

1984

Computer, Data Processing, and Communication Services

Jonathon D. Aronson

Peter F. Cowhey

Follow this and additional works at: https://ir.lib.uwo.ca/economicscsier_wp

 Part of the [Economics Commons](#)

Citation of this paper:

Aronson, Jonathon D., Peter F. Cowhey. "Computer, Data Processing, and Communication Services." Centre for the Study of International Economic Relations Working Papers, 8446C. London, ON: Department of Economics, University of Western Ontario (1984).

ISSN 0228-4235
ISBN 0-7714-0596-0

CENTRE FOR THE STUDY OF INTERNATIONAL ECONOMIC RELATIONS

WORKING PAPER NO. 8446C

COMPUTER, DATA PROCESSING, AND COMMUNICATION SERVICES

Jonathan D. Aronson

and

Peter F. Cowhey

Department of Economics Library

NOV 2 1984

University of Western Ontario

This paper contains preliminary findings from research work still in progress and should not be quoted without prior approval of the author.

DEPARTMENT OF ECONOMICS
UNIVERSITY OF WESTERN ONTARIO
LONDON, CANADA
N6A 5C2

**CURRENT ISSUES IN TRADE AND INVESTMENT
IN SERVICE INDUSTRIES:
U.S.-CANADIAN BILATERAL AND MULTILATERAL PERSPECTIVES**

THE THIRD ANNUAL WORKSHOP ON U.S.-CANADIAN RELATIONS

Sponsored by the Institute of Public Policy Studies of The University of Michigan and the Centre for the Study of International Economic Relations of the University of Western Ontario, with financial support from the Ford Foundation, Donner Foundation, National Science Foundation, Ontario Economic Council, Bank of Montreal, IBM Canada, and The Fishman-Davidson Center of the University of Pennsylvania.

October 19-20, 1984
Ann Arbor, Michigan

Department of Economics Library
NOV 2 1984
University of Western Ontario

Jonathan D. Aronson
University of Southern California

and

Peter F. Cowhey
University of California, San Diego

Computer, Data Processing, and Communication Services

Introduction

The politics and economics of modern telecommunications flow from the highly integrated nature of the system. Players in one segment of telecommunications face competition originating from other segments. Although the boundaries defining each segment are blurring, it is helpful to distinguish three market segments.

The first segment consists of equipment suppliers who provide everything from pbx switchboards to the computers attached to the phone lines. The second segment provides traditional telecommunications services such as voice and telex which allows users to transmit information among themselves. The third segment, which began to emerge during the 1960s, provides value added services and remote data processing data bases. This segment, which is smaller than the others but is expanding rapidly as new services are introduced, provides processing of telecommunications messages that make transmission cheaper and more reliable, or they make available a menu of services ranging from complete data processing to specialized data bases. In US parlance, these are the equipment, basic services and enhanced services segments of the telecommunications market.

Many large companies are active in all three segments of the market. Nonetheless, in each segment the array of producer and consumer interests constantly evolve as rapid innovation changes the face of telecommunications and redefines distinctions between computer and communications equipment and services and among the various segments of the market.

This paper argues that the politics of the equipment market has stood in the way of achieving open, full competition in

telecommunications equipment on an international basis. Although large Canadian users pay more than necessary for equipment and services, Canadian equipment manufacturers continue to be protected by a significant tariff wall. Along similar lines, the politics of the basic communications network has been stacked in favor of traditional suppliers of phone services. Even though Canadian telephone services is not dominated by a single, European-style Postal, Telegraph and Telephone (PTT) authority, provincial suppliers of telephone services, Telesat (the Canadian satellite communications company that is jointly owned by other phone companies) and Teleglobe Canada, the federally owned provider of international telecommunication services (except for U.S. traffic), have insisted that new common carriers in the U.S.-Canadian market agree to use the established networks' facilities for a substantial share of their traffic. In contrast, the political, economic, and technological interests involved in the provision of value added services are less institutionalized and more changeable. Competition between those with opposing interests is intense, but the outcome is less certain.

Domestic and international competition in the provision of value added services could be substantially liberalized over the coming decade. The United States is pushing hard for deregulation and free trade in these services. Some other countries including Canada have shown some sympathy for more competition, if not for privatization.

Moreover, the most likely path towards more international competition in the equipment market is through liberalization of the value added network. We suggest that increased international competition in value added services, especially computer services, could promote a decline in protection for producers in the equipment

market and possibly in the traditional communication segment as well. Put another way, the terms governing competition to provide value added services importantly influence the degree of liberalization of trade in the equipment market. However, we expect that even if agreements are negotiated that favor more competition in equipment and VANS on the first round, later rounds of regulatory battles will follow because disgruntled suppliers will redouble their efforts to influence network standards in order to improve their competitive position.

A Model of the Regulatory Process

For the purposes of this paper a highly simplified model of the regulatory process will suffice. In our view the highly integrated economies of the United States and Canada make it possible to treat the telecommunications sector of the two countries as a single market with dual regulatory commissions. (In this analysis we also treat regulatory and trade policy as two aspects of the same regulatory problem.) Thus, we are picturing the process of policy making as somewhat akin to a federal system where state (or provincial) authorities all have vetoes over policy. Given this approach we want to know when and on what terms compromises on highly contested issues are possible.

Contemporary scholarship about regulation argues that policy makers seek political profit from delivering policy in response to costs and benefits organized by groups of producers and consumers. Because of the collective goods problem of free riding, interests are not automatically organized in society. It is easier to organize groups where one or several dominant members have so much at stake that

they will accept a disproportionate share of the cost of procuring a benefit that will benefit every firm in the sector. This is more frequently true of producers than consumers. Sometimes when large scale users (or middle men in a market such as oil refineries) identify major potential savings from collective action they may organize. Or, entrepreneurial politicians may seek to profit from organizing their interests. However, the larger and more diffuse is the class of producers and consumers being organized by the entrepreneur, the more difficult it is to guarantee its staying power in the regulatory process or of accepting finely tuned bargains.

A special complication for the politics of regulation is that producers often have conflicting interests. There is no single, satisfactory dimension for identifying their divisions. But three dimensions are at least heuristically useful.

One dimension is the division between high and low cost producers. High cost producers more often seen protection from regulatory restraints than low cost producers. (However, low cost producers may benefit from protection by collecting rents in the marketplace.) A second dimension relates to the ability of the firm to compete in diverse product markets within the sector. Firms with the size or cash flow and borrowing power to compete in both mature and rapidly growing markets can make different regulatory bargains than firms with narrow product lines. In particular, the former group can bargain over mixes of more competition in one market in return for protection in another. Prior to the judicial process forcing a much more radical restructuring of ATT its preferred strategy was to make precisely such tradeoffs. Today, Bell Canada is yielding to greater competition in some basic network services in return for freedom to enter new markets and reap

unregulated profits from such investments as a \$450 million dollar oil pipeline. Finally, the more multinational a company's operations, the more it must consider the precedent set by a decision in one market for its operations in others. Obviously, this is not a process of simple stare decisis because the profit from bad precedent in one case may be great enough to offset losses elsewhere. Nonetheless, we expect global firms should seek rules that although imperfect in any single country, are viable across the universe of countries in which they operate. They cannot afford treat each national case as an island, at least when it comes to prominent precedents. (Loopholes obtained by "shopping" are discussed shortly.)

As good profit seekers interest groups and regulators are highly sensitive to the marginal costs and benefits of each decision. Regulators will be especially quick to spot the declining returns from tilting too hard in favor of one interest in any market where there are clashing organized interests. Moreover, rigging the market on behalf of any one interest is most profitable when the cost to the other side is not obvious.

Regulation works most satisfactorily (in the political sense) when imposing costs on consumers either slows a decline in prices, allows price increases for an item of declining importance for the consumer, or limits product and performance options in unobtrusive ways. When imposing costs on producers it is most successful either by slowing down an increase in rents or trading off more competition in one market for protection in another. In short, regulators like to blunt the costs imposed on any one group in a particular time period; especially for participants well established in the policy process losses are rolled over and amortized over a longer period of time than a strictly

market adjustment would permit.

Moreover, the profit maximizing regulator seeks to reduce his/her transaction costs (that is, the losses imposed by the wear and tear of making and enforcing bargains). Perhaps the most onerous of the potential problems is the difficulty of getting conflicting parties to accept short-term losses in return for long-term benefits. To do so regulators have to persuade all involved that they will continue to exercise influence and have ample ways to impose penalties on all parties if authorities renege one-sidedly on bargains. Many of the elaborate institutional rules of due process review and the extensive use of industry advisory committees that run on a consensus basis serve this purpose. The same incentives explain why large-scale consumers with the resources to remain persistently organized and active in regulatory politics do best over time. They have the staying power to permit bargains that have a chance of being sustained. (Many consumer movements can win temporary victories but quickly become unraveled after a few years.)

A final characteristic of the process in this case follows from its "federal" structure. Once the two countries had opened their networks to some competition (so that this was not simply a case of two opposed monoliths) interested parties could shop for the appropriate regulatory forum to advance their particular cause. Shopping is a now familiar phenomenon in the judicial process where the choice of jurisdiction by the filing party is often sensitive to the reputation of different courts. (Another example arose recently in the U.S. banking system when banks began to switch from the Federal Reserve system to the state regulatory systems on the basis of the size of the required reserve requirement.)

The effect of shopping on policies depends on broader political and economic conditions. On the one hand, if actors can "exit" in part or in whole from operating under a given regulator (as in the case of the reserve requirements) it drives regulatory "outliers" toward the mean. In the case of telecommunications, once some competition is allowed, it is not in the interest of the major public networks to lobby for strict protection of their remaining advantages. Over time other players will pay more to exit from the system if the networks remain inflexible. On the other hand, some actors (particularly large ones operating actively in both countries) can shop to achieve special advantages by learning how to use the loopholes in the system. Such players may resist far-reaching reforms because such reforms may inordinately benefit those who have not paid the price for learning to use existing loopholes. It may be smart for experienced players to oppose reforms that help their competitors substantially more than themselves. Only if the benefits of a general reform greatly exceeds the value of a basket of second best exceptions achieved by shopping will shoppers favor general reform. (This was the case with the reform of certain US oil price controls. A number of companies became adept at maximizing their advantage under the controls. Still, their overall losses from the controls were greater than the particular advantages they derived by working loopholes that remained. Therefore they favored the abolition of the controls.

This review of the dynamics of regulation suggests a series of hypotheses that can anchor our more detailed review of the issues.

1.) All other things being equal producers are likely to be better organized than consumers because they are fewer in number and have a larger individual stake in the policy outcomes. Therefore, on

many issues involving telecommunications (such as television border broadcasting) the interests of producers are likely to be disproportionately influential. However, on the issues examined in this paper the growing importance of communications and data processing in corporate strategies produces a group of users with large immediate interests in the policies. Therefore, it is the degree of concentration of the interests of producers that vitally influences the ability of regulators to resolve conflicts. In general, the fewer the number of the producers the easier it is to negotiate bargains that split the difference over policy and reduce conflict by spreading out costs and benefits over a longer period of time. (Recall that longevity in the regulatory process makes bargains easier.)

2.) The interests of producers concerning attempts to introduce more competition vary according to several criteria. High cost firms with narrow product lines are more resistant to competition while those with a wider range of products are more apt to accept tradeoffs. Multinationals with a wide range of products are more likely to support greater competition but they will be very wary of the particular terms of any formal change in the rules. (See hypothesis number three.)

3.) The opportunities for shopping make it likely that substantial differences in policy between the two countries will be narrowed in practice, if not in theory. Large multinational firms in particular will find ways to profit from policy "arbitrage" to their own advantage, although not necessarily to the benefit of all producers or consumers. More comprehensive reforms designed to reconcile the policies of the two countries will be more likely to win the support of firms with fewer resources for shopping. Large shoppers may support general reform but will be quicker to prefer no change to general

reform.

4.) Because actors respond to marginal costs and benefits, those actors interested in more than one segment of the market will switch their center of attention before reaping all the benefits of regulatory politics in a particular segment. We expect them to "cycle" their attention as the segment with the easiest and largest gains changes. Subsequent rounds will see attention return to the segment to reap the next most attractive set of gains.

With these hypotheses in mind we now examine the relationship among the three segments of the telecommunications sector (equipment, basic services and value added services). Then, we examine how the politics of each individual segment has related to the others.

The Ties That Bind: Network Rules and Technical Standards

The advantages and practicality of policies designed to maximize competition at home and through free trade in the world market require no elaboration. But the trade in telecommunications/data processing equipment and information services are tied together. As such they illustrate many of the policy challenges with trade in services.

Even in domestic markets the degree of market regulation for most services is significantly greater than the liberal ideal. These regulations became even more restrictive when dealing with international provision and purchase of services. In communications, for example, controls are so pervasive that the provision of equipment is still heavily controlled as a consequence of the regulations.

Critics hypothesize that free trade in communications and related services would not lead to the ideal of liberal competition.

Because communications networks will still be organized in ways that significantly impede liberal competition, free trade will only alter the arena of imperfect competition, not approach the liberal ideal. They believe that the organization of the communications system leads inevitably to formal or informal regulatory agreements that significantly skew competitive advantages.

The role of regulation by public or private authorities in communications markets becomes clearer when the current American data communications situation is considered. Even after the break up of ATT, private parties and government authorities continue to negotiate ways to set terms for technical standards, pricing, and the right to use various communications channels in order to transmit data. These negotiations are important because technical standards influence equipment decisions and network rules determine advantages among different types of customers, users, and equipment providers.

To clarify the important links between standards and competition some elaboration is useful. Technical standards significantly affect how the rules for networks influence business competition. The ways in which technical standards for a network are designed and set can have far-reaching implications for software and hardware providers. There is no agreement on exactly how standards influence competitive advantages, but it is possible to sketch a plausible picture based on the activities of some of the firms in the market.

Technical standards are ambiguous, amendable, and duplicable. They are ambiguous because no standard fully resolves all of the questions involved. (A classic instance is the "X-25" protocol for data communications. Two systems both adhering to the protocol can be

virtually incompatible due to conflicting secondary specifications.) Standards are frequently amended when new or modified equipment is introduced. Therefore, a company that is at a disadvantage because its standards vary from the norm at one time can hope to catch up later. And, standards are duplicable because suppliers can engineer their products to become compatible with a new standard even if it is in conflict with an old one. Ambiguity, amendments, and duplication mean that standards do not create irrevocable advantages for some players in the competitive market.

If standards are not permanent guarantees of competitive advantage, they can provide a temporary boost. Some companies gain from their choice of a standard, especially in a technologically innovative field, while others suffer because of their incompatibility problems. Buyers usually bestow their loyalty to the firms that first establish a standard because these companies are the most experienced with the standard and have the largest economies of scale. Thus, leaders on standards often enjoy a competitive edge. The introduction of each new generation of equipment reopens the question, but at any one time standards influence advantages. Therefore, equipment and software suppliers lobby on behalf of standards favoring individual interests. (However, these same companies work together in support of a preferred national standard in an international forum such as the International Standards Organization.)

For example, Xerox, DEC (Digital Electronic Corporation) and Intel labored to have "Ethernet" adopted as the standard for local office system networks by the IEEE (the Institute of Electrical and Electronic Engineers). (The firms popularized the standard by offering to license it to other firms for only \$1,000.00) So long as Ethernet

was the favored candidate for the new standard many users preferred DEC and Xerox equipment. However, as the standard became more widely used, other companies adapted their equipment to Ethernet and thereby gained competitive access to the customer base of the two companies. The two firms gambled that they could turn their early lead into a continuing advantage. And, IBM reportedly took Ethernet seriously enough to discourage its selection as the official standard.

Another example of standards and sales of software and equipment involves the Canadian videotext system, Telidon. While many consider this an excellent system, the domestic Canadian market is not large enough to generate the economies of scale required for economic success. Therefore, the Canadian firms have assiduously courted influential American companies to experiment with their technology as the basis for a new standard. For example, Telidon persuaded GTE to abandon a British system (Prestel) and adopt the Canadian videotex system in 1980. In addition to the question of technical standards, there is the issue of network rules. These rules govern which types of networks can provide what services and according to what pricing system. While the number of restrictions concerning these items can be curtailed by deregulation, public or private agreements concerning network rules have important implications for which networks will service customers.

Two important cases in U.S.-Canadian relations are satellite telecommunications services and the use of telecommunications to do data processing. Many American companies now offer commercial satellite networks to corporate customers, and these networks can easily serve Canada as an extension of their current services. Canada's official telecommunications corporation, Telesat, feared that the entry of

American signals would divert a large part of the profitable traffic of multinational corporations from its channels. Another important issue is to what extent firms can shop freely across national borders for computer data processing services provided over telecommunications facilities. We discuss both items later.

Rules governing the pricing and access to network facilities also can influence advantages concerning equipment. The most obvious example is in computer services. To the extent that there is unlimited nondiscriminatory access by users to computer services it puts pressures on equipment suppliers in any given nation to be either competitive in cost or watch computer processing (and therefore equipment decisions) filter out to other countries. Another case is under debate in many countries. The issue is whether to rent private lines for fixed fees to companies with their own data networks. One alternative is to charge a variable fee depending on the volume of usage. In general, volume sensitive pricing favors the makers of data processing equipment over telecommunications hardware because the user has a strong incentive to do data processing locally on a more frequent basis. (If the cost of using a communications line depends on the amount of data transmitted, users have a strong incentive to invest more heavily in local data processing at individual work sites rather than channeling data elsewhere for processing or revision. A cost efficient solution for the user will, on the margin, invest more heavily in data processing equipment than complex telecommunications equipments geared to channel larger and more complicated flows in the most reliable manner.)

In summary, the analysis so far has demonstrated that network rules inevitably skew competitive advantages. But the examples have

not shed any light on which aspects of the interconnections among the network, equipment, and VANs will dominate, why some issues move to resolution more quickly than others, and why some issues have so far remained relatively quiescent. The next section answers these questions.

Equipment and Competition<=>

The equipment trade between the United States and Canada is dramatically different for telecommunications and data processing. In 1983 (based on third quarter estimates) Canada ran a surplus on trade in telecommunications equipment with the United States of \$104.6 million (and a global surplus of \$311 million). However, the United States had a surplus of approximately \$377.5 million in 1982 with Canada on computers and related equipment. (Imports supplied 85% of the Canadian market and the United States overwhelmingly dominated the imports.) Although the relative success of the two countries varies according to the market, one constant is a difference in the relative importance of the trade for the two countries. The Canadian market is far less vital to American firms than vice versa. For example, U.S. global exports of telecommunications equipment in 1983 amounted to \$786 million, and Canada constituted about 10.5% of the total. (Total U.S. production was about \$20 billion.) U.S. production of computing equipment amounted to about \$41 billion in 1983, of which about \$10.2

Our discussion of equipment, basic services, and VANs draws heavily on an internal working paper prepared the NTIA for U.S. government officials in 1984. One of the authors obtained a copy of the paper. We have supplemented its analysis with other documents and interviews.

billion was exported. Canada accounted for about 9.5% of foreign sales. In 1984 Business Week estimated that the total production of telecommunications equipment in Canada was about \$2.3 billion. In 1982 its total exports of such equipment and imports in 1982 amounted to \$475 and \$164 million respectively. Of these totals about \$188 million went to the United States and \$83 million came from there, or about 39% of exports and 50% of imports. Likewise, about 86% of the total Canadian domestic consumption of data processing equipment was supplied by U.S. imports (the total market was about \$1.6 billion) and \$600 million of Canada's \$842 million worth of exports went to the United States. The structure of the equipment manufacturers in the two countries further clarifies the competitive picture. Four firms manufacture about 90% of U.S. production of telecommunications equipment (Western Electric alone is 68.4%).

One of the four is a Canadian company, Northern Telecom, that is majority owned by Bell Canada (which is not part of ATT). It derives about 55% of its revenues from its U.S. operations. Two others have extensive operations in Canada (ITT and GTE, the latter indirectly owns the British Columbia's telephone system and a smaller telephone company in Quebec). Both ATT and ITT have (or plan) extensive multinational commitments. (ATT once held an ownership share of Bell Canada. As a result of lingering problems about patent rights it refrained from entering the Canadian market until 1984. Now it hopes for sales of about \$150 million per year by 1990.)

The data processing equipment market in the U.S. has about 1,000 companies that are easily identifiable. Despite the giant size of IBM (about \$17 billion in computer sales in 1983) concentration in production has been declining for years. The dominant companies are

multinational firms with extensive operations in Canada. (One reason for these investments is the requirement for local manufacturing by suppliers of data processing equipment to the Canadian government.)

The Canadian industry is also highly concentrated in the production of telecommunications equipment. The dominant firm, Northern Telecom, has about 54% of the market. However, recent changes in regulatory policy have liberalized competition in the equipment market, at least in regard to domestic suppliers.

The relatively tiny computer equipment industry is dominated by a few large multinationals and many small Canadian firms. (As of yet, Northern Telecom has not made its debut in the data processing market.) More generally, it is estimated that 72 out of the largest 100 Canadian electronics firms are foreign owned. The United States has by far the largest share of these companies.

Government policies in the two countries differ in regard to the equipment trade. The Canadian tariff on telecommunications products is about double the U.S. level (17.5% vs. 8.5%). In both countries the tariff on computer hardware is about 3.5% while peripherals and software are duty free. In both markets the Canadian government has promoted a "Buy Canada" program and in the case of the telephone companies this has largely succeeded. More importantly, the Canadian policies reflect an interesting tradeoff between the interests of producers and consumers. Canadian producers of telecommunications equipment evidently produce at costs comparable to prevailing U.S. levels. Moreover, both consumers and smaller producers have benefited from decisions to liberalize the domestic equipment market. Northern Telecom, as the largest and highly competitive producer in both countries, benefits from the tariff protection at home but it would

certainly shift its position on protection if it threatened overall trade relations. The question is why American producers of telecommunications equipment have not protested more vigorously.

The market for computer equipment has yet another logic. Smaller Canadian firms are higher cost producers that have narrow product niches. The extensive efforts of the Canadian government to respond to their vigorous lobbying have created an environment where the costs of computing have risen substantially above the levels in the United States. There is no precise authoritative estimate but a commonly cited figure for the differential is that Canadian costs run 40% higher than in the United States. This may appear anomalous given the low tariff level. However, the government changed its method for determining the customs valuation of this equipment in such a way as to increase the effective protection greatly.

At the same time a growing share of the overhead costs and general strategies for quality and cost control of consumers is tied to computerization. As a result major users of computer services have an interest in forcing a change in government policies. They long ago succeeded in supporting policies to keep nominal tariffs low. Their campaign to reduce equipment prices has proven difficult because they have found fewer allies in the ranks of the largest producers than one might expect.

The response of the biggest data processing equipment makers is highly instructive in light of our model. All of these firms are from the U.S. Evidently, they support more competition by arguing that lower tariff barriers would permit their local subsidiaries to become cost-competitive producers of operationalized equipment and peripherals for their global operations and sales. However, in detailed

negotiations about the issue of customs valuations these firms also reportedly preferred caution and cheering to any particular new policy because might do better by individual arrangements. Meanwhile, small U.S. companies also are low cost producers that prefer a reform in trade policy. But the market is too small as a piece of their business to yield effective political action.

In summary, the equipment market for telecommunications has so far yielded little overt conflict even though American producers seemingly should be dissatisfied. This requires further explanation. The data processing equipment market is more contentious. Costs to large consumers are sufficiently high to produce concerted action. But more competition would not injure the dominant producers who define their interests as being in support of freer trade but susceptible to making special deals at the expense of any campaign for general reform. The particular focus of opposition to competition is the smaller computer firms of Canada. The stakes for these firms are very large so politicians can profit by organizing them. But the group is sufficiently diffuse to make bargaining difficult. Stalemate is a genuine possibility.

Back to Basics: The Politics of the Phone Networks

ATT's divestiture of its 22 Bell Operating Companies and its entry into non-voice communication markets from which it was previously banned was one dramatic fallout of the deregulatory trend in the United States. Until recently ATT held a virtual monopoly in the provision of international voice service in the United States. Domestically, it competed with 1,400 independent telephone companies that provide local

service and with several companies such as MCI, GTE-Sprint, ITT, and SBS that began to slowly erode ATT's dominance in domestic long distanced voice market. Until 1981 Western Union dominated the domestic market for record services (telegraph and telex), but was forbidden to compete internationally. International record carriers such as ITT, RCA, TRT and FTCC competed only with each other to provide international record services.

The provision of voice and record services as well as regulation of the provision of value added services has been turned on its head in the United States over the past several years. To compensate ATT for spinning off its operating companies it was allowed to venture into the domestic and international record and value added services business. Western Union was allowed to compete internationally by the Record Carrier Competition Act of 1981 which removed all distinctions between national and international markets. ATT's assured dominance over the international voice market was removed so that any firm that could negotiate an operating agreement with foreign service providers could enter the field. On a wider basis the so-called Computer II decision by the Federal Communication Commission set up a distinction between basic (voice and record) services and enhanced, value added services. Regulation of basic services was maintained. But, given the blurring of lines between computer and communication services, the FCC opted for complete deregulation of the domestic and international provision of enhanced services. (This has created considerable problems because many government owned or controlled PTTs do not accept the basic/enhanced dichotomy and have no intention of loosening their control over their own emerging value added services. This makes negotiating international operating

agreements particularly complex.)

Canadian telephone and record services are not so open as those in the United States but are considerably more open than those provided by PTTs in most industrial and developing countries. In Canada the two national telecommunications systems, the TransCanada Telephone System (TCTS) and CNCP Telecommunications (CNCP) together account for about 93% of Canada's \$6 billion telecommunications carriage market. TCTS is an association of the largest telephone company operating in each province plus the domestic satellite carrier, Telesat Canada. The federal government and the major common carriers jointly own Telesat Canada. The principal telephone companies in Alberta, Manitoba, and Saskatchewan are provincially owned. The remaining phone companies are privately controlled. Bell Canada, the largest member of TCTS, with 58% of the telephones in Canada, owns significant portions of each of the main telephone companies in the Atlantic provinces. The British Columbia Telephone Company, the second largest Canadian phone concern, is indirectly owned by GTE. CNCP, in contrast, began its existence as a national telegraph carrier associate with the transcontinental railroad, but has expanded its service offerings in recent years. Since 1978 CNCP has been allowed to interconnect with Bell Canada's local telephone network, making it possible to compete with TCTS in providing voice and data services.

Regulatory trends in Canada are in some ways parallel, if not so dramatic, as those that have taken place in the United States. In mid-1982 Bell Canada announced it would reorganize to separate its regulated and unregulated businesses. Competition between TCTS and CNCP is being allowed to increase. However, the TCTS companies retain a monopoly switched public voice services in their respective provinces

and CNCP remains a protected monopoly in the provision of telegram services within Canada. In addition, the use of private leased lines by other common carriers is still more restricted than in the United States. While leased circuits are available at rates deemed to be competitive by some analysts, the Canadian government restricts the resale and shared use of leased circuits, practices vital to many forms of competition by smaller carriers. (The right to compete for supplying telecommunications equipment has also been liberalized, but not so much as in the United States.) Teleglobe Canada, owned by the federal government, has a monopoly on the provision of overseas telecommunications services except for connections to the United States.

The overall picture, then, is roughly as follows. The number of producers of basic network services is small, the companies are rather large, and they have long-lived capital investments yielding many joint products. Therefore, they are risk adverse in regards to liberalizing terms for the basic network while they have some incentive to experiment with ways to serve the fastest-growing parts of the network. Telecommunications costs are a rising share of the budget (or more vital for cost controls) for many large companies. Therefore, they have been actively shopping or supporting more competition. Shopping has led to many provincial agreements with long-distance companies in the United States, and Telesat Canada was under substantial pressure to make similar deals if it was not to lose market share to these other arrangements.

Confronted by a relatively small number of producers and a set of large consumers actively engaged in shopping, regulators mostly have tried to create arrangements that balance more competition with some guarantee that minimum shares will be reserved for older basic

networks. The dominant bargain to date consists of more entry by U.S. long-distance carriers such as MCI in return for minimum shares of the traffic guaranteed to the Canadian basic services. This compromise protects against the worst loss of market share for the traditional common carriers while permitting large consumers in particular to make important initial savings on their phone bills. While demands for more competition may follow at a later date, many of the most important players have found it more profitable to switch their attention to an issue where the returns on political efforts could be more valuable in the next few years: what to do about the provision of computer and other value added services (the "enhanced" services).

ce 1

The Politics of VANs: All in Vain?

Total sales of computer services are rapidly catching up with data processing equipment. In 1983 software, consulting firms for data processing, integrated systems suppliers of software and hardware, and remote data processing firms had sales of \$31.6 billion. Remote processing was the single largest item in this total. Other VANs, especially those owned by such large multinationals as Control Data and General Electric, offer financial accounting services or simply limited processing and formatting of data communications of firms so as to maximize efficiency and lower costs. The Financial Times reported that remote processing and data communications was about \$15.2 billion in 1981. Exports are a major part of their business. For example, in 1977 U.S. firms that earned over 60% of their revenues from software and services reported that \$257 million of their \$1.727 billion in sales,

or 14.8% of total revenues, came from foreign markets. Total export sales by all VANs is running at about \$1 billion per year.

The structure of the U.S. industry is hard to judge precisely because the data on sales remain inconsistent and sketchy. However, one study of a key part of the computer services industry suggested that 1980 sales of on-line data bases in the United States amounted to \$1.17 billion (and was projected to grow at 30% per annum to \$4.2 billion by 1985). The largest four firms accounted for about 12% for sales and the top eight took a bit more than 19%. Therefore, concentration is very low.

The Canadian picture is much less favorable than the one in the United States. Because of the higher costs of equipment and personnel, remote processing and data base services often are 40% more expensive than in the United States. Despite this disparity a very large measure of Canada's data processing services is imported from the United States. The total Canadian market for such services (excluding in-house services in companies) was about \$486 million in 1975 and roughly one quarter of this amount was imported (mostly from the United States). One much quoted study of the Canadian government in the late 1970s expected total U.S. sales of data services to Canada to equal \$1.5 billion by 1985 at a loss of 23,000 Canadian jobs.

Canadian data services companies are not large and the market is highly fragmented. Exports to the United States total only \$10 million. The only bright light in the picture pertains to data bases. In 1982 the second and tenth largest data base companies (judged by the number of on-line bases) were Canadian. However, the United States had the other eight largest in the world and its total number of vendors (116) far exceeded the three of Canada.

The politics of this market are especially interesting. Only the largest users of data services are mobilized by the issue, but these firms know that data processing services constitute a significant growing cost in their operations and a limit on their ability to develop some of their own new products. Moreover, they have already earned substantial returns from the initial reforms concerning basic network services so their attention is cycling to an issue where the marginal returns on success would be greater. In addition, they recognize that particularistic reforms pursued by shopping have almost been exhausted. The cost differences between Canadian and U.S. VANS are sufficiently great that even narrowing the difference somewhat by partial changes would leave significant disadvantages against U.S. competitors.

Canadian consumers have accordingly urged trade and regulatory authorities in the two countries to liberalize competition for VANS, especially in computer services. Instead of protection for these networks they urge better support for research and development. Tax relief would also be appropriate in their view.

The Canadian data processing networks are both small and high cost producers. They are largely not multinational in their operations. Therefore, they are highly vulnerable to competition and have few worries about setting bad precedents for operations in other countries (except for the United States). Therefore, they wish to protect their position at home by pretending that the status quo does not discriminate against other countries.

Because the Canadian VANS are much smaller in size and employment than the equipment makers they make a better target for rationalizing the computer industry through more foreign competition.

Their potential allies are smaller Canadian equipment makers if they can convince those firms of the link between computer networks and equipment sales. They have already lost such organizations as the Canadian Business Equipment Manufacturers Association, a group with a substantial number of local subsidiaries of multinational firms. This group favors more liberal trade in data services so as to permit them to become specialized niche suppliers of computer equipment and services for their parent companies. As long as their basic networks remain relatively secure, moreover, larger Canadian telecommunications firms (such as Bell Canada) can afford to be risk prone in this rapidly growing market.

Canadian officials face a difficult choice. As long as there is vigorous opposition from the Canadian VANs it is costly to reverse policy markedly. This is doubly true because the more diffusely organized small companies are not as easily organized for splitting the difference with consumers. The question is whether increased competition could be introduced in such a way as to guarantee that a fair share of the Canadian firms survive.

Conclusion

This review of the politics of the individual market segments leads to several conclusions. To begin, the dominant issue for the foreseeable future will be in regard to enhanced services because this is where the best organized consumers will reap the greatest marginal profit from new initiatives. A breakthrough on VANs will also open the possibility of changes in regard to data processing equipment.

A second conclusion pertains to VANs and equipment markets. Political compromise has worked in the disputes concerning basic

network services because a relatively small group of firms have roughly split the difference so as to protect some share of the market of the major networks (after prodding by consumers for reform). The issues about VANS and data processing equipment are not so easily compromised. Canadian companies have a weaker competitive position and constitute a less easily managed constituency. Other larger suppliers in these two segments have profited from shopping so they are careful about the types of general reforms that they endorse. The principal difference between the two segments, however, pertains to the total size of the local producers. Equipment makers are much larger employers with bigger volumes of sales. Therefore, politicians see them as a more potent constituency.

Our third conclusion is that any liberalization of VANS will lead regulators to adapt measures to cushion the immediate indirect losses to equipment makers. Various tax breaks, research programs and other forms of support ease the pain and delay the worst shake out long enough to allow regulators to blur the causal connections between VANS and equipment.

Our final conclusion points to the consequences of current efforts to liberalize trade in telecommunications services for data processing. Because the rules of the network and technical standards inevitably influence competitive advantages there is always a temptation to seek profits through influencing them. Furthermore, the search for the highest marginal gains from the next round of policy lobbying leads to a steady review of policy options. Thus far, the principal parties have not found the benefits of manipulating technical standards to be that attractive. As long as other ground rules protected their interests common standards promoted the possibility of

easier access to larger markets. Meanwhile, the initial successes concerning basic services have caused consumers to move to other issues. But changes in regard to equipment and enhanced services will give both smaller producers and customers an incentive to reexamine policy concerning standards and basic network services. Integrated markets with dual regulatory authorities invite private initiatives designed to reset the agendas of government agencies.

1981

- 8101C Markusen, James R. Factor Movements and Commodity Trade as Compliments: A Survey of Some Cases.
- 8102C Conlon, R.M. Comparison of Australian and Canadian Manufacturing Industries: Some Empirical Evidence.
- 8103C Conlon, R.M. The Incidence of Transport Cost and Tariff Protection: Some Australian Evidence.
- 8104C Laidler, David. On the Case for Gradualism.
- 8105C Wirick, Ronald G. Rational Expectations and Rational Stabilization Policy in an Open Economy
- 8106C Mansur, Ahsan and John Whalley Numerical Specification of Applied General Equilibrium Models: Estimation, Calibration, and Data.
- 8107C Burgess, David F., Energy Prices, Capital Formation, and Potential GNP
- 8108C DSU Jimenez, E. and Douglas H. Keare. Housing Consumption and Income in the Low Income Urban Setting: Estimates from Panel Data in El Salvador
- 8109C DSU Whalley, John Labour Migration and the North-South Debate
- 8110C Manning, Richard and John McMillan Government Expenditure and Comparative Advantage
- 8111C Freid, Joel and Peter Hwitt Why Inflation Reduces Real Interest Rates

1982

- 8201C Manning, Richard and James R. Markusen Dynamic Non-Substitution and Long Run Production Possibilities
- 8202C Feenstra, Robert and Ken Judd Tariffs, Technology Transfer, and Welfare
- 8203C Ronald W. Jones, and Douglas D. Purvis: International Differences in Response to Common External Shocks: The Role of Purchasing Power Parity
- 8204C James A Brander and Barbara J. Spencer: Industrial Strategy with Committed Firms
- 8205C Whalley, John, The North-South Debate and the Terms of Trade: An Applied General Equilibrium Approach
- 8206C Roger Betancourt, Christopher Clague, Arvind Panagariya CAPITAL UTILIZATION IN GENERAL EQUILIBRIUM
- 8207C Mansur, Ahsan H, On the Estimation of Import and Export Demand Elasticities and Elasticity Pessimism.
- 8208C Whalley, J. and Randy Wigle PRICE AND QUANTITY RIGIDITIES IN ADJUSTMENT TO TRADE POLICY CHANGES: ALTERNATIVE FORMULATIONS AND INITIAL CALCULATIONS
- 8209C DSU Jimenez, E. SQUATTING AND COMMUNITY ORGANIZATION IN DEVELOPING COUNTRIES: A CONCEPTUAL FRAMEWORK

1982

- 8210C Grossman, G.M. INTERNATIONAL COMPETITION AND THE UNIONIZED SECTOR
- 8211C Laidler, D. FRIEDMAN AND SCHWARTZ ON MONETARY TRENDS - A REVIEW ARTICLE
- 8212C Imam, M.H. and Whalley, J. INCIDENCE ANALYSIS OF A SECTOR SPECIFIC MINIMUM WAGE IN A TWO SECTOR HARRIS-TODARO MODEL.
- 8213C Markusen, J.R. and Melvin, J.R. THE GAINS FROM TRADE THEOREM WITH INCREASING RETURNS TO SCALE.
- 8214C INDUSTRIAL ORGANIZATION AND THE GENERAL EQUILIBRIUM COSTS OF PROTECTION IN SMALL OPEN ECONOMIES.
- 8215C Laidler, D. DID MACROECONOMICS NEED THE RATIONAL EXPECTATIONS REVOLUTION?
- 8216C Whalley, J. and Wigle, R. ARE DEVELOPED COUNTRY MULTILATERAL TARIFF REDUCTIONS NECESSARILY BENEFICIAL FOR THE U.S.?
- 8217C Bade, R. and Parkin, M. IS STERLING M3 THE RIGHT AGGREGATE?
- 8218C Kosch, B. FIXED PRICE EQUILIBRIA IN OPEN ECONOMIES.

1983

- 8301C Kimbell, L.J. and Harrison, G.W. ON THE SOLUTION OF GENERAL EQUILIBRIUM MODELS.
- 8302C Melvin, J.R. A GENERAL EQUILIBRIUM ANALYSIS OF CANADIAN OIL POLICY.
- 8303C Markusen, J.R. and Svensson, L.E.O. TRADE IN GOODS AND FACTORS WITH INTERNATIONAL DIFFERENCES IN TECHNOLOGY.
- 8304C Mohammad, S. Whalley, J. RENT SEEKING IN INDIA: ITS COSTS AND POLICY SIGNIFICANCE.
- 8305C DSU Jimenez, E. TENURE SECURITY AND URBAN SQUATTING.
- 8306C Parkin, M. WHAT CAN MACROECONOMIC THEORY TELL US ABOUT THE WAY DEFICITS SHOULD BE MEASURED.
- 8307C Parkin, M. THE INFLATION DEBATE: AN ATTEMPT TO CLEAR THE AIR.
- 8308C Wooton, I. LABOUR MIGRATION IN A MODEL OF NORTH-SOUTH TRADE.
- 8309C Deardorff, A.V. THE DIRECTIONS OF DEVELOPING COUNTRIES TRADE: EXAMPLES FROM PURE THEORY.
- 8310C Manning, R. ADVANTAGEOUS REALLOCATIONS AND MULTIPLE EQUILIBRIA: RESULTS FOR THE THREE-AGENT TRANSFER PROBLEM.

- 8311C DSU Mohammad, S. and Whalley, J. CONTROLS AND THE INTERSECTORAL TERMS OF TRADE IN INDIA.
- 8312C Brecher, Richard A. and Choudhri, Ehsan U. NEW PRODUCTS AND THE FACTOR CONTENT OF INTERNATIONAL TRADE.
- 8313C Jones, R.W., Neary, J.P. and Ruane, F.P. TWO-WAY CAPITAL FLOWS: CROSS-HAULING IN A MODEL OF FOREIGN INVESTMENT.
- 8314C DSU Follain, J.R. Jr. and Jimenez, E. THE DEMAND FOR HOUSING CHARACTERISTICS IN DEVELOPING COUNTRIES.
- 8315C Shoven, J.B. and Whalley, J. APPLIED GENERAL EQUILIBRIUM MODELS OF TAXATION AND INTERNATIONAL TRADE.
- 8316C Boothe, Paul and Longworth David. SOME IRREGULAR REGULARITIES IN THE CANADIAN/U.S. EXCHANGE MARKET.
- 8317C Hamilton, Bob and Whalley, John. BORDER TAX ADJUSTMENTS AND U.S. TRADE.
- 8318C Neary, J. Peter, and Schweinberger, Albert G. FACTOR CONTENT FUNCTIONS AND THE THEORY OF INTERNATIONAL TRADE.
- 8319C Veall, Michael R. THE EXPENDITURE TAX AND PROGRESSIVITY.
- 8320C Melvin, James R. DOMESTIC EXCHANGE, TRANSPORTATION COSTS AND INTERNATIONAL TRADE.
- 8321C Hamilton, Bob and Whalley, John. GEOGRAPHICALLY DISCRIMINATORY TRADE ARRANGEMENTS.
- 8322C Bale, Harvey Jr. INVESTMENT FRICTIONS AND OPPORTUNITIES IN BILATERAL U.S.-CANADIAN TRADE RELATIONS.
- 8323C Wonnacott, R.J. CANADA-U.S. ECONOMIC RELATIONS--A CANADIAN VIEW.
- 8324C Stern, Robert M. U.S.-CANADIAN TRADE AND INVESTMENT FRICTIONS: THE U.S. VIEW.
- 8325C Harrison, Glenn, H. and Kimbell, Larry, J. HOW ROBUST IS NUMERICAL GENERAL EQUILIBRIUM ANALYSIS?
- 8326C Wonnacott, R.J. THE TASK FORCE PROPOSAL ON AUTO CONTENT: WOULD THIS SIMPLY EXTEND THE AUTO PACT, OR PUT IT AT SERIOUS RISK?
- 8327C Bradford, James C. CANADIAN DEFENCE TRADE WITH THE U.S.
Conklin, David. SUBSIDY PACTS.
Rugman, Alan M. THE BEHAVIOUR OF U.S. SUBSIDIARIES IN CANADA: IMPLICATIONS FOR TRADE AND INVESTMENTS.

1983

- 8328C Boyer, Kenneth D. U.S.-CANADIAN TRANSPORTATION ISSUES.
- 8329C Bird, Richard M. and Brean, Donald J.S. CANADA-U.S. TAX RELATIONS: ISSUES AND PERSPECTIVES.
- 8330C Moroz, Andrew R. CANADA-UNITED STATES AUTOMOTIVE TRADE AND TRADE POLICY ISSUES.
- 8331C Grey, Rodney de C. and Curtis, John. INSTITUTIONAL ARRANGEMENTS FOR U.S.-CANADIAN NEGOTIATIONS. PART I: CANADA-U.S. TRADE AND ECONOMIC ISSUES: DO WE NEED A NEW INSTITUTION? PART II: INSTITUTIONAL ARRANGEMENTS FOR MANAGING THE CANADA-U.S. ECONOMIC RELATIONSHIP.

1984

- 8401C Harrison, Glenn W. and Manning, Richard. BEST APPROXIMATE AGGREGATION OF INPUT-OUTPUT SYSTEMS.
- 8402C Parkin, Michael. CORE INFLATION: A REVIEW ESSAY.
- 8403C Blomqvist, Åke, and McMahon, Gary. SIMULATING COMMERCIAL POLICY IN A SMALL, OPEN DUAL ECONOMY WITH URBAN UNEMPLOYMENT: A GENERAL EQUILIBRIUM APPROACH.
- 8404C Wonnacott, Ronald. THE THEORY OF TRADE DISCRIMINATION: THE MIRROR IMAGE OF VINERIAN PREFERENCE THEORY?
- 8405C Whalley, John. IMPACTS OF A 50% TARIFF REDUCTION IN AN EIGHT-REGION GLOBAL TRADE MODEL.
- 8406C Harrison, Glenn W. A GENERAL EQUILIBRIUM ANALYSIS OF TARIFF REDUCTIONS.
- 8407C Horstmann, Ignatius and Markusen, James R. STRATEGIC INVESTMENTS AND THE DEVELOPMENT OF MULTINATIONALS.
- 8408C Gregory, Allan W. and McCurdy, Thomas H. TESTING THE UNBIASEDNESS HYPOTHESIS IN THE FORWARD FOREIGN EXCHANGE MARKET: A SPECIFICATION ANALYSIS.
- 8409C Jones, Ronald W. and Kierzkowski, Henryk. NEIGHBORHOOD PRODUCTION STRUCTURES WITH APPLICATIONS TO THE THEORY OF INTERNATIONAL TRADE.
- 8410C Weller, Paul and Yano, Makoto. THE ROLE OF FUTURES MARKETS IN INTERNATIONAL TRADE: A GENERAL EQUILIBRIUM APPROACH.
- 8411C Brecher, Richard A. and Bhagwati, Jagdish N. VOLUNTARY EXPORT RESTRICTIONS VERSUS IMPORT RESTRICTIONS: A WELFARE-THEORETIC COMPARISON.

- 8412C Ethier, Wilfred J. ILLEGAL IMMIGRATION.
- 8413C Eaton, Jonathon and Gene M. Grossman. OPTIMAL TRADE AND INDUSTRIAL POLICY UNDER OLIGOPOLY.
- 8414C Wooton, Ian. PREFERENTIAL TRADING AGREEMENTS - A 3xn MODEL.
- 8415C Parkin, Michael. DISCRIMINATING BETWEEN KEYNESIAN AND CLASSICAL THEORIES OF THE BUSINESS CYCLE: JAPAN 1967-1982
- 8416C Deardorff, Alan V. FIRless FIRwoes: HOW PREFERENCES CAN INTERFERE WITH THE THEOREMS OF INTERNATIONAL TRADE.
- 8417C Greenwood, Jeremy. NONTRADED GOODS, THE TRADE BALANCE, AND THE BALANCE OF PAYMENTS.
- 8418C Blomqvist, Ake and Sharif Mohammad. CONTROLS, CORRUPTION, AND COMPETITIVE RENT-SEEKING IN LDCs.
- 8419C Grossman, Herschel I. POLICY, RATIONAL EXPECTATIONS, AND POSITIVE ECONOMIC ANALYSIS.
- 8420C Garber, Peter M. and Robert G. King. DEEP STRUCTURAL EXCAVATION? A CRITIQUE OF EULER EQUATION METHODS.
- 8421C Barro, Robert J. THE BEHAVIOR OF U.S. DEFICITS.
- 8422C Persson, Torsten and Lars E.O. Svensson. INTERNATIONAL BORROWING AND TIME-CONSISTENT FISCAL POLICY.
- 8423C Obstfeld Maurice. CAPITAL CONTROLS, THE DUAL EXCHANGE RATE, AND DEVALUATION.
- 8424C Kuhn, Peter. UNION PRODUCTIVITY EFFECTS AND ECONOMIC EFFICIENCY.
- 8425C Hamilton, Bob and John Whalley. TAX TREATMENT OF HOUSING IN A DYNAMIC SEQUENCED GENERAL EQUILIBRIUM MODEL.
- 8426C Hamilton, Bob, Sharif Mohammad, and John Whalley. RENT SEEKING AND THE NORTH-SOUTH TERMS OF TRADE.
- 8427C Adams, Charles and Jeremy Greenwood. DUAL EXCHANGE RATE SYSTEMS AND CAPITAL CONTROLS: AN INVESTIGATION.
- 8428 Loh, Choon Cheong and Michael R. Veall. A NOTE ON SOCIAL SECURITY AND PRIVATE SAVINGS IN SINGAPORE.
- 8429 Whalley, John. REGRESSION OR PROGRESSION: THE TAXING QUESTION OF INCIDENCE ANALYSIS.
- 8430 Kuhn, Peter. WAGES, EFFORT, AND INCENTIVE-COMPATIBILITY IN LIFE-CYCLE EMPLOYMENT CONTRACTS.

- 8431 Greenwood, Jeremy and Kent P. Kimbrough. AN INVESTIGATION IN THE THEORY OF FOREIGN EXCHANGE CONTROLS.
- 8432 Greenwood, Jeremy and Kent P. Kimbrough. CAPITAL CONTROLS AND THE INTERNATIONAL TRANSMISSION OF FISCAL POLICY.
- 8433 Nguyen, Trien Trien and John Whalley. EQUILIBRIUM UNDER PRICE CONTROLS WITH ENDOGENOUS TRANSACTIONS COSTS.
- 8434 Adams, Charles and Russell S. Boyer. EFFICIENCY AND A SIMPLE MODEL OF EXCHANGE RATE DETERMINATION.
- 8435 Kuhn, Peter. UNIONS, ENTREPRENEURSHIP, AND EFFICIENCY.
- 8436 Hercowitz, Zvi and Efraim Sadka. ON OPTIMAL CURRENCY SUBSTITUTION POLICY AND PUBLIC FINANCE.
- 8437 Lenjosek, Gordon and John Whalley. POLICY EVALUATION IN A SMALL OPEN PRICE TAKING ECONOMY: CANADIAN ENERGY POLICIES.
- 8438 Aschauer, David and Jeremy Greenwood. MACROECONOMIC EFFECTS OF FISCAL POLICY.
- 8439C Hercowitz, Zvi. ON THE DETERMINATION OF THE EXTERNAL DEBT: THE CASE OF ISRAEL.
- 8440C Stern, Robert M. GLOBAL DIMENSIONS AND DETERMINANTS OF INTERNATIONAL TRADE AND INVESTMENT IN SERVICES.
- 8441C Deardorff, Alan V. COMPARATIVE ADVANTAGE AND INTERNATIONAL TRADE AND INVESTMENT IN SERVICES.
- 8442C Daly, Donald J. TECHNOLOGY TRANSFER AND CANADA'S COMPETITIVE PERFORMANCE.
- 8443C Grey, Rodney de C. NEGOTIATING ABOUT TRADE AND INVESTMENT IN SERVICES.
- 8444C Grossman, Gene M. and Carl Shapiro. NORMATIVE ISSUES RAISED BY INTERNATIONAL TRADE IN TECHNOLOGY SERVICES.
- 8445C Chant, John F. THE CANADIAN TREATMENT OF FOREIGN BANKS: A CASE STUDY IN THE WORKINGS OF THE NATIONAL TREATMENT APPROACH.
- 8446C Aronson, Jonathan D. and Peter F. Cowhey. COMPUTER, DATA PROCESSING, AND COMMUNICATION SERVICES.