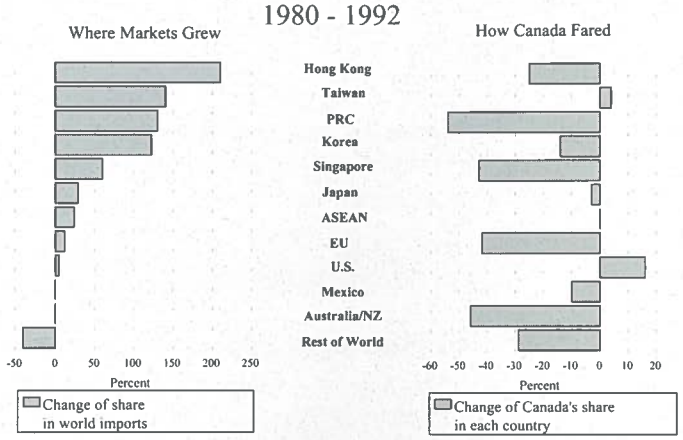
In their paper, Walid Hejazi and Daniel Trefler analyze Canadian trade patterns and the implications of growth in trade with East Asia. They reach two main conclusions. First, Canada has unusually high levels of exports in natural resource products, even after account is taken of its obvious abundance in resource endowments. Natural resources accounted for approximately 29 percent of Canada's total exports to the Asian members of APEC in 1995, compared with 12 percent to the rest of the world.

Several countries in the region are themselves resource exporters and thus compete with Canada. Over the next 25 years, however, forecasts show that the Asian members of APEC will become much larger resource consumers than they are at present.

This offers exciting export opportunities for Canada, but exports of resource-saving technologies could also become important.

The authors' second finding is that East Asia has unusually large exports in low-end manufactures. The export-oriented industrial policies of East Asia are one possible reason for this trade pattern.

Canada's Trade Performance in Dynamic Markets 1980 - 1992



Source: Industry Canada Compilations.

...even if Canada just maintains its current small market share in the region, its exports to Asia Pacific will increase by $45 billion in the next 10 years.

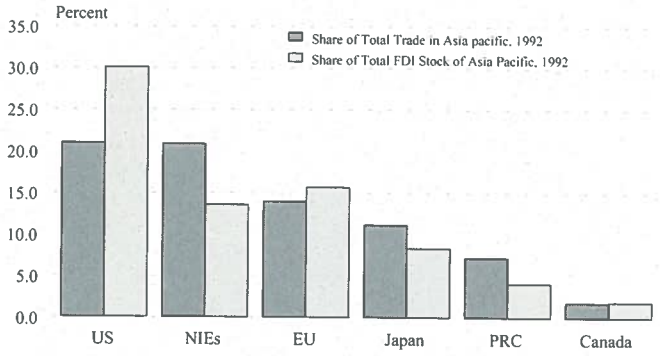
Linkages Between Trade and Investment

Japan is clearly the key player in Asia Pacific trading relations with North America, as revealed by its large trade surplus, its domination of a number of world industries and its large-scale direct investment abroad.

There are good reasons to believe that Japan's impact on Canada has been considerable in terms of trade and investment. Yet, Canada has not done as well as the United States in attracting Japanese investment. For every 15 Japanese firms that establish a presence in that country, only one does so in Canada. And of the 10 Canadian provinces, only Ontario ranks among the top 20 North American locations for Japanese companies.

Canadian investment linkages with the Asia Pacific are weak, but they are becoming stronger. For example, Canada's share of Japanese foreign direct investment (FDI) rose from 2.6 percent in 1980 to 4.4 percent in 1992.

Strong Complementarity Between Trade and Investment in the Dynamic Asia Pacific Markets



Source: Industry Canada Compilations based on data from various sources.

At the same time, Canadian investment represented 0.6 percent of total inward FDI in the NIEs in 1980, a proportion that had grown to 2.5 percent by 1992. Conversely, Canada accounted for only 0.5 percent of China's inward FDI in 1980, and that share had declined to 0.4 percent in 1992.

According to Keith Head and John Ries, there are a number of ways in which Canada's provinces could increase their attractiveness to foreign investors, including the "Newfoundland solution" of offering $2,000 for each job created. At the same time, caution must be taken to avoid mutually damaging subsidy wars among the provinces that could actually lower the economic welfare of the winning province. Given the temptation for local governments to offer such incentives, Head and Ries suggest that constitutional or legal measures be taken to prevent such an outcome.

Service Trade

Business Services

While Canada traditionally runs a net deficit on service trade with the world at large, it has recorded a surplus with the Asia Pacific region. Japan accounts for the largest single percentage of the region's trade in services, but the Japanese share has been declining – from 50 percent in 1990 to 35 percent in 1993. The key services, here, are engineering, consulting, financial services, telecommunications, research and development (R&D) services, and postsecondary education.

Lawrence Schembri, author of the chapter investigating these issues, argues that there is potential for Canadian firms to make substantial headway in the Asia Pacific market. That optimistic assessment is based on the fact that Canada enjoys a comparative advantage in services, thanks to its strong skill base and to its experience in areas such as resource extraction and construction. Exports of services to Japan, for example, were twice as high as imports from 1973 to 1995, on average. Recent data suggest that the demand for services has grown faster in the Asia Pacific countries than in the rest of the world. Given closer ties with the region and the growth of income, Canadian service exports should increase substantially.

Education

In 1992-93 no fewer than 23,000 students from the Asia Pacific region were enrolled in Canadian postsecondary institutions. This large contingent represents about $200 million in business service exports to the region (25 percent of the total). Given the strong emphasis on education in Asian culture, Canada could well expand its market opportunities in this area.

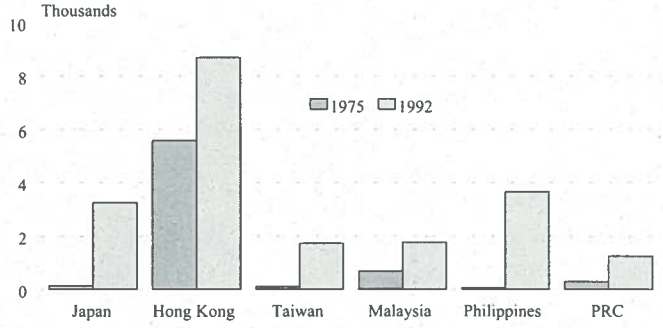
As postsecondary education is almost exclusively the domain of the provinces, achieving that goal would re-

If Canadian banks can succeed in the United States and Europe, then that success may well ultimately carry them into Asia when further deregulation occurs.

quire explicit government policies aimed at developing these markets or else a deregulation of the secondary education sector.

Schembri's paper deals in part with service exports to China. Given the large amount of infrastructure spending that is expected to occur in that country and the success of US firms there, the author foresees substantial opportunities for specialized Canadian firms, particularly in construction and engineering services.

Enrollment of Students from Selected Asia Pacific Countries in Canadian Educational Institutions, 1975 and 1992



Source: Schembri, L. "Canadian Exports of Business and Education Services", in *The Asia Pacific region in the Global Economy: A Canadian Perspective*, table 9, page 185.

Banking

John Chant conducts an interesting multi-country comparison and finds that income growth generally increases the importance of the financial system and banking services. This result suggests that the Asia Pacific banking sector will experience substantial growth. Chant subscribes to a follow-the-leader sequence in which Canadian banking activity will follow Canadian direct investment abroad (DIA). Total direct investment in Pacific Rim countries by Canadians was $14.7 billion in 1995 – 10.3 percent of all Canadian DIA. In the Asia Pacific region, Canadian DIA was concentrated in Japan, Australia, Hong Kong and Singapore.

According to Chant, however, a major difficulty for the banking sector in most Asian countries is the presence of a rigid regulatory system that resists attempts at liberalization. Only Hong Kong, Japan and South Korea offer foreign banks unrestricted entry to their markets, and elsewhere the situation is not likely to change soon. Hostility towards foreign banks will likely continue. Canada's situation in this regard is by no means unique, but if Canadian banks can succeed in the United States and Europe, then that success may well ultimately carry them into Asia when further deregulation occurs.

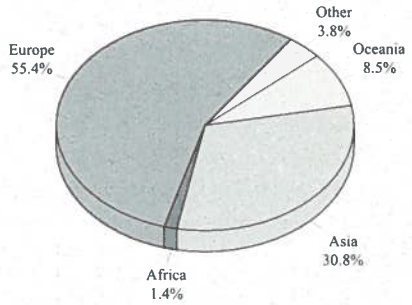
International Tourism

Tourism from the Asia Pacific region has attracted a lot of attention. In 1992, Canada's share of world tourist arrivals was only 3.4 percent, most of it from south of the border. Tourists from the Asia Pacific region are catching up to Europeans in numbers. Arrivals from Asia have grown considerably between 1972 and 1994, rising from 13 percent of the total to just over 31 percent. They now make up almost 40 percent of arrivals from countries other than the United States. Japanese travellers account for about 40 percent of all Asian visitors to Canada.

According to Stephen Easton and Richard Harris, it is very difficult to say whether Japanese tourism patterns will be replicated in other Asian countries. Income levels will have to grow considerably in the poorer countries before their levels of participation in international tourism can approach that of Japan.

Still, demographic and income growth in the region should translate into a high rate of growth for the international tourism market.

Tourist Arrivals in Canada by Region of Origin Other than US, 1994



Total Non-US Visitors: 3.5 million

Source: Richard Harris and Stephen Easton, International Tourism in the Asia Pacific Region and Its Implications for Canada , in *The Asia Pacific region in the Global Economy: A Canadian Perspective*, table 11, page 268.

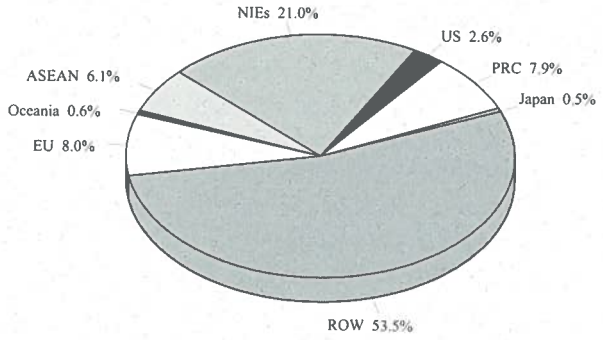
Immigrants from Asia contribute to the expansion of Canada's commercial relations with the Asian countries.

In addition, supply-side factors could work in Canada's favour simply because of the geographical size of the country. The tourism sector is relatively unencumbered by regulation, and competitive forces should lead to lower prices. Tourism may thus experience faster growth rates than other, more highly regulated service sectors.

Immigration Issues

Immigration from Asia is one area where statistics and public perceptions are fairly close – much closer than is the case for trade and investment, for example. Over half of Canadian immigrants come from regions of the globe other than APEC (including the United States) and Europe. While European immigration declined by 46 percent from 1980 to 1996, immigrants from the Asian APEC countries increased by 266 percent. Asian immigration to Canada (which would also include immigrants from the Asian subcontinent) stands at about 50 percent of the total, or about 110,000 people a year. The bulk of Asia Pacific immigrants hail from China, Hong Kong, Taiwan and the Philippines. Michael Baker and Dwayne Benjamin contend that while the number of immigrants to Canada has been large, immigrants have not had an appreciable negative impact on labour market developments in Canada. Asian immigrants assimilate at about the same rate as other immigrants but start from a lower initial earnings level.

Number of Immigrants to Canada, 1996



Total Immigrants: 221 thousand

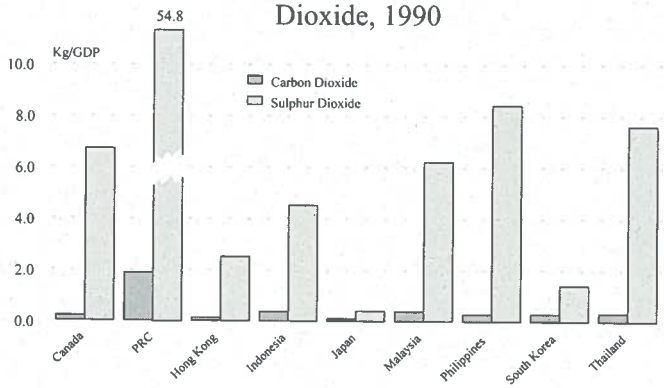
Source: Immigration Statistics, Department of Citizenship and Immigration, 1996.

The link between trade and immigration is still relatively unexplored. Given that Canada has experienced strong growth in Asian immigration, is there any evidence to suggest that immigration affects trade or investment? The authors find evidence that Canada's exports and imports are both positively correlated with Asian population in Canada.

Environmental Issues

In another paper, Brian Copeland examines the relationship between trade with Asia and the quality of the environment in the Asia Pacific region. For instance, he examines whether the demand for pollution-intensive goods by the developing countries makes the environmental situation better or worse.

Emissions of Carbon Dioxide and Sulphur Dioxide, 1990



Source: Copeland, B. "Trade, Environment and Growth in the Asia Pacific Region: Implications for Canada", in *The Asia Pacific region in the Global Economy: A Canadian Perspective*, tables 1 and 2, pages 359 and 360.

A number of studies suggest a "humped effect," with pollution first rising with increasing per capita income, then falling. Indications are that many of the poorer countries are still on the "wrong" side of the hump, where more growth means more pollution.

Trade liberalization may worsen the situation because of its unintended effect on the environment. For example, a country with weak pollution controls and whose growth depends on the export of "dirty" products may opt for policies and regulations that benefit its current workers at the expense of its future population.

According to Copeland, the policy implications of this analysis for Canada are far from clear. For example, Canada could push for the "greening of trade," but envi-

The overall participation rate of Canadian SMEs in Asia is very low relative to that of larger firms.

ronmental regulation is considered by many countries as a matter of national sovereignty. And Canada's strong opposition to the extraterritorial application of US laws is a model that could serve to bolster their views in this matter.

The idea that Canada might countervail environmental dumping leaves many people uneasy because most of the countries affected would be the poorer countries.

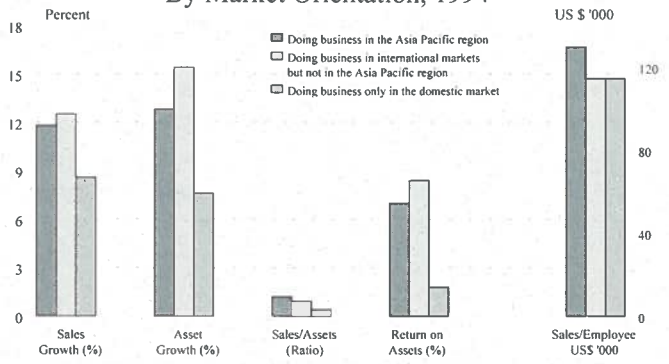
SME Participation

Small and medium-sized enterprises (SMEs) account for over 98 percent of all business firms in Canada and for most of the job growth in recent years. Recent statistics indicate a continuing dependence on SMEs as the primary source of new private sector jobs. During 1996, SMEs created about two-thirds of all such jobs. They are particularly important in the service sector and thus can be viewed as potential engines of growth in facilitating business service exports. In their analysis, Someshwar Rao and Ashfaq Ahmad find that outward-oriented Canadian SMEs are very competitive vis-à-vis their American counterparts. At the same time, only a small number of SMEs export (10 percent), and a tiny 0.2 percent invest abroad. Moreover, the overall participation rate of Canadian SMEs in Asia is very low relative to that of larger firms. SMEs account for only 9 percent of total Canadian exports to the region.

Future commercial activities of SMEs in the Asia Pacific region could thus play an important role in Canada's success in penetrating the dynamic Asian markets.

Firms that have expanded into the Asia Pacific markets generally identify the same motivations: market diversification, production for export, favourable regulations, production for the local market, and reduced production costs. At the same time, much of the explanation for the low SME participation rate in Asia Pacific lies in the large number of trade, investment and regulatory barriers in the region. These obstacles, which raise the cost of doing business, are especially damaging for smaller firms because that cost must be spread over a smaller volume of sales. Three other factors critical to SMEs must also be added to the list: a lack of financial resources, a lack of knowledge about the Asian market, and a lack of international managerial experience. Many see these impediments as justification for government assistance to SMEs in export markets.

Economic Performance of Canadian SMEs
By Market Orientation, 1994



Source: S. Rao and A. Ahmad, "Canadian Small and Medium-Sized Enterprises: Opportunities and Challenges in the Asia Pacific", in *The Asia Pacific region in the Global Economy: A Canadian Perspective*, page 420.

Trade Policy Issues

In examining Asia Pacific and Canadian interests in the region, it is critical to understand how the bilateral relationship between the United States and Japan is evolving. In her paper, Wendy Dobson reviews some well-known irritants concerning trade between these two countries. On the one hand, a number of US initiatives in past years have annoyed Japan immensely; on the other, US trade negotiators have failed time and time again to open the Japanese market to US producers.

The implications of this impasse are worrisome for Canada. The Japanese and other members of the Asian community tend to see Canadians as being "like" Americans and thus are apt to treat them the same way.

There are certain signs, such as Japan's own investment in the Asia Pacific region, that raise the spectre of a possible Japanese-led trade bloc that would exclude the Chinese. How the rest of Asia would react to such a scenario is not clear, but it could exacerbate the current US-Japan dispute.

Dobson offers three main policy recommendations. First, a special US-Japanese dispute panel should be set up, along the lines of the panels set up under the Canada-

Canada should increase efforts to raise its profile in the Asia Pacific region, as Australia has done.

US FTA. Second, APEC should be promoted as a channel through which Japan can link its regional thrust into Asia with global governance systems such as the World Trade Organization (WTO). APEC might also serve as an intermediary in disputes. Finally, Canada should intensify its efforts to raise its profile in the Asia Pacific region, as Australia and New Zealand have done.

Murray Smith proposes three important considerations for Canadian trade policy in the Asia Pacific region. First, Canadian trade barriers against the exports of most of the countries in the region are still quite restrictive in a number of areas – agriculture, textiles and manufactured goods, for example.

Second, Canada itself faces substantial export barriers in the region. These barriers may explain, in part, Canada's relatively poor export performance in East Asia. Reducing trade barriers in the region should therefore be a major policy objective for Canada, and in this respect Canadian and US interests converge.

Given the clear opportunities in the Asia Pacific region, it is only prudent that Canada pursue these opportunities, keeping in mind, however, that there are problems as well. If Canada is to succeed in Asia, Canadian business must establish a more evident and visible presence there. Government policy should be directed towards reducing market barriers. In addition, Canada cannot expect to make progress unless it is perceived as a fair trader in the region. Reducing existing Canadian trade barriers to imports from Asia is one way to foster better economic ties with that region.

Third, as a pool of low-cost labour, Mexico competes directly with Asia in both Canadian and US markets. The emergence of a more liberal regime regarding the import of goods from Asia could lead to some reduction of the trade diversion towards Mexico within North America. This could be a source of tension among the NAFTA partners.

The effect of the Asian growth experience on Canadian economic policy not only reflects concern about its trade and investment consequences; it has also had an enduring impact on the debate, in academic and policy circles, about the role of governments in promoting growth. Richard Lipsey and Russell Wills step into the fray by looking at the role that government science and technology policies have played in South Korea and Singapore. They view the NIEs as examples of what Lipsey calls "massaged market economies," where governments do the massaging. Government policy has successfully facilitated the substitution of knowledge-based inputs for low-skill labour and resource-based inputs. The authors argue that Canada might benefit from studying the details of these policies. In addition, they support greater Canadian involvement in R&D in East Asia via strategic alliances and partnerships with both South Korea and Singapore as a means of keeping open potential windows of opportunity for Canadian businesses.

Richard Pomfret rounds out the book with a review of Australia's trade performance in Asia. Australia represents the greatest success story in terms of export expansion into East Asia. Its presence on these markets remains concentrated in primary products, but its success to date may have set the stage for the next step up the product cycle. If Australia can upgrade its human-capital base, it may be well placed to export higher-value-added goods and services to East Asian markets. Canadians should be watching these developments with considerable interest.

Despite the complexity of the subject, a consensus emerges. Indications are that Canada will forge stronger links with the Asia Pacific region in the coming years. This trend is certain to have an impact on Canada's economic growth, industrial growth patterns, wage trends, and trade and industrial policy, as well as on the country's future as part of the multilateral trade system and on its relationship with the United States and Mexico.

Sylvia Ostry presents a thoughtful analysis of world trading patterns over the post-WWII period, during which three factors affected world trade and investment. First, two dichotomous trends have emerged regarding the organization of trade: globalization or convergence, as typified by the General Agreement on Tariffs and Trade (GATT) and the WTO; and regionalism, embodied in the trade and investment agreements that divide the world into trading blocs. There were 109 such regional agreements

Regional trade and investment agreements are driven by economic globalization, deregulation and the rapid evolution of information technologies and the communication industry.

in force at the end of 1994 – the EU, FTA, NAFTA, APEC, etc. Second, these trade and investment-oriented pacts are driven by economic globalization, deregulation and the rapid evolution of the information technologies and communication industry. In the case of APEC, globalization was also accompanied by a surge in FDI oriented geographically towards the East Asia region. The third factor was the evolution of American trade policy. It was not expected that Europe and Japan would catch up so quickly after the war, nor was it believed that capitalism would come in so many varieties. The direction of US policy was towards regionalism characterized by multilateral and regional agreements. But there was also an accompanying thrust to freer trade within the GATT and WTO, with harsh penalties being imposed on those economies deemed to be dealing unfairly or unreasonably.

APEC presents its own unique issues. First, APEC is focused less on trade policy as such than on the integration of trade and investment. Second, unlike the EU, APEC integration has been led by the private sector, with help from non-governmental organizations, followed by governments. Third, the engine of integration has been investment, especially FDI by its own members.

DISTINGUISHED SPEAKERS LECTURE SERIES

Hal Varian talks about the Internet

If you are like the average Canadian, you probably think that the Internet is for surfin' – surfin' and nothing but surfin', for work and, especially, for play.

Few people know the truth about the Net, and most probably don't need to. Most get on the Net, point and click, and download the latest game demo or clip from the blockbuster film release, or else they send out a few E-mail messages or visit the hottest Web sites.

However, lurking beneath the glitzy surface of the information super-highway is an unsettled substructure, says Hal R. Varian, Dean of the School of Information Management and Systems at the University of California, Berkeley. In a September 1996 Distinguished Speakers in Economics presentation on "The Economics of the Internet," Dr. Varian sketched out his vision of how the Internet will evolve until the turn of the century.

"Because the Internet began as a state-financed public utility, the economic and business practices that would have normally been developed naturally as an industry grows and matures are missing. However, the open standards and public-spirited pattern of cooperation that have characterized the Internet's history would probably not have been possible in a privatized environment. Now, the 'public' and 'private' facets of the Internet are increasingly coming into conflict," points out Varian, "and there are many fundamental legal, economic, and organizational issues remaining to be solved."

Pursuing this line of argument further, Varian warns: "This raises the spectre that critical decisions may be made prematurely. For many issues, the 'right' answers are very obscure, and it will be easy for a poorly informed or poorly advised policymaker to make the 'wrong' choice."

Professor Varian's lecture encompassed three major areas – the Internet of today, the Internet of the near future, and the Internet of the distant future.

Highlights

The Net of today is experiencing growing pains. There are multiple networks and service providers, yet no commercial infrastructure standards are in place. New Internet applications are demanding higher and higher quality of service, but current protocols and practices are not up to the task of delivering better service. Pricing

Should access to the Internet be paid for by subscription use, by pay-per-use fees or by advertising revenues?

policies have yet to be determined: should access be paid for by subscription use, by pay-per-use fees or by advertising revenues? There is a need to evaluate the quality and/or other key factors of the multitudinous Web sites. And the industry has so far been unable to determine what kinds of content people are prepared to pay for.

These are just some of the concerns. In addition to these commercial considerations, there are regulatory ones. Should content be regulated and, if so, to what degree (for example, "dirty" pictures, certain four-letter words, specific literature styles)?

Another area is encryption policy. It is now technically feasible to encode documents in a way that is widely believed to be "unbreakable." According to some, this would allow criminals and terrorists to encode their communications in a way that would prevent detection and prosecution. Should encryption technology be controlled?

There are also issues involving intellectual property. Content producers are quite worried about producing material that is disseminated in digital format since it can be copied almost perfectly and disseminated widely at very low expense.

Internet Issues

- *Should content be regulated? If so, how and to what extent?*
- *Should encryption technology be controlled to facilitate the detection of communications of criminals and their prosecution?*
- *What measures can be implemented to protect intellectual property?*
- *What is the role of public policy in setting the limits between publicly available information about an individual's activities on the Net and his or her right to privacy?*

For the Internet of tomorrow, Professor Varian foresees a likely shakeout in the backbone industry and in the whole industry of Internet service provision. The industry will come to be dominated by a few large telecommunications companies (telcos) and others that own their own lines because the cost of leasing a line from a telco is much greater than the cost to the telco of providing that line itself. Thus, firms that own their own lines have significant cost advantages over those which have to lease them.

Rising demands for higher quality of service also suggests that the larger service providers are likely to begin to offer end-to-end guarantees, with the result that customers with the same service provider will receive better quality service than customers that use different service providers.

Quality-of-service classes might begin to emerge, along with different prices for essentially the same information. Differentials might be based on time (for example, real-time versus delayed reporting of stock prices), quality (colour and graphics versus black and white text) or other determining factors (bug fixes, plug-ins, add-ons, related links, etc.).

There will likely be a market solution to replace content regulation. For example, certain sites will set themselves up as "recommenders" providing content rating, thus enabling clients to make informed judgments about whether their own individual values and tastes coincide with those of the recommender(s) and act accordingly.

It is also likely that the market will reject intrusive intellectual property (IP) protection, as attempts to overly protect IP are competed away – much as software copy protection was competed away in the 1980s.

Privacy will also be an issue. There are two factors affecting privacy issues: annoyance and "nosiness." Often, when people say they want their privacy they mean they don't want to be annoyed. Here, the incentives of producers and consumers coincide, in that the former do not want to advertise to those unlikely to buy their product while the latter are interested only in information relevant to their purchasing decisions. Nosiness issues have to do with situations where the interests of the two parties are diametrically opposed – for example, you may not want the insurance company to know whether you smoke or not, whereas they want to know this information. Here, Professor Varian sees a role for public policy to sort out the limits between the public and private spheres.

The distant future of the Net is more difficult to predict. Varian considers two possible scenarios. The more likely outcome, in his view, is that only two or three firms will remain in the market, providing end-to-end

Because cybercrime will become a significant problem, some degree of regulation must exist on the Internet.

service and negotiating some sort of interconnection. The exact number of firms will likely be determined by political and antitrust considerations rather than by technological factors. The other scenario is that many firms will operate in the market, with interconnection standards and settlements. However, Professor Varian has not seen much evidence of movement in this direction, so he labels this scenario highly unlikely.

The phenomenon of increased wireless connectivity to the Internet, already present in the San Francisco area, will likely become widely available by the year 2000.

Concerning content, either the browsers of today will disappear and be replaced by an applications environment that is network-aware, or else the browser will become the operating environment and all applications will be bundled with it.

Professor Varian also believes there will be some sort of regulation of the Internet. As with all important sectors – automobiles and transportation were cited as examples – some degree of regulation must exist. And, following the Willy Sutton principle – "Why do you rob banks?" "Because that's where they keep the money!" – cybercrime will become a significant problem as more and more money is "kept" or transacted on the Internet.