CT-95/02

THE COMPETITION TRIBUNAL

IN THE MATTER OF an Application by the Director of Investigation and Research under sections 79 and 105 of the *Competition Act*, R.S.C. 1985, c. C-34, as amended;

AND IN THE MATTER OF an abuse of dominant position in the supply of shared electronic network services for consumer-initiated shared electronic financial services.

BETWEEN:

THE DIRECTOR OF INVESTIGATION AND RESEARCH

Director

- and -

BANK OF MONTREAL, THE BANK OF NOVA SCOTIA, CANADA TRUSTCO MORTGAGE COMPANY, CANADIAN IMPERIAL BANK OF COMMERCE, LA CONFÉDÉRATION DES CAISSES POPULAIRES ET D'ÉCONOMIE DESJARDINS DU QUÉBEC, CREDIT UNION CENTRAL OF CANADA, NATIONAL BANK OF CANADA, ROYAL BANK OF CANADA, THE TORONTO-DOMINION BANK and INTERAC INC.

Respondents

- and -

TELPAY, A Division of CTI-Comtel Inc. RETAIL COUNCIL OF CANADA CANADIAN LIFE AND HEALTH INSURANCE ASSOCIATION MIDLAND WALWYN CAPITAL INC., RICHARDSON GREENSHIELDS OF CANADA LIMITED, MACKENZIE FINANCIAL CORPORATION and TRIMARK INVESTMENT MANAGEMENT INC.

Intervenors

AFFIDAVIT OF DR. ROGER WARE

AFFIDAVIT OF DR. ROGER WARE

I, ROGER WARE, of the City of Kingston in the Province of Ontario, MAKE OATH AND SAY AS FOLLOWS:

1. I have been retained by the Director of Investigation and Research to provide an economic assessment of certain issues raised in the affidavits filed on behalf of the Intervenors by Professor Quigley and Mr. Morrison in relation to the Application of the Director in this matter. My report setting out that assessment is attached as Exhibit "A" to this Affidavit.

2. I am an Associate Professor in the Department of Economics at Queen's University. I base my report on expertise built up over fifteen years as a professor of economics at the University of Toronto and Queen's University, teaching and researching in the area of Industrial Organization. I have published many research papers, and developed special expertise, in the areas of market structure and barriers to entry. Specifically, I have studied the electronic payments industry for two years while giving advice to the Director in regard to the investigation of the Interac Association. My Curriculum Vitae is attached as Exhibit "B" to this Affidavit.

3. The Intervenors make two fundamental claims. They assert that the restoration of competition in the relevant markets requires that they must be allowed to directly issue cards to their customers that can access funds through the Interac network. They also claim that entry to the network by entities that would participate as acquirers only is not economically viable or that it will be prevented by stragegic activity of the Respondents.

4. My conclusions are that the arguments of the Intervenors on both these issues are invalid and that the provisions of the Draft Consent Order that relate to these issues, taken in conjunction with the whole of the DCO, will be adequate to restore competition.

SWORN BEFORE ME, in the City of Hull, in the Province of Québec, this 31st day of March, 1996

R. Ware

Dr. Roger Ware

133 831

A Commissioner for taking oaths in and for the Province of Québec for the Judicial District of Hull

This is Exhibit "A"
to the affidavit of
Dr. Roger Ware
sworn before me this
31st day of March
1996
A Commissioner
Notary Public, etc
133 831

REPORT BY DR. ROGER WARE

I INTRODUCTION

1. The object of this report is to provide an economic assessment of the arguments advanced by Professor Quigley and Mr. Morrison, in support of the Intervenors' position that the Draft Consent Order (DCO) in this matter is not adequate to restore competition. Their position rests on two essential points:

(i) indirect card issuing arrangements for non-financial institutions ("non-FIs") will not enable them to provide effective or competitive access to shared electronic financial services for their customers; and

(ii) participation in Interac as an acquirer-only is not economically viable, or will be prevented by strategic conduct on the part of the current members of Interac.

2. The conclusion of my report is that the concerns of the Intervenors are unwarranted. The case presented by the Intervenors and their experts does not hold up under sound economic analysis. Secondly, the facts on which they base their arguments do not establish the points they seek to make.

II THE ANALYTICAL FRAMEWORK OF COMPETITION IN A SHARED ELECTRONIC FUNDS NETWORK

3. This section sets out the analytical framework of competition in a shared electronic funds network. The purpose is to evaluate the claims made by the intervenors and their experts, Mr. Morrison and Professor Quigley.

4. The economic model that I will use to address these issues is that of a network of demand complements, developed by Professor Steven Salop.[1] I apply the model to competition in a shared electronic funds network, where issuance and acquisition are complementary activities. Every transaction, either at an ABM or at a point of sale terminal, involves a card issuing institution and an acquiring institution. The acquiring institution can be any member of the network that deploys terminals. Because one unit of each of these activities is required for every transaction, issuance and acquisition are, in economic terminology, perfect complements.

5. In a shared electronic funds network, members compete for card issuing services by offering cards. Other things being equal, the cards of competing issuers are substitutes, from the cardholder's perspective. Members also compete

[1] Salop, S.C. "Evaluating Network Pricing Self-Regulation" in *Electronic Services Networks*, edited by Guerin-Calvert, M.E. and Wildman, S.S., Praeger, New York (1991).

to deploy terminals and acquire transactions. Other things being equal, a terminal of any member is a substitute for a terminal of any other member in acquiring. Members may compete in both activities or in only one. Competition among members, whether for issuing or acquiring, is referred to as intranetwork competition. The overall structure of the network is that of a group of substitutes in issuing (card issuing services) which are perfect complements to a group of substitutes in acquiring (terminals).

6. The description of this framework is completed by considering the prices for these services. Consider first pricing for SCD. The per transaction price for issuing services is the "foreign fee", charged to cardholders by their issuing institution. The per transaction price for acquiring is a surcharge at the terminal, charged to the cardholder. Either fee could take the form of a rebate. This fee structure is equally applicable to IDP transactions, but for IDP services, the acquirer may also charge the merchant a per transaction fee.

7. Another fee, the interchange fee, is set by the network and it is a payment between issuer and acquirer per transaction. An issuer's revenue per transaction consists of the foreign fee less the interchange fee. An acquirer's revenue per transaction consists of the interchange fee plus any surcharge. In the IDP service, the acquirer's revenue may also include any fee charged to the merchant. There is an important relationship between these fees or prices. If competition is effective

in both card issuance and acquisition, then the interchange fee is redundant. That is, in a fully competitive network, if the network establishes a $1.00 change in the interchange fee, competitive forces will operate to produce equal and offsetting changes in the fees for issuance and acquiring. As a result , it makes no difference to any of the parties, issuers, acquirers or cardholders, at what level the interchange fee is set.[2]

8. The predictions of a model in which the final product is made up of two complementary inputs are quite standard. The first key prediction is that if there is competition in the supply of both inputs, the market for the final product operates efficiently. The second key point is that if a party exercises market power over one input, it cannot improve its economic position by seeking to monopolize the other input. It would extract the maximum economic surplus from the exercise of market power over one input and could not benefit if it extends its market power into the other input.

9. The following example illustrates this second point. There are two complementary inputs: glass jars and jar lids. Assume a consumer will not pay more than $2.00 for the combination of a glass jar and lid. Seller A has a monopoly in the supply of glass jars and can produce jars at the marginal cost of

[2] The redundancy result is developed in Salop, S.C. "Deregulating self-regulated ATM networks", *Economics of Innovation and New Technology,* 1, 85-96 (1990).

50 cents. Lids are supplied in a competitive market at a price equal to a marginal cost of 20 cents. Seller A maximizes its profit by setting the price of jars at $1.80, thereby earning a profit of $1.30. Now suppose seller A seeks to monopolize the market for lids. Because it can never charge more than $2.00 for the entire package, it could not earn a higher profit by selling both lids and jars. That is, because its total cost of producing the package is 70 cents (20 cents for lids and 50 cents for jars) its profit is still $1.30. As this example shows, in a model of demand complements, a firm which exercises market power in the supply of one input cannot increase its profits by seeking to extend its market power into the supply of the other, where the other input is supplied competitively.[3]

10. In the remainder of this affidavit, I will apply this model and its predictions to analyze the two concerns raised by the intervenors; the efficacy of indirect card issuance and the economic viability of acquiring transactions. In terms of my model, these two concerns can be broadly characterized as an inadequate level of competition in the supply of the two complementary inputs, card issuance and acquiring. As I will argue, these concerns are unwarranted. In my opinion, the DCO will promote effective competition in card issuance and card acquiring and, consistent with the model, will lead to a competitive supply of shared electronic financial services.

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[3] See Herbert Hovenkamp, Federal Antitrust Policy (St. Paul, Minn., West Publishing, 1994) at 371.

III COMPETITION IN CARD ISSUING SERVICES

11. The first concern of the intervenors, expressed in the affidavits of Mr. Morrison and Professor Quigley, is that indirect access for non-FIs is not a viable or efficient substitute for direct card issuance.

12. In response, I will first describe a simple mechanism by which an arrangement between an FI and a non-FI could provide effective indirect card issuance for the non-FI. Secondly, whether or not such indirect issuance is efficient and profitable, I suggest that there are other alternatives to direct card issuing status in Interac, for these non-FIs and their customers.

13. Finally, I point out that several arguments by the Intervenors' experts against the efficient operation of "sweep, pass-through and zero balance accounts" are in fact misleading and erroneous. In my opinion, the affidavits of these experts systematically overstate the alleged costs of such arrangements, and understate their efficiency advantages.

14. A simple arrangement to issue co-branded cards might operate as follows. Customers of the non-FI sign a cardholder agreement with the FI of a conventional form, acknowledging liability for their transactions. The FI issues cards to these customers, which will bear the name of the non-FI. The non-FI maintains funds

with the FI in an amount sufficient to cover daily transactions by these cardholders. Each day the non-FI provides information to the FI to establish withdrawal limits for each of the cardholders. As cardholders make debit transactions, the messages come in to the FI, which authorizes the transactions and guarantees payment, reducing the cardholders' withdrawal limits accordingly. At the end of the day, the non-FIs account at the FI is debited by the total amount of the transactions of the cardholders. A record of transactions is sent electronically to the non-FI, which adjusts its customers' balances accordingly. I am informed that arrangements similar to this were operated for a period by an Interac member, Royal Trust, until Interac prohibited such arrangements.

15. I emphasize that the market will select the most efficient arrangement to facilitate the indirect issuance of cards. There is no reason why it should be precisely as I describe in the above paragraph. There may be numerous arrangements of a "co-branding" nature that could facilitate indirect access for non-FIs and their customers, as the American experience demonstrates.

16. An example might be the kinds of arrangements described by Mr. Carmody that have developed in the United States between brokerage firms and card issuing "banks". Experience shows that certain depository institutions have responded to the demand by non-FIs for access for their customers to shared networks, by supplying an off line debit card. The affidavit of Mr. Carmody documents

extensively the operation of such off line debit cards.

17. While the regulatory and financial environment of the U.S. might be different from Canada's, the widespread adoption of such indirect access arrangements supports my view of their economic efficiency. In addition, the U.S. experience has demonstrated that banks will enter and compete to provide these indirect issuance services, and that some banks have specialized in providing such services to non-FIs and have exploited economies of scale to drive down costs.[4] As a result of competition in the market among FIs providing this service, fees charged to non-FIs have come down in exactly the way that the economics of entry and competition would predict.

18. Another alternative is available through the use of credit card networks. I am informed and believe that Canadian Tire, through an affiliate, and GE Capital Ltd., are members of the MasterCard Association and are entitled to issue MasterCard products in their own right. The liabilities arising out of transactions by cardholders of these entities are cleared and settled directly through the mechanism maintained for this purpose by the MasterCard Association. MasterCard membership, with the right to issue MasterCard products, may not be a perfect substitute for direct issuing status in Interac, with the attendant need to

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[4] See the affidavit of Mr. Carmody (para 70).

clear and settle through the CPA. Nevertheless, it is my view that it could be a functional alternative for the intervenors, having regard, *inter alia*, to the fact that MasterCards are accepted at a much greater number of retailers than are Interac debit cards.

19. Still another alternative to direct card issuance exists for non-FIs. These institutions can form subsidiary financial institutions which do meet the requirements of the DCO pertaining to card issuing. It is not in dispute that Interac cards may be issued by such subsidiary FIs. By taking advantage of the removal of the Interac ban on arrangements involving "sweep, pass through or zero balance accounts", a non-FI will be able to allow its customers to use a card issued by its FI subsidiary and indirectly access their funds held with the non-FI.

20. The conclusion of the above discussion is that substitutes exist for direct card issuance by non-FIs. It is my opinion that any lessening of competition, measured in terms of lost economic surplus, which could ensue from the restriction against direct issuance by non-FIs is, at most, very small.

The fee structure of contracts between FIs and non FIs for indirect card issuance

21. Mr. Morrison's affidavit contains a schedule of hypothetical costs that might be associated with indirect card issuing arrangements. The U.S. experience with

competing suppliers of card issuing services to non-FIs suggests that Mr. Morrison's figures are exaggerated and that the forces of entry and competition will, over time, bring down the cost of indirect card issuance services. There is every reason to believe that indirect card issuance would provide adequate service to non-FIs at an efficient and competitive cost.

Transactions Costs and Efficient Institutional Arrangements in Card Issuance

22. Professor Quigley argues in his affidavit (paras 36-38) that indirect card issuance utilizing sweep, pass through or zero balance accounts will impose higher transactions costs on non-FIs and place them at a competitive disadvantage. The point is echoed in Mr. Morrison's affidavit (para 40).

23. Both experts suggest that additional, unnecessary costs will be generated by requiring the routing of messages from the acquirer, through the issuing FI, to the entity which obtains indirect Interac access for its customers. Such a position may well be applicable to a goods market (e.g. the shipping of grain) where shipping, loading and unloading entail significant economic costs. But the transmission of messages in an established electronic network involves virtually no additional costs, even when routed through a number of connected entities. If there were such costs, the fact that there are indirectly connected FIs that could connect directly, suggests that the costs are not significant.

24. Both Professor Quigley and particularly Mr. Morrison emphasize the transactions costs of having the cardholder open and maintain two accounts, one at the non-FI and one at the card issuing FI. This point rests on assumptions about the characteristics of the accounts involved. Their description tends to maximize the costs and complexities of such accounts. It is not realistic to assume that sophisticated institutions would not develop the most efficient arrangements at the least cost. The evidence of Mr. Carmody indicates that this is the reality in U.S. arrangements of this sort.

25. In my opinion, the evidence of Professor Quigley and Mr. Morrison systematically overstates the transactions costs associated with indirect issuance. They exaggerate the transactions costs of sending electronic messages through additional entities, but neglect the essence of transactions cost analysis, which is to locate activities in those institutional arrangements best suited to provide them. Transactions cost analysis, properly applied, would suggest that reliance on specialist issuing institutions may well be less costly than having unspecialized non-FIs issue cards themselves.

Hold up problems and principal agent issues

26. Mr. Morrison (paras 69-70) and Professor Quigley (paras 45-49) argue that requiring non-FIs to enter into arrangements with FIs for indirect card issuance

introduces the potential for inefficiencies of the type which economists term "hold up" and "principal agent" problems. The argument is essentially that in an asymmetric bargaining relationship, inefficiencies may be introduced into the contractual outcome. For example, Professor Quigley postulates that economic inefficiency will result if an FI can use superior information in negotiating with a non-FI for an indirect issuance arrangement.

27. The simple answer is that if markets are competitive, almost all principal agent issues disappear. Continuing with Professor Quigley's example, if there is a competitive supply of card issuance services by FIs to non-FIs, the type of inefficient contract he postulates would not be feasible. In my view, because the DCO will remove the barriers to entry, a competitive supply of such services to non-FIs is likely to emerge.

28. A different argument, propounded by Mr. Morrison (paras 69-71), is that even if there is competition among card issuing FIs, the non-FI may be liable to exploitation because it is "locked in" by virtue of its investment in the cardholder agreements and its outstanding stock of cards. Economists would describe this as a "hold up" problem. Standard theory holds that the problem cannot arise if each party is able to enforce the contract between them, and therefore avoid exploitative renegotiation strategies by the other party. And in reality, if there is competitive supply of card issuance services to non-FIs, each party would

recognize this risk, and the non-FI would be able to negotiate an agreement of sufficient duration, and on sufficiently competitive terms, to mitigate the risk of a "hold up". As we are dealing with substantial corporate entities, I regard the hold up hypothesis as implausible and Mr. Carmody's evidence tends to corroborate this assessment.

IV COMPETITION IN ACQUIRING SERVICES

29. The terms of the DCO include two important changes which effect the acquiring business. First, full acquiring status is open to non issuing, non-FIs. Second, surcharging at terminals is permitted. The Intervenors' experts argue that entry by entities acting as acquirers-only is not economically viable, and that if it is, strategic conduct by the members of Interac will prevent it.

30. The broad question at issue is whether sufficient economic incentives will exist, in the environment generated by the DCO, to induce entry by firms in the sole business of acquiring. In my opinion, scope for profitable entry will exist, on the following grounds.

Revenue issues

31. Under the DCO, in SCD transactions, acquirer revenue accrues from interchange fees (75 cents) plus any surcharges. Mr. Morrison claims that at the average volume of ABM transactions per month, revenue is insufficient to allow profitable new entry. In fact, the important point to note is that an acquirer will not deploy terminals at locations likely to yield only "average revenues" but will seek locations with above average revenue opportunities. At locations where demand is high, but volume low, an acquirer would be able to sustain a positive level of surcharging in long run equilibrium. In the United States, where surcharging has recently been permitted in many States, the result has been an increase in the profitability of the acquiring business, and a more efficient allocation of ABMs.[5]

32. In IDP transactions, surcharging by an acquirer is also allowed under the DCO, and may be expected to occur in some locations. Acquirer revenue in IDP is enhanced by a merchant fee, paid from the merchant to the acquirer: my understanding is that values range currently between 0 - 17 cents per transaction. While it is difficult without more information to know the absolute viability of per terminal entry by new acquirers, it is clear that retailers, as well as other entities, have at least some incentive to become acquirers either directly, through a

[5] "This (surcharging) means the acquiring part of the EFT business can be a very good and profitable business to be in" according to the president of the Pulse network, quoted in *Bank Network News*, Vol. 14, No. 8, September 13, 1995. The same article cites a level of ABM transactions similar to that used by Mr. Morrison as being profitable with surcharges. The affidavit of Scott Engle, para 28 (a) also provides supporting evidence.

consortium or through a third party. In my opinion, they will do so, when it is to their economic and competitive advantage.

Cost Issues: Economies of Scale and Scope

33. Both Professor Quigley (para 59) and Mr. Morrison (implicitly in para 106) argue that economies of scope between the businesses of acquiring and issuing will render entry by specialized acquirers uneconomic. Economies of scope occur where a firm can produce two different products more cheaply than could two specialized firms producing the same products.

34. The evidence of Mr. Engle is that there are no significant economies of scope between issuing and acquiring. His affidavit emphasizes that the key component of acquiring is data processing, and that there are significant economies of scale <u>and</u> economies of scope between transaction acquiring and other, non-issuing activities. The most convincing part of his evidence is the rise of large companies in the United States in the business of acquiring only. The second and third largest deployers of ABMs in the U.S. are acquiring companies who issue no cards and maintain no accounts.

35. Specialized acquiring activity in IDP has lower intrinsic economic costs than it does in SCD. The acquirer does not have to own and maintain ABMs, in

particular, keeping them stocked with a cash inventory. IDP terminals have fewer functions, and cost much less to produce. In contrast to SCD, the deployment of IDP terminals has only just begun, with only about 140,000 retail outlets currently operating terminals. Moreover, incentives for entry are enhanced by the high degree of consumer acceptance of the technology, as evidenced by the 390 million IDP transactions in 1995. I conclude with Mr. Engle that there are strong entry opportunities in the business of IDP acquiring.

36. I conclude that the current market structure is the result of the restrictions and anticompetitive acts set out in the Director's Application. The effect of the DCO will likely lead to the entry and growth of companies specialized in acquisition, and in my opinion, there is no reason to believe they will be unable to compete effectively with the current members of Interac.

Surcharging and the potential for growth in the number of ABMs

37. Mr. Morrison expresses the opinion (para 100) that "there is no significant remaining potential for installing ABMs in Canada". There are compelling reasons to believe that this view is wrong. Entry into the acquiring business has been restricted by Interac, to date. These barriers to entry are a factor in the existing equilibrium in the acquiring business. By removing the barriers to entry we should expect investment in new ABMs to accompany competitive new entry. In

addition, we can predict a more efficient allocation of ABMs. Furthermore, the introduction of surcharging suggests that an incentive is created for ABMs to be installed in locations which would be uneconomic in the absence of surcharging. Obvious examples include ski resorts, small hotels etc.

38. Finally, Mr. Morrison states in para 113 that "An Acquirer which imposes a Surcharge would be at a competitive disadvantage with FIs that may not impose a Surcharge, since the Acquirer's service to Cardholders would be more costly". In fact, in a free entry equilibrium, all ABMs will be pricing at average cost, but costs will be different for different ABMs. The source of the difference may be low volume, or the logistical costs of servicing ABMs in remote or high cost locations. Acquirers entering with new ABMs can adopt two strategies to attract new business. They can find high cost locations that have not been exploited because of the ban on surcharging; or they can "undercut" existing ABMs by offering rebates. I would expect both kinds of entry to occur. Either way, when the market sorts itself out in equilibrium, there will be a more efficient allocation of ABMs. I apply the same reasoning to the deployment of IDP terminals.

Strategic Leverage to Deter Entry by Acquirers - Only

39. Professor Quigley argues, in para 59(iii) of his affidavit, that members of Interac "may find it feasible and profitable to inhibit entry" by acquirers-only, by

pricing fees for terminal use at below their marginal cost. That is, he postulates a strategy by Issuers to deter entry by acquirers-only. Such a strategy presupposes collusion and predation by Issuers. A similar position is advanced by Mr. Morrison.

40. This argument lacks any theoretical or factual foundation.

41. Firstly, because issuance and acquiring are demand complements, there is no incentive, in the model I have described above, for a party with market power in one of the complementary inputs to leverage that power into the supply of the other complement. In short, the party with market power in one of the complementary inputs cannot increase its profits by seeking to monopolize the supply of the other complement, where the latter is competitively supplied. There is simply no reason why the current members of Interac would follow the strategy articulated by the Intervenors' experts, even if the current members collectively hold market power in issuing.

42. Secondly, this argument also presupposes collusion among issuing members of Interac. Standard economic analysis emphasizes the tendency for collusion to break down when agents pursue their self interest. Any issuing member has a strong incentive to cut price from a collusive level and seek a larger market share. In my opinion, therefore, effective collusion by the issuers, as required by the Intervenors' experts' arguments, is unlikely.

43. The scenarios suggested by Professor Quigley and Mr. Morrison are made even less likely by the fact that some of the current Interac members are "net issuers", whereas others are "net acquirers". A net acquirer would sustain losses on the acquiring side, without being able to recover all the losses from its issuing activities.

44. For these reasons, I conclude that these experts' arguments on this point are untenable.

CONCLUSIONS

45. I have reviewed the arguments of the Intervenors' experts on the basis of an economic model, that of a network of demand complements. That model predicts that if there is competition among issuers and among acquirers, the market for shared electronic financial services will be competitive.

46. It is my view that arrangements are likely to emerge that will provide adequate card issuing facilities for the customers of non-FIs who may seek such a facility. It is my opinion that the evidence of these experts systematically overstates the costs and complexity, and understates the benefits, of an indirect card issuing arrangement between FIs and non-FIs. Effective card issuance will, in my opinion, be supplied on a competitive basis under the DCO.

47. I am also of the opinion that effective opportunities will exist for non-issuing entities to enter and compete as acquirers only. I do not accept the hypothesis of the Intervenors that strategic conduct by the current members of Interac could effectively deter such entry. The acquiring business will be competitive, in the environment established under the DCO.

48. Accordingly, the market for shared electronic financial services will be competitive, in my opinion, following implementation of the DCO.

CURRICULUM VITAE

Dr. Roger Ware

December 1995

CURRENT POSITION:	Associate Professor, Queen's University
OFFICE ADDRESS:	Department of Economics Queen's University Kingston, Ontario K7L 3N6 (613) 545 2295
HOME ADDRESS:	352 Victoria Street Kingston, Ontario K7L 3Z3 (613) 544 7043
DATE AND PLACE OF BIRTH:	February 23, 1951 - England
CITIZENSHIP:	U.K. and Canadian (dual)
EDUCATION:	

B.A. Honours (Economics)
Cambridge University
Awarded June 1972

M.A. (Cantab) awarded July 31, 1976

M.A. (Industrial Economics)
University of Sussex, England
Awarded December 1973

Ph.D., Queen's University,
Kingston, Canada, Awarded October 1981

This is Exhibit "B"
to the affidavit of
Dr. Roger Ware
sworn before me this
31st day of March
1996

A Commissioner
Notary Public, etc
133831

POSITIONS HELD:

January 1991 - present	Associate Professor, Queens University
August 1993 - August 1994	Holder of T.D.MacDonald Chair in Industrial Economics, Bureau of Competition Policy, Ottawa
1989 - December 1990	Associate Professor, University of Toronto
1987-88	Visiting Associate Professor, Department of Economics, University of California, Berkeley.
1986-87	Sabbatical Leave. Visiting Research Scholar, Carleton University and National Bureau of Economic Research, Stanford University
July 1986	Promoted to Associate Professor with Tenure, University of Toronto.
1981-86	Assistant Professor (Economics), Erindale College, University of Toronto.
1980-81	Lecturer in Economics, Erindale College, University of Toronto.
1979-80	Instructor, Introductory Economics, Queen's University
1977-79	Various Tutorial and Research Assistantship Positions held, Queen's University.

1975-1977

U.K. Department of Industry, Industrial Policy Analysis and Briefing Division.
Provided advice on government support for research and development, and special assistance schemes for industry. During this period I completed a cost-benefit study of cost sharing support for industrial development projects.

1973-1975

U.K. Department of Industry. Economic Assistant, working on an econometric forecasting model of U.K. trade flows. Promoted to Senior Economic Assistant, October 1974.

AWARDS:

Holder of R. Samuel Mclaughlin Scholarships for graduate studies at Queen's University, 1977-78, 1978-79, 1980-81 sessions.

Awarded a Social Sciences and Humanities Research Council Post Doctoral Fellowship for 1983-84, renewed for 1984-85.

Awarded SSHRC Research Grants, 1984, 1985, 1986, 1987, 1992 - 1995

Awarded an SSHRC Leave Fellowship, 1986-87.

MAJOR FIELDS OF RESEARCH INTEREST:

Industrial Organization:

Competition Policy
Strategic Behaviour
Research and Development
Dynamic Modelling
Trade and Industrial Policy

Public Economics

PUBLICATIONS:

"Limit Pricing in a model with Sequential Entry," joint with Jeffrey Church, forthcoming, *International Journal of Industrial Organization*

"Public Firms as Auditing and Regulatory Instruments," joint with Devon Garvie, forthcoming, *Canadian Journal of Economics.*

"Understanding Raising Rivals' Costs: a Rejoinder" (1994) *Canadian Competition Policy Record*, October.

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"Public Pricing Under Imperfect Competition" (1986), with Ralph Winter, *International Journal of Industrial Organization.*

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Review of Market Structure and Innovation, by M.I.Kamien and N.L.Schwartz (1983), *Canadian Journal of Economics.*

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Three Essays on the Economics of Differentiated Markets (1981), Ph.D. Thesis, Queen's University,

"The Relationship Between Efficiency and Technical change" (1977), in *Industrial Efficiency and the Role of Government*, edited by C.Bowe, HMSO, London.

PAPERS UNDER REVISION:

"A Dynamic Model of Endogenous Trade Policy," joint with Bev Lapham,second revision under review at the *International Economic Review*

BOOKS:

A major new textbook in *Industrial Organization, Industrial Organization: A Strategic Approach*, is under preparation with Jeffrey Church, University of Calgary (about half the chapters are complete in first draft), under contract with Irwin Publishing, Chicago. Expected publication date: Spring 1997.

EXPERT CONSULTING

Acted for BCRL in their successful application to enter the long distance telephone market, 1990-92.

Held the T.D.McDonald Chair in Industrial Organization at the Bureau of Competition Policy, Ottawa 1993-94, and advised the Director on the conduct of many investigations.

ORGANIZATION OF RECENT CONFERENCES

Organized a session at the Canadian Economics Association Meetings, 1992 on "Canadian Competition Policy"

Co-organizer of several Industrial Organization conferences with Tom Ross, both at UBC and Carleton, the most recent was held in the summer of 1994.

Organized a conference held at the Bureau of Competition Policy, March 1995, on Barriers to Entry, with several invited academic speakers.

Co-chair of a Roundtable on "Consumers and the Marketplace for Information", sponsored by the Office of Consumer Affairs, Industry Canada, March 29, 1995.