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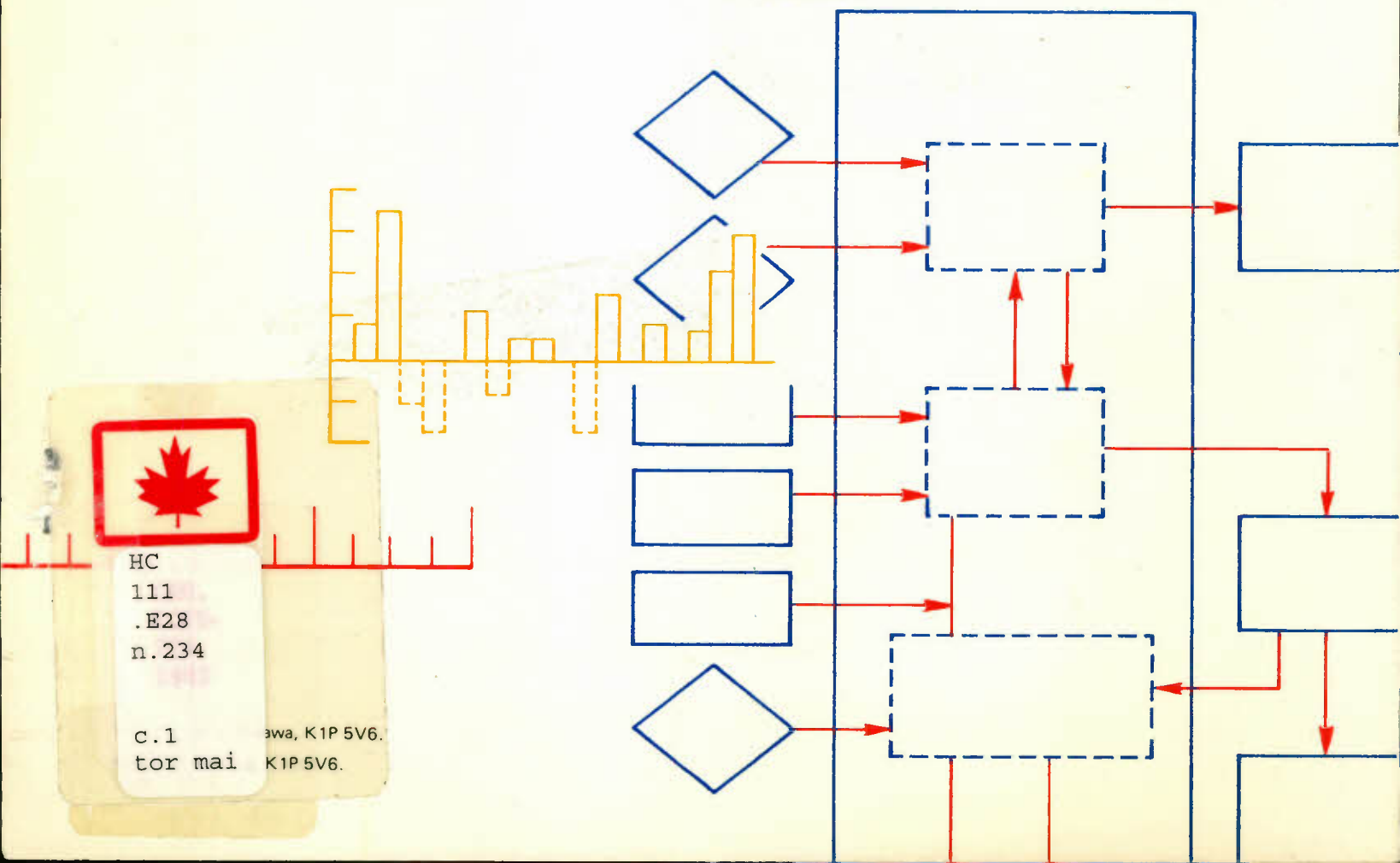

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DISCUSSION PAPER NO. 234

Transportation, Transport Policies and the Future Development of Western Canada

by W. G. Waters II

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RÉSUMÉ

Le présent document donne une vue d'ensemble des questions reliées aux transports et de leur importance pour le développement futur de l'Ouest canadien. Les transports - qu'il s'agisse de l'infrastructure, de l'exploitation ou des politiques publiques - sont considérés comme favorisant le développement économique, et non comme un moteur primaire ou un catalyseur autonome de la croissance.

Dans la première partie, l'auteur examine un certain nombre de questions s'appliquant à tous les modes de transport. Il s'agit des défis que chaque mode aura à relever au cours de la prochaine décennie : la persistance des coûts élevés des produits énergétiques; les investissements importants requis tant dans le secteur privé qu'aux divers paliers de gouvernement; les grandes réformes de la réglementation à l'étude ou en cours; le trop faible niveau des dépenses pour la recherche et le développement.

Les sections subséquentes portent sur chaque moyen de transport particulier. Pour les résidents de l'Ouest canadien, il importe au plus haut point d'assurer que le système ferroviaire qui dessert leurs provinces soit en mesure de répondre à leurs besoins. Malgré d'appréciables gains de productivité, la croissance du trafic a sensiblement dépassé le niveau des immobilisations. D'importants investissements sont nécessaires, mais leur rentabilité n'est pas assurée. La réforme entreprise en vue de remédier aux pertes dans le transport des céréales n'est qu'un premier pas vers la solution des besoins d'investissements des compagnies de chemin de fer.

Le niveau de l'investissement posera vraisemblablement un problème important également dans le cas des autres modes de transport. En outre, les transports aérien et routier font face à la possibilité d'un changement de leur régime de réglementation. Même si les gouvernements fédéral et provinciaux sont satisfaits des politiques de réglementation existantes, le volume considérable des services transfontaliers et les modifications des politiques des États-Unis exigeront certains rajustements dans les politiques canadiennes.

Dans une section distincte, l'auteur examine la croyance concernant l'importance des transports, surtout les tarifs de transport des marchandises, pour le développement économique. Il allègue qu'on a généralement exagéré à cet égard l'importance du niveau et de la structure de ces tarifs. Au Canada, on accorde une attention particulière à la structure des tarifs ferroviaires selon la "valeur du service rendu" (les tarifs étant fixés d'après ce que le trafic peut absorber). L'auteur examine la logique de la fixation des prix en fonction de la valeur du service rendu. Il en vient à la conclusion qu'une telle structure des tarifs favorise une répartition efficace des ressources, pourvu que l'on continue à tenter de rendre les compagnies de chemin de fer financièrement viables, au lieu de compter sur des subventions

publiques pour supporter l'industrie du transport ferroviaire des marchandises. Il ne faudrait pas attendre d'une structure de tarifs déterminée selon la valeur du service qu'elle favorise, parce qu'ils sont socialement souhaitables, des investissements non rentables. Il est probable toutefois que des stratégies d'industrialisation non fondées sur des considérations d'efficacité économique puissent exiger pour leur survie une aide publique plus considérable que ce qui pourrait être obtenu par les politiques de tarifs ferroviaires.

ABSTRACT

This is an overview of transportation issues and their significance for the future development of Western Canada. Transportation -- whether this refers to infrastructure, operations, or government policies -- is seen as playing a facilitative role in economic development, and not that of a prime mover or independent catalyst to growth.

The first part reviews a number of issues relevant to all modes of transport. All modes face challenges in the coming decade: the continuation of high energy costs; major investment requirements face both the private sector and the various levels of government; major regulatory reforms are under consideration or underway; R & D expenditures are below a desirable level.

Subsequent sections focus on each of the modes. The adequacy of the western rail system is a transportation issue of major importance to the West. Despite significant productivity gains, traffic growth has outstripped levels of investment. Major investments are necessary but their financial feasibility is not assured. Reform of the losses on export grain is only a first step toward resolving rail investment needs.

Levels of investment are likely to be an important issue for other modes as well. In addition, both air and road transport face the possibility of changing regulatory regimes. Even if the federal and provincial governments were satisfied with existing regulatory policies, the substantial volumes of transborder traffic and the changing policies in the United States will require some policy response in Canada.

A separate section of the paper examines the long-standing belief about the importance of transportation, especially freight rates, in economic development. It is argued that the significance of the level and structure of freight rates for economic development generally are exaggerated. In Canada, particular attention has focused on the railways' "value of service" rate structure (charging what the traffic will bear). The paper reviews the logic of value-of-service pricing. It concludes that a value of service rate structure is consistent with an efficient allocation of resources, providing the current policy continues of seeking financially-viable railways rather than relying on public subsidy to support the rail freight industry. A value-of-service rate structure cannot be expected to foster uneconomic but socially desirable investments. But industrialization strategies not based on economic efficiency considerations are likely to require greater public assistance for survival than could be obtained via freight rate policies.

ACKNOWLEDGEMENTS

This paper benefited significantly, especially in its formative stages, from discussions with Professor Trevor D. Heaver of the University of British Columbia and Professor Fred Anderson of the University of Regina. While they cannot be held accountable for the end result, their assistance is gratefully acknowledged. Professor Garland Chow of the University of British Columbia also provided valuable comments on an earlier draft. Dr. Neil Swan of the Economic Council of Canada politely wielded the "carrot and stick" to encourage prompt completion.

In an overview paper an author accumulates an unusually large debt to previous writers. The literature on Canadian transportation and transport policy includes many works both fascinating and informative. Not all the references in the bibliography have been cited explicitly in the text. But they have had their influence; therefore I have included them in the bibliography.

TRANSPORTATION, TRANSPORT POLICIES
AND THE FUTURE DEVELOPMENT OF WESTERN CANADA

1.0 INTRODUCTION

Transportation and economic development have been viewed as synonomous in Canada's history. The causal relationship between them is not as simple as much of the conventional wisdom suggests, but there is a definite association. The markets for many Western products lie at considerable distance from Western producers. Also, many Western products are of relatively low value hence transport costs can constitute a signficant portion of the final delivered price. Transportation will play an influential role in the future growth of the Western economy. But just what aspects of transportation and government policies will be the most important are subject to debate.

This essay is an overview of the transportation issues which are likely to be prominent in the coming years. Like any forecasting venture -- particularly one which involves public policy issues -- there is room for debate. No one review can be final. But there is considerable experience and professional literature which can be drawn upon to identify the major issues, to explain what is involved in them, and to comment on the likely implications for the future economic development of Western Canada.

Transportation issues in Western Canada are many and varied. Some deal with the provision or abandonment of infrastructure. Others concern the level of freight rates, passenger fares, or conditions of service. Some issues arise concerning the relationship of one transport price to another. There are environmental, safety, and other social concerns.

Some issues are very familiar, the arguments made 50 or more years ago are still timely today. Branch line abandonment hearings are an example. Other issues are more novel, such as the concern for inadequate mainline capacity on the Canadian rail system. Some concerns involve the complaints of particular shippers about the workings of transportation markets. Other issues reflect more general social or political concerns. Many transport issues arise because of conflicts between commercial considerations and social-political expectations about the transportation system.

There are two major forces determining the allocation of resources: the market or commercial system; and, the public economy. The latter involves a mix of economic and non-economic goals, and the outcome is influenced by the pushing and pulling of various interest groups in society. Transportation often involves 'the Public Interest.' That is a vague phrase but it is important nonetheless. To understand particular transportation policies in Canada often requires knowledge of both the economic and political forces at work. This essay concentrates on the economic side. This is the economist's domain. Economic considerations are important and can dominate public policies, but not always. When particular transportation issues become prominent in the political life of a region or a nation, and emotions run high, the decision process may not be very responsive to logical and empirical arguement. There is more to Canadian Transportation Policy than economics. Nonetheless, this is an appropriate foundation from which to approach transporation issues.

The aim here is not to produce a catalog of all transportation issues and controversies in Western Canada. That would be overly ambitious. The object is to identify the most prominent transportation issues and to indicate which are of special significance for the future development of Western Canada. Some issues may generate considerable controversy and publicity yet they will have little real impact on the future of Western Canada; passenger trains are an example. Some problems may have received little attention thus far yet may prove to be important in the future; the possibility that the market system may not be able to support needed investments in rail infrastructure might be such an issue. Still other issues may be highly visible but significant misperceptions still surround them; an example would be the role of freight rates in inducing economic development.

The next six sections of the paper provide a capsule review of likely trends and developments in transportation. Section 2.0 reviews transportation issues which tend to overlap the various modes of transport. Subsequent sections address issues of particular relevance to specific modes.

Some issues loom prominent in the future development of the West. The adequacy and cost of adequate rail infrastructure is such an issue. But in most cases it is argued that transportation will play a service role to a growing economy rather than act as a fundamental catalyst to the growth process. This is contrary to a good deal of conventional wisdom in the Canadian West. Transportation infrastructure and freight rate policies are credited with a much more deterministic role in the level and

structure of economic development. These are not questions which lend themselves to simple factual verification or rejection. Many arguments can be raised; there is evidence and experience which can be cited on both sides of the issue. No one paper can put all of these disagreements to rest.

Section 8.0 examines the influence of transportation in economic development, with special emphasis on the influence of freight rate structures. The greatest controversy over freight rates and development has focused on railways. Hence there is particular emphasis on understanding the workings of the railways' value-of-service rate structure, and the implications of this pricing system for promoting economic efficiency and industrial development. It is argued that the significance of freight rate structures for economic development are often misunderstood and overemphasised.

One caveat remains before turning to the reviews. A number of issues are identified which are important in transportation. But, as important as they might be for particular carriers or localities, it does not necessarily follow that the outcome is vital to the overall development of Western Canada. But neither does it follow that unless highly-visible economic improvement results, changes which yield more efficient operations are insignificant. Improving performance in the economy is not simply a matter of a few large mega-projects or equivalent high-profile programs. Improving performance, whether in a firm or in the economy as a whole, is the outcome of a broad effort to improve ways of doing things even if only in a small way. To dismiss small improvements while looking for larger ones is a

dubious formula for economic success. This paper speculates that many transportation issues probably are not vital to the overall development of Canada. This is not to dismiss these issues as unimportant, merely that they must be kept in perspective.

2.0 ISSUES OVERLAPPING ALL MODES

The following categories of transportation issues overlap the various modes. The issues are presented in no special order. Subsequent sections of the paper provide an overview of issues of special relevance to particular modes.

2.1 ENERGY

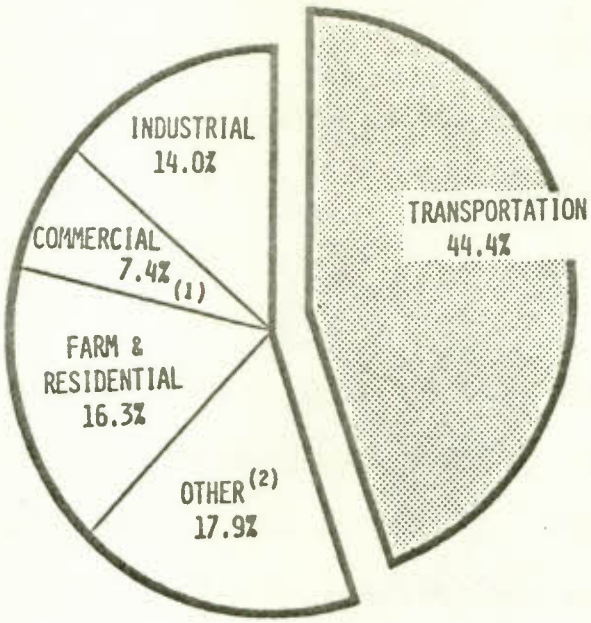
Prominent on a list of transportation issues anywhere in the world is energy use. The transportation industry is a major consumer of the nation's energy supply. Transportation consumes about 44 per cent of Canada's annual use of petroleum (see Exhibit 1). About 70 percent is for passenger transportation, primarily the motor car. Highway transportation is the major energy consumer for the carriage of freight. Dramatic increases in energy costs have occured during the 1970's and the high prices are expected to persist. There are also fears of supply disruption which could result form a high dependency on foreign countries not necessarily allied to western nations. "An energy-conscious future is certain to be transportation's destiny." (Science Council of Canada, 1982, p. 15).

Rising energy costs have hit all modes of transport. The more fuel-intensive modes such as airlines have been hit particularly hard. Fuel costs have risen from about 10 to near 30 per cent of total operating expenses for airlines. Fuel costs are near 20 percent of costs for road transport and are near 10 percent for the relatively fuel-efficient rail transportation. Ironically, a fuel efficient mode, water transport, has also been affected severely; fuel costs often run close to 40 percent of

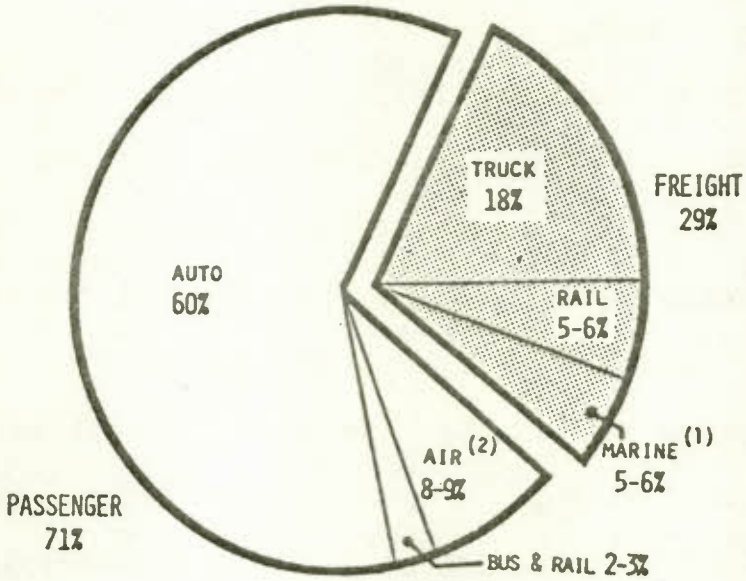
Exhibit 1

Transportation and Petroleum Use
in Canada

CANADIAN OIL CONSUMPTION
1978



OIL USE IN
CANADIAN TRANSPORTATION
1979



(1) Includes marine passenger component.
(2) Includes air freight component

Sources: Statistics Canada, Transport Canada (unpublished data).

Source: WESTAC, "Energy and Transportation," background material for a WESTAC Conference "Fuel for Transportation: Choices and Challenges," Edmonton, Sept. 30, 1980.

total operating costs. Changes in operating procedures and new engines and equipment will reduce fuel consumption for all modes. But transportation is, inherently, a fuel intensive industry. Many other industries can substitute alternate energy sources but these opportunities are more limited for transportation. There is the possibility of electrification of railways. There are possibilities of fuel substitution for urban automobiles. Transportation equipment manufacturers and transportation enterprises are already investing in more fuel-efficient technology. But the prospects for dramatic changes in the energy intensity of transportation are limited.

There are other possibilities for substitution to reduce transportation fuel requirements. "....to save on energy resources, particularly petroleum-based ones, it is necessary to shift passenger travel from air and auto to rail and bus." (Science Council of Canada, 1982, p. 13). But the prospects for this intermodal substitution must not be over emphasized. Different modes offer very different service characteristics which can be quite valuable to users. People may be willing to pay the higher energy costs for the speed and convenience of these modes. There is little evidence to support expectations of significant modal shifts. During the gas rationing in the U.S. a few years ago the major impact was reduced travel rather than substitutions to other modes. Despite several years of rising energy costs there is little evidence indicating significant modal shifts. North Americans are committed to a mobile life style along with production and consumption patterns which overlap regions and countries. Economy measures have been and

will be taken in the face of rising prices for energy,but there is little indication that this will involve radical changes in transport modes.

Improved communications is sometimes touted as a substitute for long distance travel. No doubt this is true in part, but it should also be recognised that more and better communication can encourage travel. Greater interchange of information, products and services generates some essential travel. Even TV phones are no substitute for a handshake or personal confrontation to settle contracts, disputes, etc.. Also, the demand for personal travel has increased more than proportionately with income in recent years. There is no sign of this trend abating.

No doubt future transportation will be more energy-concious than in the past, but not so much more efficient that they can nullify the effect of higher energy costs. Higher transport costs tend to discriminate against high transport cost suppliers, which is much of Western Canada. Transport costs will be a handicap to Western Canadian producers and consumers. But the orders of magnitude of current and prospective energy hence transportation costs are not so great as to cause wholesale revision of the life style and industrial structure of Western Canada.

2.2 ACCESSIBILITY

A major concern of government at all levels is the adequacy of transportation service available to residents. Transportation is a part of social infrastructure. Governments perceive an obligation to monitor the adequacy of transportation available to the public. In the modern competitive transportation industry,

this role of government is less prominent than it was in previous decades when monopoly and possibilities of discrimination were more widespread. The commercial transportation system now reaches the vast majority of people with a standard of service undreamed of only a few decades ago. But there are some markets which may not be commercially viable, yet are deemed socially important. Primarily this refers to service to small rural or remote communities, and sometimes poorer urban areas. The urgency of this function of government is confined primarily to particular regions and localties. In most places, the ubiquitous motor car and public roads bring at least minimal mobility, and communication technology has also made significant strides in recent years.

The adequacy of transportation services will continue to be monitored by governments, but it will become an issue of prominence only in particular circumstances. The most important areas probably will be the adequacy of transportation access for residents of remote communities. Insofar as Western Canada's industrial future lies in resource developments in remote regions, provision of infrastructure for the various modes may become important in the planning and evaluation of these developments. Providing 'adequate' transportation service may be a necessary cost to be borne in these remote resource developments.

2.3 CAPITAL INVESTMENT REQUIREMENTS

There are projections of major capital investment needs for transportation over the next decade or so. Exhibit 2 summarises

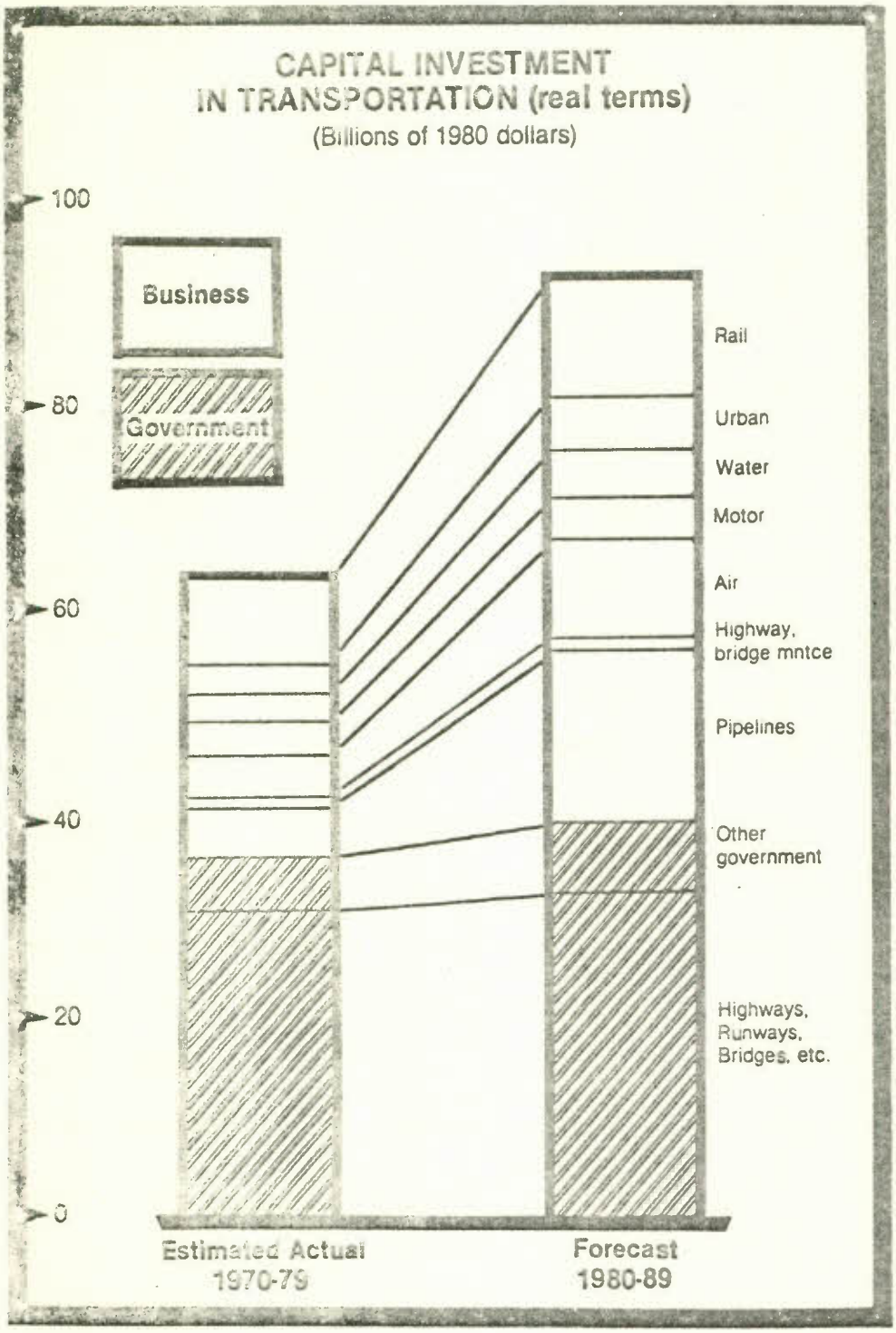
projected capital investment requirements by both business and government over the coming decade. A substantial amount will be spent by the private sector. Airlines face major fleet replacement. Railways will require investments in rolling stock to handle traffic growth as well as to replace older equipment. Major expenditures will be necessary on rail and pipeline infrastructure.

The increased capital expenditures on transportation partly reflect insufficient investment in recent years. Exhibit 3 is an illustration of the aging of the capital stock in transportation, estimated as the ratio of net to gross capital investment.

Governments typically assume primary responsibility for the provision of the infrastructure. The exceptions are pipelines and, in recent decades, rail transport. Apart from some remote areas, Western Canada's transportation infrastructure is extensive. The large land area and varying population densities result in different demands placed on the infrastructure. Some infrastructure experiences very low utilisation, such as many rail branch lines, small airports and rural highways. Other infrastructure components experience heavy utilisation. These include the rail mainlines, urban thoroughfares and transit systems, busy highways and airports. Many of these face problems of congestion and may need costly expansion.

For both lightly and heavily used facilities, much of Canada's transportation infrastructure is aging. There is a growing need for maintenance and replacement as well as needs for expansion. Transportation infrastructure is expensive, especially in mountainous regions and/or very cold climates.

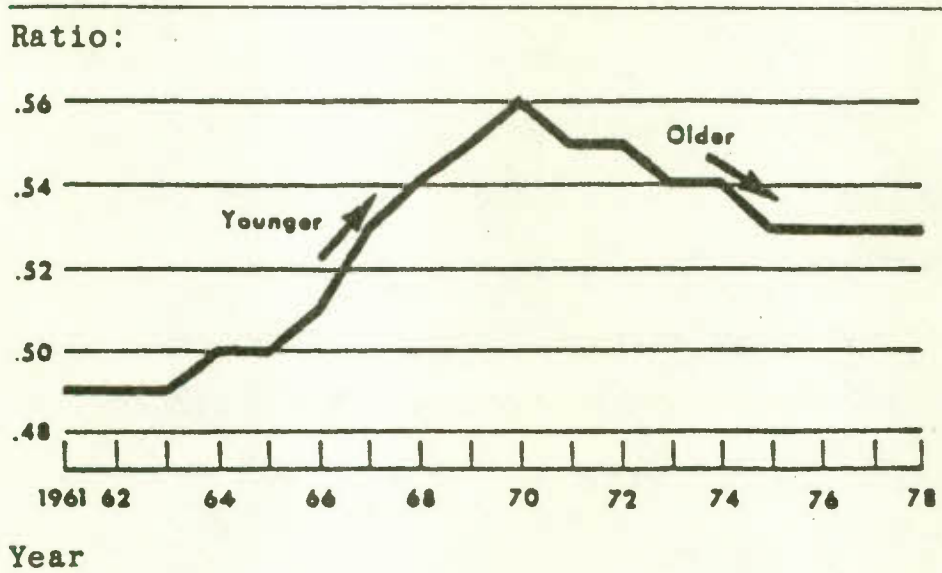
Exhibit 2



Source: WESTAC, "Canadian Transportation Challenges," the WESTAC Newsletter (May-June, 1982)p. 7.

Exhibit 3

- Aging of Capital Stock in the Transportation Services Industry as Measured by the Ratio of Net Stock to Gross Stock



Source: Transport Canada, Strategic Planning Branch, "Transport Canada's Planning Outlook to the Mid 1980's," (Sept., 1981), p. 5.

Major capital expenditures on transport infrastructure by governments will be necessary over the next decade or two. These demands for increased government spending are developing at a time of increasing calls for government restraint. The level and allocation of public funding of infrastructure may prove to be a major source of controversy in the future. Road infrastructure is primarily the responsibility of provincial governments, but there may be increasing pressure by the provinces for federal assistance. There is likely to be pressure for increased user charges to help finance needed road investments. Rail infrastructure has been primarily a corporate responsiility in recent years, but the massive capital requirements may require government involvement in the future. This could take a variety of forms, eg., capital grants, provision of equipment, or tax concessions.

In sum, the provision of transportation infrastructure is likely to be a major source of government spending (and, hence, controversy) in the coming years. Further discussion for specific modes arises below.

2.4 INFRASTRUCTURE AND USER CHARGES

Infrastructure rarely is provided without charge. User charges are levied on those who make use of facilities. Both the level and structure of user charges are a traditional source of controversy in transportation. In many cases, the level of user fees is such that the revenues collected do not cover the full costs of facilities provided. Exhibit 4 summarises the aggregate

cost recovery ratio for road, air and marine infrastructure in Canada, in constant dollars. Rail is not included because their infrastructure is not provided at public expense. The percentage cost recovery is less than unity for all three modes. The cost recovery has increased for air infrastructure in recent years. In constant dollars, the cost recovery for road infrastructure has declined, while that for marine has been fairly constant. However, it must be noted that these are aggregate figures; given the diverse subsectors of each mode, there can be considerable variance in the cost recovery for these subsectors. For example, a revenue surplus is generated at the largest airports in Canada (Baldwin, 1980, pp. 12-15). Because infrastructure is used by different users with different costs associated with their use, the structure of user fees and whether or not particular operators "pay their way" is a constant source of controvery in all modes.

The public provision of infrastructure and lack of full cost recovery has prompted lengthy debates over the efficiency of resource allocation between rail and other modes of transport. This is an important issue in the economics of road and rail transport, but the implications of this situation should not be overstated in terms of the significance for the overall economic development of Canada. Infrastructure costs are only a portion of the total social costs of providing transportation. If user charges are not set at an efficient level the size of the implicit subsidy (or differential tax) on a mode generally amounts to less than ten percent of the final delivered price of

transportation. Exhibit 5 shows some aggregate estimates. Even adjusting for the current costs of infrastructure shows the "subsidy" to be between 10 and 20 per cent. Efficiency in resource allocation can be improved by more efficient pricing of infrastructure. But, except for particular situations, this is not likely to cause massive reallocations of traffic among the modes nor significant shifts in the types of traffic being carried.

It should be noted that full cost recovery of infrastructure is not always expected. One reason is that infrastructure often has a high initial outlay with low marginal cost of use. Economically efficient pricing calls for a low price to encourage utilisation of the fixed facility. Similarly, infrastructure is often provided in anticipation of need. Cost recovery is not expected in early years of use. There is also the reason that transport infrastructure may be supplied where it is uneconomic as a matter of social-political policy, e.g., residents of smaller or remote communities may be deemed to have certain rights to "adequate" transport facilities. The latter rationale would have been relevant to rail infrastructure historically, but in more recent years it is infrastructure for other modes which has been provided at public expense.

There is an unresolved policy issue regarding cost recovery of transport infrastructure. The National Transportation Act requires that "... each mode of transport, so far as practicable, bears a fair proportion of the real costs of ... facilities ... provided ... at public expense." This has come to be known as

Exhibit 4

Air, Marine and Road Infrastructure Cost Recovery: Cash Flow Analysis (percent)

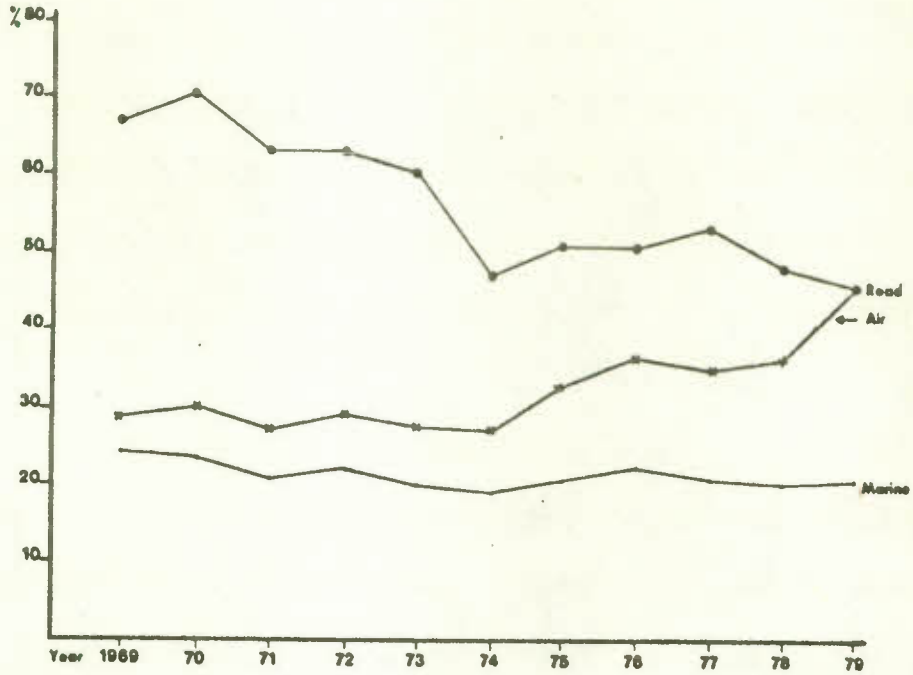


Exhibit 5

Total Transport System (Canada, 1979): Inflation-Adjusted Analysis
(millions of 1979 constant dollars)

Mode	Infrastructure Costs	Vehicle Costs	Total Modal Costs	Modal Costs as a Percent of Total Transport Costs (%)	Modal Deficit[2]	System Revenue/ Cost Ratio(%)
Air	869	3 241	4 110	7	557	86
Marine	1 164	3 476	4 640	8	1 032	78
Road	7 172	38 667	45 839	77	4 419	90
Rail	1 247	3 177	4 692[1]	8	666	86
TOTAL	10 452	48 561	59 281	100	6 674	89

[1] Includes $268 million in corporate taxes.
[2] Air includes $2.0 million in direct subsidies to regional air carriers.
Marine includes $118.8 million in contributions for ferry and coastal passenger and freight services.
Road includes $48.9 million in direct subsidies paid under the Atlantic Region Freight Assistance Act and $436.0 million in subsidies for urban transit.

Source: Transport Canada, Strategic Planning Branch, "Transport Costs and Revenues in Canada, 1969-1979, pp. 55,58.

the "user pay" principle. But as Exhibits 4 and 5 have shown, revenues from user fees are not covering the full costs of infrastructure. The Federal Government has significantly increased the level of cost recovery for air transportation, but the percentage of infrastructure costs recovered from marine and highway infrastructure has declined. As noted, economic efficiency does not necessarily call for full cost recovery; and infrastructure provided for social or political reasons is not necessarily to be financed by other transport users. But no explicit policy has been articulated to give guidance to government departments charged with provision of infrastructure and charging for its use. This leaves an inconsistency or, at least, an ambiguity about one component of transport policy in Canada. This is further complicated because different levels of government -- federal, provincial and local -- have jurisdiction over different transport infrastructure.

2.5 REGULATION, COMPETITION AND THE SUPPLY OF TRANSPORTATION

The supply of transportation generally involves a mix of the market system and public involvement. The latter can entail direct investment in facilities, regulation of private carriers, and, occasionally, direct operation by crown corporations. The role of government in provision of infrastructure has been mentioned and will be discussed further. Canada appraches the mid-1980's with some debate over the appropriate extent of government intervention in the commercial supply of transportation. The U.S. is vigorously pursuing deregulation; the interest

in deregulation has spilled across the border. Some deregulation is almost inevitable. The continued growth of markets and the wide range of options in the transportation industry, including private carriage by large shippers, make it futile to try and monitor and direct the details of such a diverse industry. On the other hand, Canada remains a less densely-populated country than the U.S., and with significant expectations that transportation must supply services to small markets, remote communities, etc.. The public interest in Canadian transportation is not limited to monitoring competition in large markets, but also ensuring socially acceptable minimum levels of service to many markets. Where such services are not commercially viable, or only marginally so, public intervention may be sought. There is disagreement over how significant these social concerns are in Canadian transportation, and whether regulation or some other policy mechanism is the most appropriate means for dealing with them. (Most economists would answer the latter question negatively, e.g., Heaver and Nelson, 1980, and Stanbury and Lermer, 1983.) But the point is, the enthusiasm for deregulation has not been as strong in Canada. It is likely that there will be continued controversy over the type and extent of transport regulation (or deregulation) which is appropriate in Canada.

The U.S. experience with deregulation is significant for Canada in two respects. First, it is inevitable that ideas cross the border. This has been mentioned. A second and more controversial item is the potential extra-territorial reach of U.S. anti-trust (anti-combines) laws. This is not a settled

issue yet, but if U.S. deregulation makes price and service agreements among carriers illegal (i.e., removes anti-trust immunity from rate bureaus), this can affect Canadian carriers doing business with the U.S. The U.S. anti-trust laws are far more rigorous than Canadian statutes. Unless the two countries have quite similar regulatory frameworks, there may be unavoidable clashes in the trans-border trade. It is too early to tell at this time, but this could become a source of considerable controversy for all the modes in the coming years.

The laissez-faire philosophy has never been held as strongly in Canada as in the U.S.. There are many who believe some government involvement in Canadian transportation is unavoidable. However, to acknowledge the principle for government intervention is not sufficient for specific policy guidance. The deregulation movement arose in large part because of widespread dissatisfaction with the economic performance of regulated industries. Insofar as deregulation could encourage greater efficiency and lower transport prices, this would be a welcome force to offset other tendencies to increase transport costs such as rising energy costs and/or high cost infrastructure. Maximising the economic performance of transportation will be important for the future of Western Canada. This requires efficient and timely provision of infrastructure and efficient operation by carriers. Some government involvement may be desirable. But economic performance is not always the most important consideration in public action. The potential costs of regulation have been well-documented. How to reconcile desired

public action with the need for private initiative and performance in supplying services will remain an important challenge for transportation and the development of Western Canada.

2.6 SAFETY AND ENVIRONMENTAL CONCERNS

Safety and environmental issues have been prominent reasons for public involvement in transportation. These are not new concerns and there is no indication that they are becoming less important. Quite the contrary, more and more people are traveling and a greater number of products are being moved. The travel and transport have to be concentrated where people live which is, increasingly, in densely-settled urban areas. Further, concerns for safety and environmental issues appear to be a "luxury good," i.e., the importance of these matters rise with personal incomes. Thus it is likely that these issues will be even more prominent in future transport policy debates.

It is impossible to eliminate risks but tradeoffs exist. Safety and environmental issues generally involve externalities or other types of "market failure", hence government action is appropriate. When specific safety or enviromental concerns become a matter of widespread public concern there are dangers of overreaction. It is easy and politically tempting to promulgate strong laws and regulations regarding highly-visible public concerns. But such actions often impose less visible but high costs of conforming to the regulations and these costs may be worth more than the actual reduction in risks. Improving our

ability to carry out risk benefit analyses or equivalent and putting them into practice may be important for efficient transport decision making in the future.

2.7 RESEARCH AND DEVELOPMENT

The adequacy or inadequacy of research and development (R&D) in Canada has been a topic of concern for many years. This is especially true in transportation. Given the importance of transportation and transportation equipment manufacture to the Canadian economy, the productivity of these sectors are important to the long term growth of the Canadian economy. Increasing the amount of R&D in transportation (and other sectors) has been a stated policy aim of government for some years. But the amount of spending is considered to be very low.

> Over the last several years...the Canadian commitment to Research and Development (R&D) has generally not been sufficient to ensure the timely development of new tchnologies to help address system problems as they arise. For example, in current dollars:
>
> - total transportation R&D expenditures increased from $177.1 million in FY 1975/76 to $230.9 million in FY 1979/80, while the percentage these expenditures contributed to the Transportation National Product (TNP) decreased from .72% in FY 1975/76 to .62% in FY 1979/80;
>
> - industry's share increased from $89.2 million in 1975/76 to $155.0 million in 1979/80, while the federal government's R&D expenditures decreased from $81.6 million to $67.2 million during the same period.
>
> Of major significance is the discrepancy in modal distribution. Air, which dominated national transportation R&D spending, accounted for 68% of the expenditures, while rail and highway accounted for just 2% and 10%, respectively. Expenditures on rail R&D amount to less than 0.05% of rail revenues. (Transport Canada, 1981b, p. 69).

In 1980, the Federal Government Ministry of State for Science and Technology identified transport as one of five sectors for priority attention in R&D (Transport Canada, 1981b, p. 70). The government aim is to increase private sector spending on R&D even more so than via direct government expenditures on R&D.

> The federal-industry priority thrusts for Transport R&D in the 1980s are rail freight, Arctic marine, urban and pipeline transportation and energy transportation, substitution R&D. Emphasis within these thrusts will be communications and control, safety...and intermodal technology. (Transport Canada, 1981b, p. 70-71; see also Science Council of Canada, 1982).

It is hazardous to speculate on what is the most promising or important areas for R&D because of the inherent uncertainty which surrounds these endeavors. The rail freight and pipeline technology would appear to be the most important topics identified for Western Canada. Beyond this it probably is not wise to speculate on promising areas for R&D in the tight confines of this paper. Transportation is an important part of the Western economy as it is for all of Canada. The low level of R&D expenditures on transportation is a concern shared by all Canadians.

2.8 TRANSPORT PRICING AND ECONOMIC DEVELOPMENT

The price of transportation services can influence the prospects for development. This is true for all modes, but the greatest attention paid to this issue has arisen with rail transport. Railway rate making has been a perennial source of controversy in Canada. The debates over efficiency versus equity, alleged discrimination, and possible impacts on regional

economic development are legion. The political economy of freight rates in Canada has been summarised eloquently as "The Railway Age Ideology" by Howard Darling (1974). These traditional debates lay dormant the past few years. The pricing freedom to railways under the 1967 National Transportation Act has largely eliminated the regulatory forums where freight rates, levels of service, and relative rate levels could be publically debated. But old fears and suspicions persist that transport prices, especially railway rates, are intimately linked to economic development -- or its absence -- in Western Canada. This is an important topic and is taken up in the final section of the report. It is argued that the impact of transport pricing on modern economic development has been grossly exagerated.

3.0 RAIL TRANSPORTATION ISSUES

The major transportation issues facing Western Canada can be identified with rail transportation. This has long been the case. However, it is important to recognise that the number and diversity of rail-related issues are fewer now than in the past. Except for local freight and passenger movements, the railway once dominated all forms of passenger and freight movement in the West. This is no longer true. Rail transportation remains the dominant carrier of bulk commodities which are the major economic base for much of the West. (But even for bulk materials, oil and gas pipelines provide many of the tonne-kilometres of Western transportation.) Substantial freight is moved by highway trucks over extensive road networks. The growth of trucking (and other modes) reflect both a diversification in the Western economy and greater specialisation among transport modes. The proliferation of high quality roads and trucking services, combined with the ubiquitous motor car, have transformed life styles, shipping points, types of commodities consumed, and the whole way of life in Western Canada (e.g., Anderson, 1981).

3.1 RAIL PASSENGER SERVICE

One perennial source of controversy with high visibility but of little fundamental importance to the future of Western Canada is rail passenger service. Once it was the communications link and lifeline which bound diverse regions together as a political entity. It has become a remnant of its former self now used mainly -- but still sparingly -- by tourists and recreation

travel. In Canada, as in most other countries of the world, rail passenger service survives only by government edict and subsidy. There are only isolated situations where rail passenger service is of fundamental importance to the economic well-being of a community; railway hotel and recreation complexes in the Rockies are the main example. And even in these cases there is alternate access for users.

In brief, the arguments for continuation of rail passenger service have little to do with economics. Passenger trains are a part of our national heritage and many would feel a loss at their demise. The abandonment of passenger service would cause some localised economic impacts. Various interest groups lobby for the preservation of rail passenger service. The relative political strength of these various interest groups are likely to determine the survival of passenger trains. Whether they survive or not is of limited consequence for the future economic life of Western Canada. The chief ecomomic impacts of continued rail passenger service in the West are the opportunity costs of government finances used to support rail passenger operations, and the opportunity costs of tying up rail capacity which could otherwise be devoted to freight traffic. These opportunity costs are of increasing importance to Western Canada.

3.2 GRAIN TRANSPORTATION

Among the most visible of Western transportation issues are the complex array of controversies and problems which surround the grain handling system. This includes the controversial "Crow

Rates" on grain and the various distortions and problems traced to these unremunerative rate levels. The problems facing Western Canada's grain handling system are not just a function of the existence of the Crow rates. There are the complex institutional arrangements which surround the collection, storage and shipment of grain. There are branch line controversies.

The fundamental problems facing the grain handling system are three. First, the system is full of inefficiencies. This is not surprising given the persistence of an uneconomic rate which applies throughout the system. There are few incentives and opportunities for participants to make local improvements. Second, the system is deteriorating. Existing subsidy programmes have not prevented deterioration of many branch operations and much equipment. Nor have existing subsidy programmes contributed directly toward upgrading and rationalisation of the system. Third, the future adequacy of mainline capacity is of concern. The possibility of inadequate mainline capacity is a problem shared with non-grain traffic, but grain is one of the largest commodity movements on the rail system hence the grain industry probably has the greatest interest in the adequacy of the system.

The complexity of issues surrounding the grain handling system cannot be reviewed adequately here. There have been numerous studies and investigations; major Federal initiatives are under consideration at the time of writing. The present discussion can only highlight the existence of various grain transportation problems and their signficance for the future development of Western Canada.

Two caveats should be stated at the outset. The first is that despite the immense publicity and controversy about the inadequacy and deterioration of the grain handling system, it should be recognised that its performance has been improving. Rationalisation is taking place. There are far fewer grain collection points than there once were. Commissions of inquiry and inter-governmental committees have succeded in reducing factual disagreements and clarifying alternatives. Railways and port operators have turned in impressive performances despite the obstacles which face them. Much remains to be done but it would be unfair not to acknowledge the progress which has been achieved thus far.

The second caveat is that the grain handling system is discussed here under the heading of rail transportation. But it also involves road and water transportation, either or both of which may increase in importance in the future. Ideally, the grain handling system should not be thought of in terms of transportation modes but as a transportation system. Indeed, non-transportation agencies also can have significant influence on the grain transportation system, e.g., the number of wheat grades used by the Canadian Wheat Board affects grain handling and transportation.

Although there is more to grain transportation than the statutory Crow rates, they are the focal point of problems and potential improvements to the grain transportation system.

There is little to be gained here by a detailed review of the specific problems associated with the Crow rates. That they

uneconomic is beyond dispute. That they cause a lack of incentive both for railways and producers to rationalise the system is well-recognised. That something must be done is universally recognised. But there remains disagreement on exactly what should be done and who should pay for it. The Gilson Commission (1982) and subsequent Task Forces and Working groups diligently sought compromise and agreement among the various groups involved in the grain and its transportation. The disparate interests affected by the Crow rates and grain transportation have proved too great to achieve unanimity, but sufficient agreement has been reached for the Government to announce a major initiative to reform the Crow rates (Government of Canada, 1983).

At the heart of the Crow rate problems has been the fundamental inconsistency between the fixed rate and the incentives for efficient transportation management. A major economic function of prices are to provide signals for resource allocation. Profitable operations are signals for expansion of that service; unprofitable results are a signal to cutback or eliminate services. It has long been an implicit tenet of Canadian transport policy to rely as far as possible on managerial discretion in providing transportation services. Even crown corporations such as Air Canada and CN are given wide latitude for decision making. It probably is safe to say that most Canadians share a preference for decentralised management in transportation so long as this does not contradict explicit public policy objectives. The Crow rates are probably most

distinctive exception to the principle of management freedom in Canadian transportation. Even where rates are highly regulated there is significant freedom for management to propose changes and/or alter conditions of service. But the Crow rate is rigid. And the inefficiencies bred by this rate have led to growing government involvement in grain handling and transportation in an attempt to offset the various distortions caused by these rates. Decisions on branch line abandonments, allocation of railway cars, provision of grain cars, the repair of grain cars, increasingly involve public agencies. And the list is likely to grow unless significant reform comes about.

A complex institutional framework has grown up to oversee the grain handling system. A restructuring of this institutional framework will also be important for improving the efficiency of grain transportation. Various proposals exist and the reforms of the grain handling and distribution system will depend on how the Crow rates are changed. As mentioned, a blanket uneconomic rate leaves no room for negotiation among producers, shippers, and carrier management for local improvements to steamline parts of the system. Administrative fiat is necessary because commercial negotiations are not free to work. There are various alternatives for improvement. The specific proposals are not reviewed here but a major implication must be mentioned. The long term prospects for growth in the grain industry are affected by how well the grain distribution system can be controlled and managed, and this is not just a function of how much investment is made or level of rates charged. The performance of the

Canadian grain handling system is of fundamental importance to Western Canada. Despite all of the interest in potential industrial diversification of Western Canada, this does not alter Canada's comparative advantage in grain production. With growing world populations, there are high prospects for increased Canadian grain exports. Whatever other industrial options are available to Western Canada, grain production, especially for export, will continue to be a major economic base. The level of economic activity in this traditional economic base of Western Canada will be influenced significantly by the efficiency of and prices and service conditions in grain transportation.

The fact that there has been public involvement in the grain handling system in the past, and the economic and social significance of grain transportation to the West and all of Canada, indicate a continued involvement of the public sector in the grain handling system.

This could entail a variety of forms. The Federal government has proposed a statutory commitment in excess of $650 million per annum (the so-called "Crow benefit") in lieu of continuing the patchwork policies necessitated by the Crow rate. However, the Federal Government's initiatives of early 1983 have not become law at the time of writing. Therefore it is inappropriate to attempt specific discussion of the likely outcomes of the proposed legislation. To say that it will be a needed change is an understatement. It would be the all-important first step toward reforming the Crow rates and, ultimately, the whole grain transportation system. Initial

phases will channel some funds directly to the railways. This will enable them to initiate major expansion and upgrading. The grain rates would begin to rise. This is a step toward a more rational system. As rates rise this will increase incentives to make economic decisions about the use of the grain transportatin system. But there will be many problems to be worked out. A complex administrative structure is still necessary, and it may become more complex as the proposed Grain Transportation Agency comes into being. It is too early to speculate on the ultimate outcome of the initiatives. But without doubt it will be a move to facilitate the long term improvement of Canada's grain transportation system.

3.3 RAILWAY BRANCH LINES

Railway branch line issues merit brief mention. They are a part of the problems facing the grain handling system. The issues in branch line abandonments are of primary interest to the Prairie provinces, particularly Manitoba and Saskatchewan. The issue of branch line abandonments focuses attention on a type of issue which involves the public sector in all transport modes. This is the public concern over the importance of transportation facilities -- whatever mode and type -- for the economic well-being of communities and regions. The objections to branch line abandonments are not a denial that this would be more efficient; it is because it is feared that their disappearance would signal the demise of rural communities. They are social-political factors which call for continued operation of

these lines. This is in spite of substantial evidence that these branch lines rarely play a fundamental role in the vitality of a community. The coming of good roads and the motor car undermined the focal point of local communities on the town elevator. At worst the closing down of elevators and branch lines (which are not synonomous by the way) may hasten the decline which is already underway in a community. In rail branch operations as in other modes, the withdrawal of transportation service is more likely to be the symptom than the cause of community decline (eg., the "Hall Commission", 1977, pp. 75-84; for circumstances where rail abandonnement and community decline are related, see Maloney, 1982).

3.4 RAILWAY CAPACITY, FINANCE AND MANAGEMENT

A topic which has received recent publicity is the prospect of inadequate capacity on the western rail mainlines. Already the mountain divisions of CP and CN constitute a heavily utilised single track operation. The projected traffic growth indicate that traffic will exceed operational capacity of both railways in the next few years. Exhibit 6 shows recent and projected rail traffic by commodity for the mountain divisions of the trans-continental railways. Both railways forecast inadequate capacity. This is illustrated in Exhibit 7. Massive investments will be required, perhaps so large that the commercial viability of these investments may be in doubt.

Rail investment in mountainous regions is always costly. What makes projected capacity expansion in the Rockies particularly expensive is that the rail system has already been upgraded

Exhibit 6

Existing and Projected Traffic
on Western Main Lines

CP Mountain Subdivision

Net Ton Miles Per Mile

(millions)

	1980	1986	1990
Coal	10.5	31.9	36.2
Grain	4.2	5.9	6.3
Potash	0.6	2.5	3.6
Sulphur	2.2	2.7	2.6
Forest Products	1.3	1.7	1.4
Other	5.8	8.1	9.3
Total - NTM	24.6	52.8	59.4
- GTM	41.8	89.8	101.0

CN - Red Pass to Swan Landing

Net Ton Miles per Mile

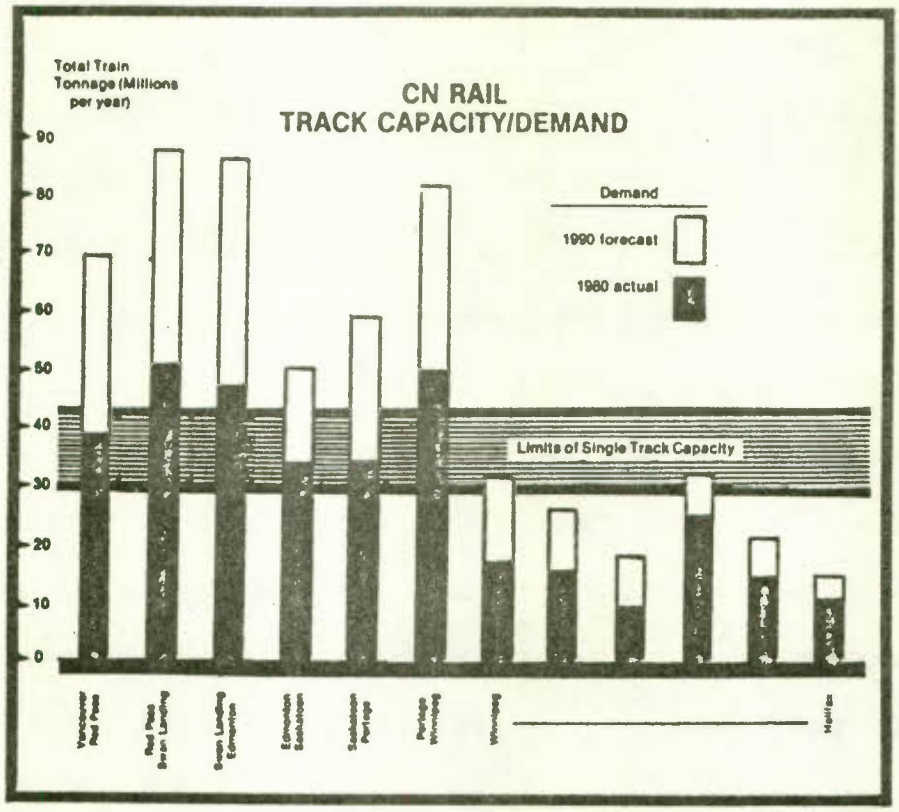
(millions)

	1980	1985	1990
Coal	5.3	12.3	14.3
Grain	6.3	6.3	10.0
Potash	3.4	4.9	7.8
Sulphur	3.7	4.0	4.0
Forest Products	6.5	7.5	8.4
Other	2.9	3.5	4.9
Total - NTM	28.1	38.6	49.4
- GTM	50.0	67.0	86.0

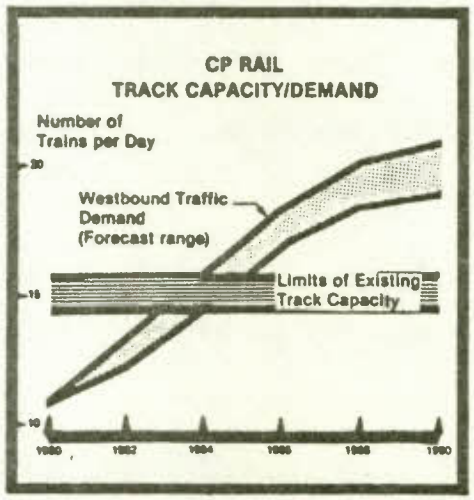
Source: COFI (Council of Forest Industries of British Columbia), "Presentation to the Action Meeting on ' Canada's Crisis in Rail Transportation Capacity,'" Coal Association of Canada, Vancouver, August 6, 1981.

Exhibit 7

Western Rail Capacity Limits



Source: CN Rail



Source: CP Rail

Source: WESTAC, "The Crisis in Rail Capacity and Financing," WESTAC Briefing (October, 1981) p. 4.

significantly. The less expensive solutions for increased capacity have been undertaken. Sections have been double-tracked where this was not too costly. Sidings have been added to facilitate "meets and passes." But there are practical limits to single track operations. Once utilisation approaches this practical capacity limit, the next step is to double-track a significant part of the system, i.e., a quantum increase in system capacity. There is a discontinuity in cost-output relationships. Average and, especially, marginal costs rise sharply as utilisation approaches capacity. Once the quantum increase in capacity is provided, marginal costs fall drastically as now there will be more than sufficient capacity to handle the traffic. Rail management must focus on the financial viability of this investment. For some time, both railways have expressed concern that projected rail revenues fall short of providing sufficient funds for immediate capacity expansion needs.

Legislation is under consideration to revise the Crow rates. This will result in a significant increase in flow of funds to the railways. Both CP and CN have announced significant capacity upgrading contingent on the increased availability of funds. But it is important to note that incremental revenue associated with the Crow rates basically is compensation for existing losses, and not necessarily surplus revenue exclusively available for mainline expansion. The railways propose to use the funds for the latter purpose. But bear in mind that much of the rest of the grain transportation system has been deteriorating and it will need investment too. And even if Crow rate reforms are able to fund current expansion needs, continued

traffic growth will require still more investments. The source of funding for these further investment needs is not so clear.

This question of the financial viability of western mainline expansion is a matter of speculation. But the size of expenditures which may be required, and the limited rail rates of return earned despite considerable pricing freedom for the railways, do raise a question about the financial viability of western mainline upgrading. Given the importance of the rail system to the West and to the rest of Canada, rail expansion is almost a certainty. If corporate revenues should prove insufficient, some sort of public involvement probably is inevitable.

Although the early construction of rail infrastructure was assisted significantly by government, in recent decades the railway companies have had primary responsibility for the provision of rail infrastructure. This differs from road, air and water transportation where private companies make use of publicly-provided infrastructure, albeit with user charges imposed. As mentioned, given the sizeable rail investments needed over the next decade or so, and the limited cash flow being generated by the railways, it may be that public support will be necessary to help finance expansion of western rail infrastructure. This would not be unusual historically, nor out of character with the treatment of other modes. But it would be unusual in the recent history of Canada's railways.

The railways have been able to make nearly all their investment and pricing decisions with considerable autonomy. What public support that has been received has come through

"arm's length" payments for specific unremunerative services required by government. More active government support for rail investments would, no doubt, compromise rail management autonomy. This could be important. The Canadian railways have thrived in comparison to other North American railways. They have managed to achieve modest financial returns and impressive productivity increases. This performance is associated with the managerial independence which accompanied the deregulation in the 1967 National Transportation Act (e.g., Caves, et al, 1982; Heaver and Waters, 1982). If public support for infrastructure expansion becomes necessary, this could pose a major challenge to try to reconcile conflicting desires for managerial autonomy but with public accountability.

Rail management face quite a challenge in maintaining the high productivity increases achieved through the 1960's and 1970's. The observed high performance which accompanied managerial freedom in rail rate and service decisions came about during a time when massive upgrading of infrastructure was either unnecessary or could be achieved at relatively modest cost. "Railway main lines have historically been more than adequate to accommodate major traffic growth without major changes and investments." (Mulder, 1980, p. 24). Many parts of the system had excess capacity; where investments in track and rolling stock were necessary, they could be financed from revenues generated by traffic carried. Rail loadings increased 90 percent between 1965 to 1978 (Mulder, 1980, p. 22). Yet, railway investment in structures was running about 1 percent per year (Caves, et al, 1982, p. 134). It was inevitable that such traffic growth would catch up to capacity.

Now that the overall mainline system is being utilised intensively and encountering capacity limits, the railways are in a situation of rapidly rising costs. This is a quite different decision-making environment from when there was always room for more traffic with only modest investment required. Now railways must be more selective about traffic; system-wide effects of incremental traffic are more significant. This may necessitate more centralised control by rail management over rates and traffic development. Pricing and marketing personnel cannot have as much freedom as before. More reviews are necessary, and controversy and conflicts can arise among rail management over balancing their abilities to serve various customers. This is a different management environment than the more free-wheeling era of the recent past. The high performance achieved by rail management speak well for the recent rail pricing framework. But circumstances may be changing. Canada still needs efficient rail management, perhaps more than ever. But under congested conditions, it is a more centralised management environment, paying more attention to system effects of individual traffic decisions. The need for greater coordination in accomodating (and rationing) traffic demands could also result in pressures for greater government involvement. Already the railways have indicated that public involvement will be desired if shortages of capacity necessitate rationing of mainline capacity. This is in addition to likely public involvement if public support becomes necessary for financing mainline expansion.

The prolonged recession of 1981-83 has slowed traffic growth and given some relief to pressures on railway capacity. The influx of funds from revamping the Crow rates will enable expansion of capacity. This scenario of reduced traffic growth for a time, combined with adequate funds for immediate expansion needs, could relieve prospective capacity shortfalls in the near term. This could relieve the aforementioned tendency for greater centralization over pricing and traffic solicitation.

In sum, the adequacy of western rail mainlines, the efficiency of rail management of congested operations and their plans for expansion, the potential need for public involvement and support for capacity expansion, and the challenge of reconciling a desire for managerial freedom with demands for public accountability, all these threaten to be prominent issues in western rail transportation for the coming years. While the importance of transportation for economic development can be debated (and is in section 8.0), there is no doubt that inadequate capacity and/or inefficient operations can hamper economic growth. If the demand for western rail traffic grows as predicted, the performance of the Canadian rail system will be a vital factor in the future economic growth of Western Canada.

3.5 RAILWAY PRICING AND ECONOMIC DEVELOPMENT

Controversy over railway rates probably is as old as railways themselves. Disputes over railway rates were so prominent in our history that Darling labelled the twentieth

century up to the National Transportation Act as "the Railway Age Ideology" (Darling, 1974), so called because of of the extreme belief which came to be accorded to railway rates as an allegedly vital factor explaining the pattern of economic growth -- or its absence -- in Western Canada.

Some railway pricing concerns are shared with other modes, e.g., fears of monopoly pricing in isolated markets. The reasons for greater attention to railway pricing are twofold. All modes share a common feature that a multiplicity of services are provided simultaneously (pipelines are the exception). For railways, this characteristic is combined with significant capital intensity in production. The result is great difficulty in identifying portions of total rail costs which can be identified with specific services provided. Cost measurement in rail transportation is inherently ambiguous. This means that attempts to compare prices with costs almost inevitably leads to controversy. The second important characteristic of railways is that, historically, they were often in a monopoly position. There may have been grounds for concern that prices could exceed costs substantially and that such prices could be detrimental to local communities.

The monopoly power of railways has been greatly reduced through intermodal competition for higher valued freight, and market competition (competition in the market for the product carried which limits the ability of the commodity to bear transportation charges) for bulk commodities. With the primary and conspicuous exception of the Crow rates, the railways have

enjoyed considerable pricing freedom since 1967. The railways openly practice value-of-service pricing, i.e., charging what the traffic will bear over and above the estimated variable costs of transporting the commodity. This approach to pricing is not new but has been a part of railway pricing for decades.

The railways' ability to practice value of service pricing is more precise today. There are more precise cost measurements and better estimates of the ability to pay of rail customers. That is, the value-of-service pricing framework is potentially more effective today than decades ago. Recognition of the flexibility (discrimination) in railway pricing feeds a long standing suspicion of many that railway pricing somehow interferes with the economic development of the West. The belief is that the discriminatory aspects of the railway rate structure fosters continued dependence on traditional Western industries and interferes with possible industrial diversification. There is some causality here, but it is complex and it is the opposite of the popular belief about rail freight rates and economic development. It is not the railway rate structure which determines the industrial structure of a region; rather it is the cost and market structure of the industries which determines their ability to pay for transportation and, hence, the structure of a value-of-service rate system. This long standing concern about railway rate structures and economic development merits further discussion. It is examined in Section 8.0. It is argued that the workings of a value of service rate structure are broadly consistent with the efficient allocation of resources including promoting efficient industrial development of the West.

4.0 ROAD TRANSPORTATION

Rail remains the dominant mode for moving bulk commodities, a mainstay of much of the western economy. But the importance of road transportation to the Western economy must not be understated. In terms of passenger travel, the motor car dominates the movement of people and has transformed life in Western Canada just as it has in the rest of North America. In terms of freight transportation the greatest diversity of products produced and consumed move by truck. Although railways carry a larger share of tonne-kilometres of freight, the motor carrier is now the dominant mode of freight transport in Canada, in terms of tonnage or, especially, in terms of the value of goods transported and amount of money spent on transportation.

Western Canada does not have the number and size of cities as in the more densely-settled parts of Eastern Canada where road transportation is even more prominent. Nonetheless, the trucking industry will be an important part of the future economic development of Western Canada in much the same role as it plays today. Ceteris paribus, as the number, diversity, and value of goods traded increases, the more important are the service advantages offered by motor transport relative to rail.

The supply of motor transportation involves two basic components: the road infrastructure which is provided by government, primarily provincial, and provision and operation of vehicles by private entrepreneurs. The latter may be large or small commercial companies, owner-operators, or individuals (or corporations) transporting their own goods.

4.1 INFRASTRUCTURE

For the most part, the basic road infrastructure is in place. Because of the lower density of population in Western Canada, the number of miles of road per capita to be supplied and maintained are higher than in Ontario or Quebec. This is illustrated in Exhibit 8. The unusually high Prairie road mileage includes roads not maintained year around. While highways between major centres are well utilised, there are many miles of roads in the West which provide access to those living in low-density areas. Such roads are provided as part of necessary social infrastructure, more as a matter of right than economic justification. In the Prairie farming regions there is the grid road system for rural access. In the ranch lands of Alberta and parts of B.C. there is a less dense road network, but access roads are needed nonetheless. There are also access roads to communities and resource developments in mountainous areas of Alberta and B.C..

The central point is that there is an ongoing burden on provincial governments to supply and maintain a basic road infrastructure beyond what might be justified on strict economic grounds. Both the climate and terrain are harsh in most parts of the West. Further, many major roads and highways have been in existence for many years. This includes urban streets. Some roads, particularly between urban centres, are heavily utilised and warrant upgrading. Other roads are less heavily used but, nonetheless, are ageing. Many of these roads will require major reconstruction and upgrading in the coming decade or two. In

Exhibit 8

Road Mileage Per Capita

Province	1976 Pop. ('000)	Total kms. of roads	Road kms. per capita
B.C.	2,466.6	65,320	.026
Alta.	1,838.0	180,146	.098
Sask.	921.3	206,191	.223
Man.	1,021.5	81,398	.080
Ont.	8,264.5	160,654	.019
P.Q.	6,234.4	113,847	.018
Canada	22,992.6	884,273	.038

Source: Road mileage from Canada Yearbook 1980-1981, Table 15.9.
Population from Statistics Canada, #92-901, Table 1.

brief, it is likely that maintenance and upgrading of road infrastructure will be an important activity of provincial governments in the coming years.

A well maintained road system is a part of a modern economy. A precise connection between this and the rate of growth of an economy probably cannot be established. What causality which exists probably would characterise the state of road transportation as a function of the level of economic activity rather than vice versa.

The need to finance road investment may be linked with another issue. For years there have been debates on the costs of heavy trucks on highways. Although disagreements will continue, the evidence grows that large vehicles impose greater costs on the road system than the user charges imposed on them (e.g., U.S. Dept. of Transportation, 1982). The primary impact is not on direct maintenance costs of roads but reducing the time until major reconstruction is necessary. Much of the evidence regarding vehicle weights and road costs is based on studies in warmer climates. The relevance of these findings in colder climates can be debated. Nonetheless, there is the prospect of increasing attention being paid to the size of user charges for different weight vehicles. This will be especially so as provinces need to allocate greater expenditures on road upgrading and rebuilding.

4.2 SAFETY AND ENVIRONMENTAL CONCERNS

The environmental consequences of motor vehicles such as air pollution are of lesser importance in most of the West as

compared to areas of higher population density. Residents of Western Canada share the common concern over high energy prices. But there is no substitute for the motor car in low density areas. No reasonable cost form of public transport can provide comparable quality of service to that of the motor car.

An issue which may receive greater attention by governments in coming years is that of highway safety. This includes both the standards of highway design (e.g., guard rails) and safety programmes directed at the driving public. Seat belts are now mandatory in British Columbia. The high economic and social costs of motor vehicle accidents are becoming more widely appreciated. This is especially important because young adults -- those for whom society has already invested in education and their productive years lie ahead -- are disproportionately represented in traffic fatalities. The return on investing in reducing road fatalities appears very promising in comparison to alternatives such as the costs of medical facilities and research. The measures which could be adopted are diverse. They could include more driver education (although the effectiveness of these programmes is questionable, e.g., Maag, 1982), crackdowns on drinking drivers, enforcing seat belt use, as well as improving highway design features.

4.3 THE SUPPLY OF ROAD TRANSPORT SERVICES

The supply of road transport services includes both passenger and freight transportation. Regarding passenger travel, the motor car dominates passenger travel in the West as it does

elsewhere, and this is unlikely to change. There is also interest in the financial viability of bus transportation, both in urban and rural areas. Buses are the alternative to those without access to cars. In most areas bus transportation has survived with little or nothing in the way of public subsidy. Provision of bus service has been and will continue to be regarded as very important in providing a minimum standard of mobility/accessibility to communities. Also, bus service to small communities normally supplies package freight as well as passenger service.

Declining and growing communities each generate issues concerning motor transportation. There is a tendency for many smaller communities to stagnate or decline. Their bus and freight transportation services may become no longer commercially viable. Governments will come under pressure to try and prevent abandonment of service. The arguments will be made that arresting the decline of freight and passenger services will arrest the decline of the community. But that would be a rare exception. It is the decline of communities which results in declining demands for service which generally explain the reduction of services supplied.

For communities which are growing, the problems are different. The market system can be relied upon to provide freight service, and the same generally is true for inter-city passenger service. But local bus transportation will require subsidy if it is to survive, and growing towns need growing bus service. Bus transportation in towns and cities continues to be

important, both as a designated social service -- providing mobility to non-car users -- and for economic reasons -- the benefits of buses are the reduced congestion which would result from greater use of cars. The latter is a classic example of an externality. The main beneficiaries of buses in congested areas are the motorists who do not use them. But these real benefits are not manifested as farebox revenues. Public intervention and subsidy is necessary to provide an economically efficient level of service.

Concerning road transportation generally, there are various changes developing. Motor freight carriers and inter-city bus transportation are still adapting to higher fuel prices. This is a fact of life that transportation companies everywhere must adjust to. Perhaps more important is the growing debate over deregulation of transportation markets. Deregulation of trucking (and other modes) is well underway in the U.S. and pressures exist in Canada too. Different provinces have held quite different attitudes regarding competition and regulation in motor transportation.

> "...the Canadian trucking industry is controlled by ten different regulatory boards acting under ten different sets of regulations and procedures. The severity and enforcement of regulation varies between type of movements (intra versus extraprovincial), types of service, and type of commodity. To say that motor carrier regulation in Canada is complex is almost an understatement." (Chow, 1983, p.46).

Exhibit 9 summarizes the extent and type of trucking regulation across the provinces. In the West, Alberta's basically unregulated environment contrasts sharply with the restrictive regulatory regimes of Manitoba and Saskatchewan.

Exhibit 9

Regulation of Canadian Trucking

	Intraprovincial				Extraprovincial			
Province	Entry	Rate Filing	Rate Filing and Approval	Rate Pre-scription	Entry	Rate Filing	Rate Filing and Approval	Rate Pre-scription
British Columbia	Yes	N/A	Yes	No	Yes	No	No	No
Alberta	No	No	No	No	Yes	No	No	No
Saskatchewan	Yes	N/A	N/A	Yes	Yes	No	No	No
Manitoba	Yes	N/A	N/A	Yes	Yes	No	No	No
Ontario	Yes	Yes	No	No	Yes	Yes	No	No
Quebec	Yes	N/A	Yes	No	Yes	N/A	Yes	No
New Brunswick	Yes	Yes	No	No	Yes	Yes	No	No
Nova Scotia	Yes	Yes	No	No	Yes	Yes	No	No
Prince Edward Island	Yes	Yes	No	No	Yes	Yes	No	No
Newfoundland	Yes	N/A	Yes	No	Yes	N/A	Yes	No

Source: Garland Chow, "How Much Longer Can We Live with Regulation of Canada's Trucking Industry?" Canadian Business Review (Spring, 1983), p. 46.

Regardless of the pro and con positions on deregulation, there certainly is widespread interest in standardising the patchwork of regulations which affect inter-provincial trucking. Bcause Part III of the National Transportation Act has not been implemented, Federal jurisdiction over inter-provincial trucking has been delegated to the provinces who apply their intra-provincial regulations. Because the latter differ, this has impeded the development of inter-provincial trucking in the West. Clarifying this situation could assist the Western trucking industry and enable it to play an even more active role in Western transportation.

Section 2.5 above raised the possibility of growing conflict between Canada and the U.S. as the latter emphasizes a deregulated environment. There is a large amount of transborder traffic and carriers serving these trades could be caught between very different regulatory regimes. If the provinces decide to restrict entry to Canadian markets by U.S. carriers, this could rekindle the recent "trucking war" between Canada and the U.S. over freedom of access to markets (Chow, 1983). A more active Federal role in international trucking may be necessary.

4.4 SUMMARY: ROAD TRANSPORTATION AND WESTERN DEVELOPMENT

All aspects of motor transportation -- automobiles, bus transportation, motor freight transporters both commercial and private -- are prominent in the economic life of Western Canada. There are various issues associated with this mode which likely will receive greater attention in the coming years. The

continued growth of traffic and the aging highway stock may begin to necessitate significant expenditures on the road system. There may be pressure to review the size of user charges levied on heavy vehicles. There may be greater emphasis on road safety via closer monitoring of drivers and traffic conditions. The "adequacy" of marginal or unremunerative services such as rural freight and passenger services as well as public bus transportation will continue to be a source of concern to provincial and local governments. There will be pressure for greater coordination of regulations affecting inter-provincial trucking and, if present trends continue, some move toward deregulation probably are inevitable. The general growth and maturity of the road transportation industry and its great diversity of types of services provided make it ill-suited for detailed regulation. There is the possibility of conflict between the U.S. and Canada if their respective regulatory regimes differ significantly.

In sum, the motor transportation industry will continue to play a prominent role in the economic life of Western Canada. But given the already substantial presence of this mode, its role in the future of the Western economy is best thought of as a service function which will grow or stagnate as the economy grows or stagnates. The health and diversity of road transportation will mirror the level and diversity of the Western economy, rather than be a significant causal factor in determining the level and structure of the economy.

5.0 AIR TRANSPORTATION

Like road transportation, air transportation is a combination of publicly-provided facilities and private vehicles which make use of the public infrastructure. And like most other modes, there is considerable diversity in types of services provided. Air transportation is indispensible in a modern economy. No other mode can offer the speed and flexibility although it comes at a higher cost. Air transportation is regarded as an essential service for long distance passenger travel, emergencies, and communication to facilitate political and economic integration.

5.1 INFRASTRUCTURE

For large market centres, the volume of passenger and fast freight is able to support the necessary infrastructure. But much of Canada consists of lower density areas, some extremely so. Air travel makes use of "God-given" pathways, although navigational aids and traffic control necessitate costly high technology. Airport facilities must be constructed. A wide range of air infrastructure is possible. VTOL aircraft (vertical take off and landing) can function with the smallest cleared space; float planes can make use of lakes or rivers. Many aircraft can operate on relatively simple gravel strips, and there is every possibility up to the largest multi-runway airport. Once airport infrastructure get beyond the simplest level, the costs escalate rapidly.

Canada has extensive airport infrastructure in place; it is a mix of highly- and low-utilised facilities. The largest airports can generate a financial surplus, but this is not true of most others. Exhibit 10 shows a revenue/cost comparison for major airports in Canada (Baldwin, 1977). (Costs includes interest and depreciation.) Total government revenues from air infrastructure are less than the costs incurred, although the gap has been narrowing (see Exhibit 3 in section 2.4). (It might also be noted that a large portion of airport revenues are derived from concession rentals rather than user charges per se.) This is not to say that all facilities are supposed to pay for themselves. Many airports are regarded as necessary social infrastructure to be financed, at least in part, by the general public. And even if users could pay for facilities, it is economically-efficient to set low prices for use of under-utilised facilities to encourage their use. However, as noted in section 2.4, there is ambiguity in Canadian Transport Policy about what standard of public facilities should be provided under what conditions for what level of cost recovery.

Air infrastructure includes navigation aids, weather and communication services as well as airports. Again, one could expect commercial services on main routes to support such facilities (although revenue/cost figures are not compiled and reported on this basis). This would not necessarily be true on other routes. Nonetheless, Canada can be expected to maintain modern and high quality navigation and traffic control technology. Safety is one of the primary objectives in air regulation.

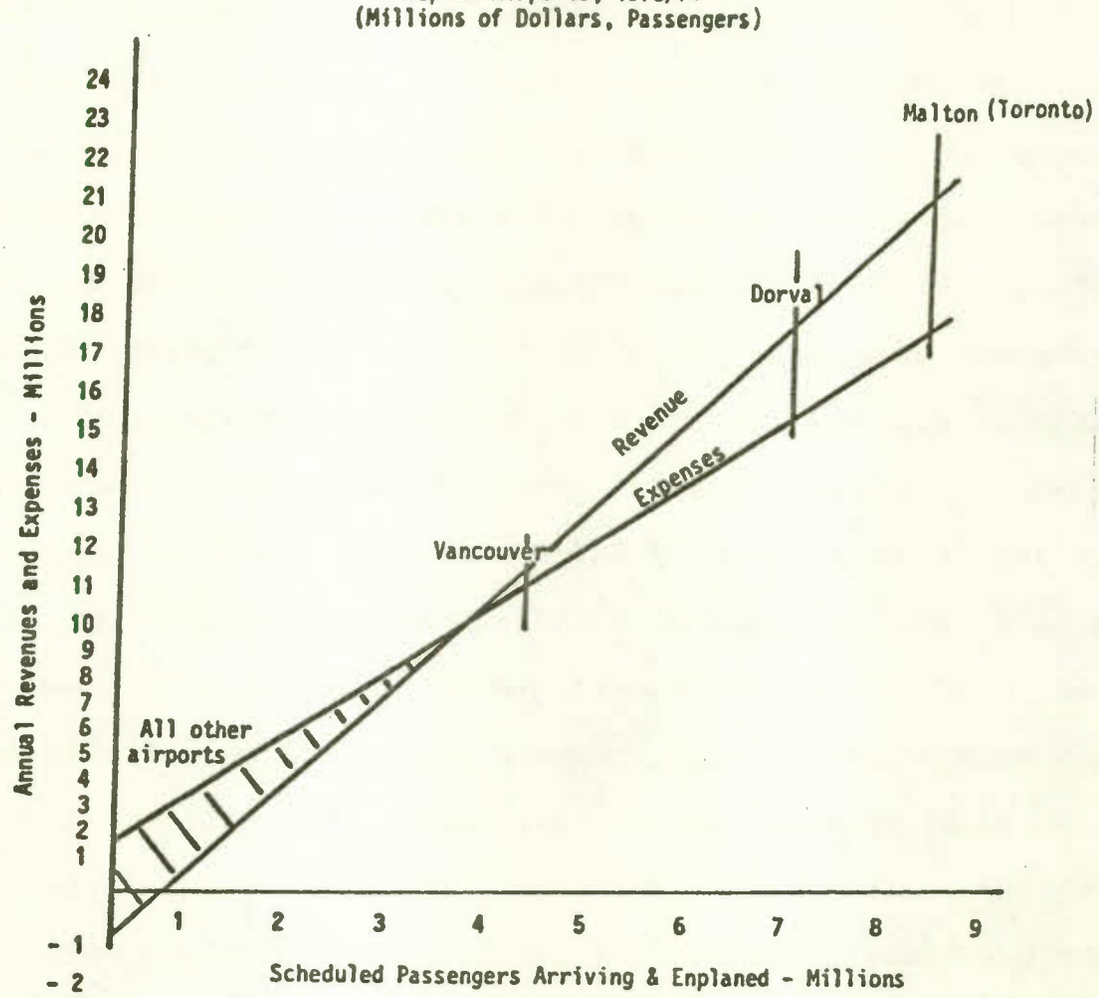
Exhibit 10

Cost-Revenue Comparisons for Major Airports in Canada

Operating Surplus (Deficit) for Seven Canadian Airports 1975-1977
(Thousands of Canadian Dollars)

	Toronto	Dorval	Vancouver	Calgary	Winnipeg	Mirabel	Ottawa
75/76	15288	9669	1845	3263	(880)	(18382)	(2040)
76/77	22389	1983	5722	4468	2	(49821)	(781)

Trends of Revenues, Expenses Versus Passengers Enplaned
Top 23 Airports, 1973/74
(Millions of Dollars, Passengers)



Source: Blair C. Baldwin, The Management Structure of Airport Operations in Canada and the United States (UBC Centre for Transportation Studies) Vancouver, 1980, pp. 14-15. The graph originally appeared in J. Smith, "Considerations in Local Administration of Airports in Canada," Annals of Air and Space Law (Vol. III) 1978.

Navigational aids and air traffic control are extensive on the main commercial jet routes. The level of support is more modest on low density routes, especially in remote areas and for small aircraft. Here pilots often must judge weather and navigation for themselves. It is likely that there will be increased pressure to upgrade navigational aids and related facilities in remote areas. In fact, some Western Provinces are taking steps in this areas despite the fact that this is federal jurisdiction.

In sum, Canada has an extensive air infrastructure in place. Where facilities are heavily utilised there will be pressures for expansion, which is usually very costly. There are concerns about the level of utilisation of Canada's busiest airports. But selecting alternate airport sites and/or expansion of existing sites have proven controversial. Proposed expansion for Toronto and Vancouver are embroiled in conflict. The only large airport built in recent years, Mirabel, proved to be very costly and is still grossly under-utilised. Carriers and other users have been reluctant to move from more convenient Dorval.

In addition to investment needs to cope with growth in already busy airports and airspace, there will be infrastructure needs on other routes. Air infrastructure in remote areas and/or low-density routes probably cannot be self-financing. Nonetheless, facilities will be provided as a public service and it is likely that there will be calls for increased expenditures to upgrade navigational aids and related facilities in remote areas.

5.2 AIR TRANSPORTATION SUPPLIERS

The 1980's could see several changes and developments in air transportation suppliers. The large commercial carriers (and many small ones) enter the 1980's under adverse economic conditions. Airlines are inherently a fuel-intensive industry. Thus airlines have been hard hit by the rising energy prices of the past decade. Fuel costs now represent about 30 percent of total air operating costs as compared with about 10 percent a decade ago. And the present figure already reflects a variety of efforts to reduce fuel consumption.

In addition to the rise in operating costs, the recession and increased competition on many routes have hurt airline revenues. Low earnings hamper the airlines' ability to finance a turnover of their fleets to more fuel-efficient aircraft becoming available.

The competitive environment may be changing as well. The U.S. has extensively deregulated the air industry. Thus far Canada has been more conservative in considering deregulation. The arguments are that airline performance under Canadian regulation has been superior to U.S. experience (Transport Canada, 1981a), and the fear that many low density routes in Canada are marginal at best and a free market might not sustain the level of service which will be deemed socially acceptable. The accuracy of the latter fear is still subject to debate. Air freight has been deregulated, and discount passenger fares are encouraged. But the prospects for further deregulation are uncertain. Increased competition generally is a stimulus for

efficient and innovative operations, but it can be inefficient on "thin" routes. More aircraft with lower load factors will mean higher fares, and there is a recognised tendency for competing airlines to schedule departure times near one another whereas consumer choice would be widened by dissimilar departure times.

In any event, the commercial jet airline industry is well established, with an impressive record of performance and can be expected to play its service role in the future development of Western Canada.

The third level and other local airline service constitute a highly competitive industry, and could be even more so if it were not for the CTC regulations on entry. This segment of the airline industry is relatively more important to the Canadian economy as compared with the U.S.. There are relatively more smaller communities and routes in Canada. Many of these are more economically served by prop aircraft rather than large jets. As large carriers face hard economic times, some routes may be given over to smaller aircraft and airlines. And these are the carriers which provide the myriad of special passenger and freight service to remote communities. Canada is still a nation with a large frontier region, and the third level or small carriers will continue to play an important role in Canadian development.

The widespread interest in deregulation in North America is likely to have some impact on the regulation of small airlines. The industry is more mature than it was when regulations were first promulgated. Entry controls may be less important now.

However, an emphasis on safety regulations can be expected to continue regardless of possible changes in economic regulations. As mentioned, there may be increased attention and emphasis on safety- related matters including the provision of more and better navigational aids.

In sum, air transportation is a mature industry but still facing significant adjustments to high fuel prices. This includes restructuring routes and acquiring more fuel-efficient aircraft. Growing traffic will mean increased pressure on airport facilities. Expansion will be both costly and controversial. The regional and third level carriers will continue to play a prominent role in our economic life. Some deregulation, but with increased attention to safety considerations and navigational aids, may characterise the policy toward smaller airlines in Canada.

6.0 WATER TRANSPORTATION

The geography of Western Canada limits the role of water transportation primarily to its influence on exports. The adequacy of port infrastructure and shipping capacity affect the ability to move western products overseas. This influence is relevant to Port Churchill and Great Lakes and Seaway capacity as well. Water transportation plays a much more prominent role in the B.C. economy. The coastal forest products industry relies heavily on tug and barge service and on several small lumber ports. Water transportation (and aircraft) is necessary to provide access and supplies to remote coastal communities. There are also heavily utilised ferry routes which link major population centres. Finally, supplying port services to the rest of Canada is a part of the economic base of B.C.

6.1 PORT INFRASTRUCTURE AND EXPORTS

For most of the West, the key influences of water transport on the economy are the adequacy of facilities and operating procedures to handle export traffic. Efficient handling of imports is also important to our standard of living but this has not been a major source of controversy.

The adequacy of grain handling facilities has been contentious. The Canadian Wheat Board pays large sums per year in demurrage for ships delayed in loading grain. It is widely alleged that grain sales are lost each year because of an inability to move the grain. However, it must be stressed that delays in shipping grain are not simply a matter of inadequate

port facilities. Nothing in grain transportation is so simple as to be cured merely by an infusion of dollars. The tendency for irregular large purchases by foreign buyers, the inevitable sources of delay encountered in long distance overland movements, the wide variety of grain grades which complicate handling and storage, and the various inefficiencies engendered by the rigid and uneconomic Crow rates, all play their part in complicating the overseas export of grain. The adequacy of port facilities is only one component. The development of the Port of Prince Rupert will provide an alternative west coast outlet. The Government of Alberta is investing directly in grain handling facilities at Prince Rupert. Reform of the Crow rates and other improvements to the grain handling system, combined with investments in port capacity as needed, are expected to increase the performance of grain exporting in the future.

Most other bulk commodity exports do not suffer from the long-evolved complex sitution which surrounds grain exports. (Of course, other exports such as coal, potash, sulphur, etc., do not face the widely dispersed collection system which characterises grain). Many commodities move in unit trains to highly mechanised bulk-loading facilities. There have been controversies over the adequacy of bulk handling facilities in the past. But major deep draft port expansions are underway on the West Coast. The recent amendments to the Canada Ports Act, which give much more autonomy to regional ports, hold promise of speeding up decision-making for port investments in the future.

West coast forest products are shipped from a number of small coastal ports as well as via major consolidated port facilities. Several Western lumber producers have integrated forward into the overseas distribution of lumber by owning or chartering ships, and sometimes even taking responsibility for overseas delivery. This close integration of water transportation within the forest products industry makes coordination of transportation needs with industry growth easier than for some other industries.

Port facilities for general cargo and containers are also a source of controversy. The primary controversy concerns the adequacy of container facilities. This refers both to investment in cranes and related handling equipment as well as the amount of storage area. Operating conditions of ports are also a factor, e.g., hours of operation and, most notably, the controversial "destuffing clause" in Vancouver. This requires containers destined to multiple consignees within the Lower Mainland of B.C. to be unloaded at the dock. While this is a source of controversy, it must be kept in perspective. The number of containers subject to destuffing is a minority, and many which would be destuffed arrive overland via Seattle instead of routing through the Port of Vancouver. Even removing the destuffing clause would not necessarily divert traffic otherwise routed through Seattle. There is a much larger volume of traffic passing through Seattle. Many ships carry both U.S.- and Canadian-destined cargo. Unless a ship carries a large number of Canadian-destined containers, it is more economic to off-load

these containers in Seattle rather than make a separate call at the Port of Vancouver. While some may lament the loss of container-handling business to Seattle, bear in mind that shippers are still being served, and, arguably, via a more efficient transportation routing. An "inadequacy" of West Coast container facilities in Canada will not necessarily act as a constraining factor to Canadian imports or exports of container traffic.

6.2 DEEP SEA SHIPPING

Traditionally, Canada has relied largely on foreign flag vessels for the carriage of Canadian exports. This policy has served Canada well over the years. Bulk shipping has been a highly competitive industry. There has been debate about the extent of competitive forces in the scheduled liner markets. Even here Canadian policy has been one of minimal intervention. Shipping conferences -- collusive organisations of liner firms -- have been exempt from anti-combines legislation.

In recent years, increasing concern has been expressed that there are developments which threaten to reduce free market forces in ocean shipping. This is a result of the increasing presence of national flag fleets accompanied by policies to reserve portions of a nation's trade to national ships. The increased presence of COMECON (Soviet Bloc) ships has been viewed with concern by many Western nations. They have become significant competitors on many routes. This is beneficial to nations such as Canada whose trade may be sensitive to the levels

of freight rates. The Soviet Bloc ships have been regarded with greater suspicion by the U.S. and European allies.

The increase in Third World national fleets with deliberate policies to favour their fleets is also a force reducing competition in shipping markets. The UNCTAD 40-40-20 rule (40% of a country's trade reserved for its ships; this leaves only 20% to third country ships) has been the most prominent policy development. The UNCTAD agreement applies only to liner markets, but there is interest in extending a similar agreement to apply to bulk shipping. This is likely to encounter much more resistance than when applied to liner shipping. And trade between developed and third world nations is only part of world sea-borne trade. Nonetheless, these events may herald continued interference in ocean shipping markets.

The ominous signs of increased foreign intervention in world shipping have prompted reviews of Canadian shipping policy (for a recent discussion see Heaver, 1982). The possibility of a Canadian merchant marine has been raised once again. Groups are sharply divided. The possibility of extensive support for a national merchant marine seem unlikely. The U.S. merchant marine has been very costly, and Canada, more reliant on low-cost shipping, is unlikely to follow the U.S. model. But limited policy support may develop. Already sympathy for some ship development can be seen, e.g., arctic-class bulk carriers. There are calls to allow Canadian-owned foreign-registered ships to be repatriated by extending similar tax benefits to what they realise elsewhere. The argument is that Canada does not realise the tax revenue anyway. But the economic effects are more

complex. Registering a ship in Canada would employ manpower and other inputs otherwise employed in other Canadian industry. Other industries would pay taxes. The diversion of resources from where taxes are paid to where they are not is a reduction in the efficiency of resource allocation.

The future of national shipping policy in Canada is not clear. Canada is a major trading nation, and many of our exports are low- valued hence potentially sensitive to the level of ocean freight charges. It is Canada's interest to promote low-cost shipping. Protection and development of high-cost national fleets is not in Canada's interest regardless of whether they fly Canadian or foreign flags. But growing foreign intervention may eventually necessitate some policy response by Canada. But the likelihood of these events and types and effects of policies which could be adopted are still subject to debate at this time.

6.3 COASTAL TRANSPORTATION

Coastal water transportation in the West is confined to British Columbia. There are some important industries located in coastal regions, notably coastal forest products and fishing. The coastal forest products industry finance the necessary shipping, barging and port infrastructure, so there are fewer of the controversies which arise where public investments are required to serve a variety of users. But other elements of coastal transportation are more prone to controversy.

Transportation access to coastal communities is, almost inevitably, a non-paying proposition. But it is regarded as a

public duty by Government. (There are some commercially-viable services such as coastal tankers, tug and barge service, and some ship service). The operating losses of the B.C. Ferry Corporation are about 37 million dollars per year (1980). The ferry corporation receives a "highway equivalent subsidy of about $50 million per year from the Government of British Columbia. (This includes a Federal Government contribution of about 8 million dollars per year toward the provision of coastal services by the B.C. Government.) In addition, there are other coastal ferry operations provided by the Department of Highways.

The major ferry routes between Vancouver Island and the Lower Mainland of B.C. are very different from serving remote communities. The former are busy runs employing very large ferries with rapid turn-arounds. These busy routes generate considerably more revenue than the isolated routes, but they do not quite pay their way. This is because even the busiest routes are regarded as a public service, analagous to road infrastructure, which are provided at low price so as not to discourage travel and transport over water relative to comparable distances inland. It is a social overhead burden equivalent to supplying road and airport access to remote communities.

The B.C. ferry system has experienced phenomenal growth and there are calls for increased service to remote coastal communities. A continued need for B.C. Government underwriting of much coastal transportation would appear inevitable. This is a relatively localised matter, symptomatic of the recognised obligations of governments serving low-density areas. The

provision of coastal water transportation is not a vital issue in the future development of Western Canada although it would be critical to any developments in remote coastal locations.

7.0 PIPELINES

Pipelines play a major although specialised role in Canadian transportation. About 25 percent of total freight tonne-kilometres are moved by pipelines. Pipelines are a highly energy-efficient mode of transport used primarily for carriage of oil and gas. Pipelines are generally owned, or at least closely coordinated with, the suppliers of product carried. Provision of pipelines are intimately linked to energy developments. Thus, the future of pipeline transportation in Canada is tied to our future energy developments.

The possibility of transporting coal in slurry form has been under study for some time. Conceivably, this technoloy could be employed to handle major increases in thermal coal exports thereby freeing rail capacity for alternate commodities. But this is highly speculative; it is contingent both on further feasibility studies of the technology, as well as development of long term large scale coal production at a single location. The latter would be necessary to justify such a capital intensive venture.

There are important public issues associated with pipelines. Although quiet and, if buried, unobtrusive in operation, the construction can cause a variety of environmental, social and economic impacts. Monitoring and mitigating these externalities of pipeline developments can be an important cost in large scale energy developments. Improving expertise in identifying and mitigating adverse consequences of pipeline

developments are one of several factors which influence the feasibility of future energy developments, especially in remote regions.

8.0 TRANSPORTATION, PRICING POLICIES, AND ECONOMIC DEVELOPMENT

The previous sections survey major issues facing transportation in Western Canada. Some of these could have significant impacts on the future development of Western Canada. But for the most part, transportation is best viewed as an important accompanying ingredient to economic growth, not a determining force. Transportation can be a critical component in particular developments; but, in overall regional and national development, transportation is but one of many important considerations.

There is much popular belief that transportation, both investments in infrastructure and the level and structure of freight rates, play a more deterministic role in economic development. This has been a long held -- even cherished -- view in Western Canada. It is not without some historical foundation. But the role of transportation in the opening of a new frontier is not necessarily the same after decades of growth. This part of the report comments on the role of transportation in economic development. There is special attention to the arguments associated with freight rates, especially rail rates, and their influence on economic development.

This paper argues that transportation can play a significant role in specific industrial developments, but the influence on overall economic development is not so prominent. It is also argued that the beliefs that discriminatory rate structures affect the structure of industrial development in Western Canada are exaggerated. The discriminatory or value-of-service rate

structures which are prominent in transportation, especially railways, are linked to the industrial structure of a region, but the causality is not as popularly thought. It is the cost and market structures of industries which determine the structure of value-of-service rates, not vice versa. The frustrations of the West with the structure of railway rates and their alleged influence on economic development confuses a symptom with a cause. The problem is that the social- political expectations about the pattern of economic development conflict with economic reality. The value-of-service rate structure mirrors the latter, and is incorrectly blamed for not bringing about the former. Proposals to modify rate structures to achieve industrial development objectives are unlikely to be very effective. This is not to denigrate social-political objectives, but to point out that these goals probably will be most effectively achieved by government policies aimed directly at desired industrial diversification strategies, rather than to seek these goals by indirect (and unreliable) freight rate policies. The determinants of economic development are far more complex than to be achieved by tinkering with freight rates.

8.1 THE PARADOX OF TRANSPORT AND INDUSTRIAL DEVELOPMENT

There is no question that there are dramatic instances where provision of transport infrastructure or reductions in freight rates proved to be the crucial factor in enabling a specific industrial development to take place. There are also cases of large scale expenditures on transport infrastructure or major

intervention in rate-making which have had almost no impact on industrial development. Of course, if transportation simply is not an important component in the costs of an industrial development, it is not surprising that transportation improvements have little impact. But even where transport improvements have had significant impacts on a particular development, they may prove disappinting when applied on a more ambitious scale to the same industry. This paradox results from a confusion between the marginal and total impacts on an industry.

Transportation investment or rate reductions can have dramatic effects at the margin. The supply of product to any market will leave some firms barely able to survive. Any increase in costs of production including transport costs could be sufficient to prevent profitable operation. Conversely, even a small reduction in any component of total delivered costs of a product could enable a firm presently barely unable to compete to enter the market. For a distant supplier, a short extension of service and/or reduction of rate can have dramatic effects. This is a very visible and dramatic impact, but it refers to a marginal supplier. The total impact on market supply of the marginal firm entering or leaving the market may be miniscule (although it is highly visible to the firm, surrounding merchants, and political representatives of the region). Therefore, despite the significant effects of transport improvements in specific (marginal) cases, it does not necessarily follow that similar impacts could be expected on an

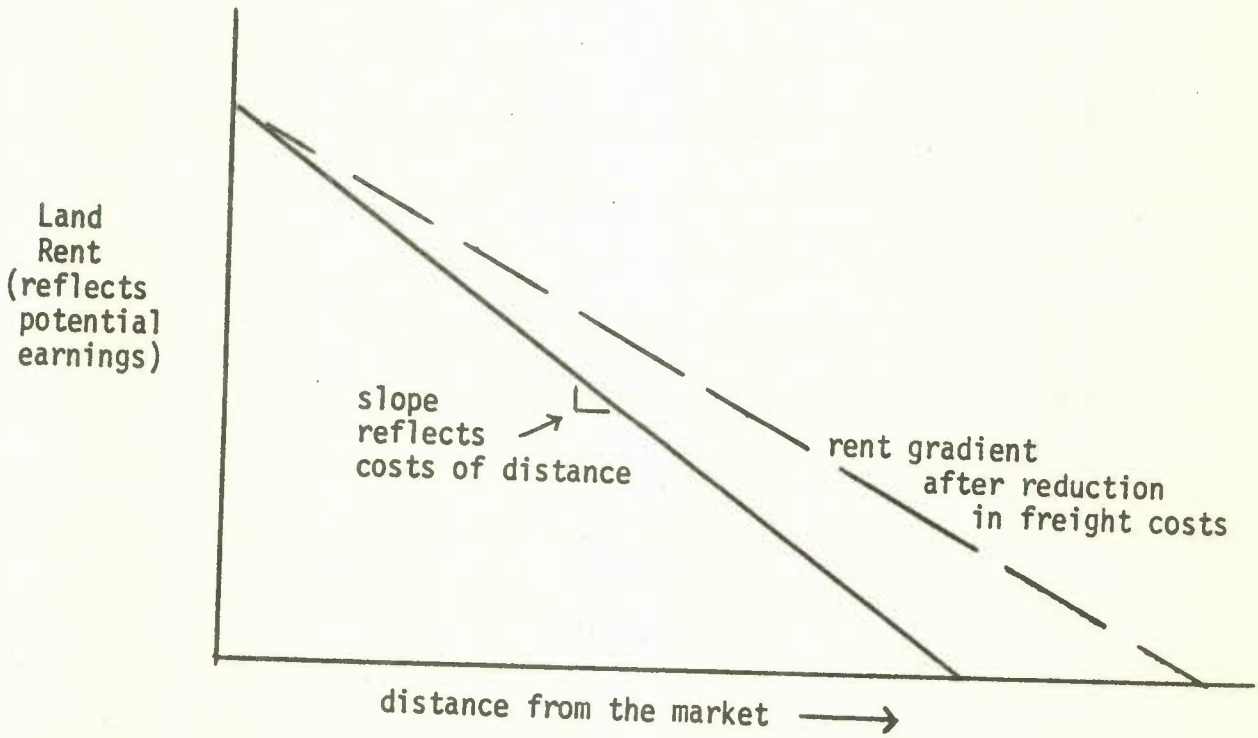
industry wide basis. This is a "fallacy of composition," an invalid generalisation from a single instance to a population at large.

An illustration of this point is in Exhibit 11. This is an illustration based on the familiar principle about location and land rents, viz, that competition for land use bids up land prices which capitalise the relative accessibility of different locations for different land uses. This can be applied to agricultural location or in the urban context. The "rent gradient" portrays the reduced earning power of more distant suppliers to a central market. Producers near a market face lower transport costs hence they can bid higher prices for the more accessible land. For a single product illustration, there is a distance beyond which production and transport are too costly; land rents fall to zero at this point. This initial rent gradient is indicated by the solid line in Exhibit 11.

A change in accessibility is a reduction in the costs of distance. This results in an outward rotation of the rent gradient, indicated by the dashed line in Exhibit 11. The impact of this transport improvement differs considerably depending upon which producers are examined. The overall impact on supply to the market will normally be relatively modest. The increase in supply will tend to have a depressing effect on market price; this would be indicated by a reduction in the intercept of the rent gradient and thus partially offsetting the effect of the reduced slope of the rent gradient. But the impact on economic activity and land values at the margin are dramatic. The increase in earning power and land values are many fold for the

Exhibit 11

The Differential Impact of
a Freight Rate Reduction
on Land Rents



marginally profitable or formerly unprofitable areas. But, the significance of these impacts at the margin cannot be generalised to predict the total impacts on the industry.

In sum, transport improvements can have dramatic impacts on specific industrial developments in specific circumstances where transportation happens to be a significant cost component of firms barely able to penetrate a market. It is easy to overlook the combination of special conditions which make transport improvements appear so productive. Generalisations about the experience of transport improvements and economic impact must be made with caution.

8.2 TRANSPORT POLICY AND INDUSTRIAL DEVELOPMENT

Some implications for public policy initiatives grow out of this paradox of transport rates and industrial development. Any market will have some marginal suppliers. By definition, marginal suppliers are ones for which any increase in costs of production or transport could have serious consequences. Even slight increases or decreases in accessibility to market could change their fortunes.

Any market has limits beyond which suppliers are unable to compete. This could be explained by costs of production which are higher than elsewhere, low quality raw materials, lack of knowledge about marketing and distribution arrangements, or freight costs which are too high. At the margin, a reduction in any of these could enable a marginal supplier to compete. But if the firm is unable to reduce any of these costs internally or

through the market, its only alternative is to seek some outside intervention. As Stigler once remarked, aside from prayer, the only alternative to the market is the public sector. Of course, not all appeals to the public arena can be heard and acted upon. The cry for assistance must strike a harmonious note with others to achieve sufficient political visibility. A concern that one is discriminated against because of distance, e.g., high freight costs, may find such harmony of interests in Western Canada.

Most of Western Canada has developed as a frontier region, a "hinterland" linked to an industrialised "metropolis" in eastern Canada (Anderson, et al., 1979). Distance from markets has been a dominating theme in discussions of Western Canadian development. Transportation factors are important and, especially, highly visible in Western development. And transportation policy has long been a major focal point between Federal and Provincial governments. To this day, transport issues are a favourite rallying cry in the West to accompany all manner of dissatisfaction with Eastern Canada and the Federal Government. And transportation matters are a prominant policy mechanism which the Federal Government can use to court the provinces.

Assistance to one sector or group may stimulate other groups to seek similar assistance from the public sector. But transport (or other) policies can have significant influence only if they are marginal producers who only need modest levels of assistance. Even large transport assistance may be insufficient for suppliers which face greater hurdles to penetrate markets. But these groups may be no less shy at seeking assistance from

the public arena. The experience that modest assistance (of whatever type) was sufficient to enable marginal suppliers elsewhere to enter a market may call forth unwarranted expectations both by other industries and public officials about the efficacy of transport policy.

The central point is that producers unable to compete in distant markets may turn to the public sector for some manner of assistance. If they are truly marginal producers then significant impacts may result even from modest public policy efforts. But once the principle of overriding market outcomes is embraced, there are no inherent limits as to how widely to extend such assistance. Various groups and industries may come forth seeking assistance. The successful application of a policy in one instance may encourage policy makers to expect similar results in different circumstances. In a region very conscious of the barrier of distance facing local producers a general appeal to transport difficulties as the culprit limiting economic success has higher credibility than this argument might have elsewhere.

The appeal that transport can have dramatic impacts on marginal producers may also suggest that transport can assist in establishing/promoting other industries not in existence currently. Regions often have aspirations about what is to be produced and not just "how much." Most of Western Canada have long dreamed of diversification of their industrial base to reduce dependence on a narrow range of grains and minerals subject to cyclical variations in demand. There is prestige

attached to having an industrial base with highly skilled manufacturing components. The idea of using transport to assist in altering the industrial structure of a region has proved popular. But unlike the potential impact of transport improvements to established suppliers just at the margin of being able to compete, there is much less promise of freight rate changes -- or even infrastructure improvements -- to bring about dramatic changes in a region's industrial structure. There are specific cases where transport policy can have very visible impacts. But it does not necessarily follow that transport policies can have similar impacts whereever they are tried. The factors which determine comparative advantage in a region are many and complex. Transportation rarely is a major component in the total costs of producing and distributing manufactured goods. Even if transport costs were zero it is unlikely to bring radical shifts in comparative advantages. If only economic development were so simple as to be achieved by tinkering with freight rates.

It is not only the level of freight rates which is at issue, but also their structure. Ceteris paribus, higher rates on some commodities than on others tend to discourage the movement of high freight cost items. For example, higher rates on finished products relative to their raw materials tends to encourage shipment of raw materials rather than processed product. Low rates on products imported to a region could discourage development of local industry to compete with distant suppliers. These are logically valid points. However, their logical

validity is no guide to their empirical significance. This depends on particular circumstances. There has been careful analysis of both the logic and facts regarding popular Western conceptions of freight rate biases (e.g. Norrie, 1976 and 1978). The only documented cases of rate distortions impacting on the location of processing industries are cases caused by the uneconomic Crow rates. But these statutory rates are not part of the normal commercial rate making process.

8.3 DIFFERENTIAL COMPETITION AND TRANSPORT PRICING

Another concern about freight rates in Western Canada arises from the differential presence of competition in transportation markets. Where competition is extensive, prices are held to a minimum and there are incentives for efficient operation. But where competition is less of a factor, firms have greater discretion over prices charged and services provided.

There is great diversity in Canada, including among Western regions. Different areas have different resources, terrain, and population densities; different types of products move and there are differing degrees of competition in various markets. Some products are more amenable to intermodal competition between truck and rail. Primarily this refers to higher valued products such as manufactured goods. The higher proportion of bulk traffic in the West as compared to industrialised regions of the East might suggest that railways face less competition from trucking in many Western regions. A lower population density in the West may support less competition than that present in more

densely-settled regions. That is, many markets may be too small to support numerous carriers.

The possibility that there is less competition in the transport industries in the West gives rise to an argument that there is systematic discrimination against the West in transport rate structures. The multiproduct nature of transportation means a substantial portion of total transport costs are untraceable to specific services. There are "joint and common costs" which are incurred on behalf of a number of services and it is not possible to trace portions of the costs to individual services. There are "overheads" which must be borne by all traffic together. These costs are recouped on a value-of-service basis. With competition less prevalent in the West than in the East, the West might have to bear a higher proportion of the unallocable costs of transportation.

The logic has some appeal, but the workings of transport markets are not this simple. In fact, the average markup of rates above variable costs may be less in Western Canada; the revenue per ton-mile is much lower in the West (e.g., Heads, 1978; Norrie, 1978; Transport Canada, 1978). The fact that less competition is present does not necessarily imply a greater ability to pay by the traffic carried. Many Western products are relatively low-valued and cannot bear high freight charges. The competition a product faces in its final market has similar impacts as intra- or inter-modal competition. Efficient value-of-service pricing facilitates economic development in these circumstances. Carriers have the freedom and incentive to set rates sufficiently low to encourage traffic to move. A more

rigid pricing formula could prevent some traffic from being moved at all.

The latter points are in contrast to some traditional Western beliefs. Investigations of rail rate levels show most freight rates per ton mile lower on Western products than on Eastern traffic (e.g. Heads, 1978; Norrie, 1978; Transport Canada, 1978). Still, beliefs persist about inherent biases in the rail rate structure which discourage Western industrialisation and diversification. The importance of this topic requires some explanation and analysis of the workings of value of service pricing. This is the pricing regime which has evolved over decades in transportation, especially in railways.

8.4 VALUE-OF-SERVICE PRICING (VOSP)

Transportation rate structures have long contained elements of what is called value-of-service pricing (VOSP). This refers to charging what the traffic can bear. This is also identified as demand-based as opposed to cost-based pricing, although it will be seen that this classification is misleading. VOSP is also known as discriminatory pricing. All transportation firms, but especially railways, can charge different buyers different prices. Once again, it is necessary to qualify this characteristic. The existence of different prices charged to different buyers is not necessarily discriminatory in the economic sense because there may be cost differences in serving different shippers. Nonetheless, the basic characteristic remains that transportation suppliers generally have some discretion over the price charged, and will excercise that

discretion such that those able to pay higher rates will be charged accordingly.

Many traditional economic concepts and discussions -- and nearly all popular discussions -- of price discrimination versus cost-based pricing are founded on the theory of a single product firm. This is the standard textbook model where costs are well-defined for particular products and economic efficiency principles (e.g., price = marginal costs) can be derived readily. But many industries, especially transportation, are multiproduct in nature. The significant implication is that many of the costs of doing business are incurred on behalf of a variety of services offered. Different cost items are associated with different mixes of traffic at different times. The result is considerable ambiguity in identifying portions of total costs with specific parts of a business. The inability to link costs with specific outputs arguably is the most fundamental economic characteristic of transportation. Generations of accountants, economists, regulators, lawyers, carriers and shippers have debated the relationship between prices and costs of specific services. But the outcomes are always elusive.

Value-of-service pricing evolved as a practical management approach to transport pricing for railways. (VOSP arises in other modes too). It facilitates decentralised pricing which is so necessary when a myriad of services are offered. VOSP was a practical approach to a profit-maximising pricing framework and has been refined over the years.

It is important to note that modern VOSP is different from what was practiced years ago. It is the earlier interpretation of VOSP which is sometimes criticised in transport economics texts. The basic idea of VOSP has not changed: setting prices which are influenced by the ability of the shipper to pay. In its origin, VOSP was basically a revenue-maximising tactic: costs were ignored (more likely they simply were unknown) and treated as a common burden to be borne by all traffic on an ability to pay basis. The lack of knowledge or attention paid to some costs meant that cross-subsidisation was common, with attendant resource misallocation.

Another outmoded interpretation of VOSP refers to a simplistic formula approach to pricing that is tied to the value of a commodity. That is, recognising that product value can be a proxy for the ability to pay, a railway might try to set prices in proportion to product value and ignore the presence of competition. Such an approach would cause the carrier to lose valuable traffic. Clearly, this type of VOSP would not be consistent with efficient operations.

Some texts and articles use the foregoing interpretations of VOSP and criticise it relative to cost-based pricing schemes such as marginal cost pricing. But these criticisms are based on an outmoded interpretation of VOSP and a concept of costs which is based on single product firms.

Modern VOSP <u>is</u> a cost-based pricing scheme. The identifiable costs of serving the traffic provide the minimum basis for setting a rate. But the directly identifiable costs

are only part of the total costs of service. Some costs are incurred jointly on behalf of multiple markets. Optimal pricing under joint costs calls for rates that reflect value-of-service considerations, i.e., the relative abilities to pay of the jointly-supplied traffics. Many other costs are variable but shared among a number of traffic types. These costs are to be covered by the aggregate of traffic which share the expenditures in common, but the costs need not be apportioned according to some uniform allocation formula. Then there are costs associated with the overall level of operations of the railway. These are variable costs to be covered but they are not traceable to individual traffic. The directly identifiable costs of serving a particular traffic establish a minimum basis for rate making, but the rate charged must be above this to make a contribution toward the costs of operations shared with other traffic. The markup over directly identifiable costs reflects the shippers ability to pay. Taken collectively, this profit-maximising approach maximises the amount of traffic moved consistent with the level of profits earned. If the level of profits are no higher than competitive levels, VOSP is consistent with economic efficiency criteria.

Note that VOSP does not entail cross subsidisation; all traffic must pay its way. Traffic paying low rates more than cover their direct costs; this traffic makes a contribution toward the costs shared with other traffic. Low-rated traffic would not move at higher rates. It is better to carry the traffic with a small markup than to lose the business by trying

to charge a price greater than the "value of the service" (Baumol, et al, 1962).

There are further economic implications of VOSP. There has long been concern that application of the economists' ideal of marginal cost pricing to the railway industry would render it bankrupt. This is because marginal costs lie below average costs when there are economies of scale or excess capacity associated with lumpy inputs. (Contrary to popular belief, empirical evidence indicates that scale economies in railways are rather limited; economies of density or utilisation of indivisible facilities and equipment appear to be the major source of decreasing unit costs for railways, e.g., Harris, 1977, and Griliches, 1972). If, as a matter of policy, we wish the railway system to be financially viable, i.e., self-sustaining without public subsidy to cover loses from decreasing cost operations, then the economically optimal pricing policy on efficiency grounds is VOSP until the overall rate of return starts to exceed competitive levels. This is known as Ramsey or Boiteux pricing in the economics literature (e.g., Baumol and Bradford, 1970).

In summary, there are economic efficiency arguments favouring VOSP up to the point where the overall returns exceed competitive levels.

Canadian transport policy for railways has stressed both economic efficiency and financial viability as major objectives. Economic efficiency is a major emphasis of the 1967 National Transportation Act and an emphasis on the financial viability of reailways is a policy which predates 1967. Given these explicit

policy objectives, VOSP is an appropriate pricing policy providing rail operations are efficient and earnings do not exceed competitive levels.

The Canadian railways have long practiced VOSP although they were subject to regulation for many years. However, since 1967 (and in many markets before that) the railways have been able to negotiate prices with individual shippers largely free from regulatory interference. (This excludes the statutory Crow rates). The railways have aggressively pursued a value-of-service rate structure. The railways have a reputation of being efficient operators. Their rates of productivity growth during the recent deregulated era are remarkable, far out-pacing U.S. rail productivity increases both on an absolute and relative basis (Caves, et al, 1982). But despite their high performance and aggressive VOSP, the railways have not been able to earn rates of return comparable to most other industries. This would be true even if they were compensated for statutory grain losses. The presence of intermodal competition, and/or market competition facing the product carried, greatly limit the ability of the railways to take advantage of their apparent monopoly position. In short, it appears that there is sufficient competition and/or inability to pay by shippers that regulatory intervention to prevent monopoly profits is not necessary.

8.5 VOSP AND INDUSTRIAL DEVELOPMENT

Historically, distrust of VOSP arose when railways were in a stronger monopoly position than at present. Monopoly earnings

were possible and wider opportunities for discrimination existed. In recent decades there has been increasing competition from other modes for much of rail traffic. For traffic which tends to be captive to railways, the railways' power to charge high prices often is limited. Competition in the market for the product transported limits its ability to pay freight charges. A captive shipper is not necessarily able to pay high freight rates. This is an important point for understanding the working of VOSP and Western Canadian development.

Traditional economic concerns about the discriminatory aspects of VOSP emphasise the negative feature, viz, the abilities of railways to charge higher prices where willingness to pay is greater. But an important feature of the ability to discriminate is that it works two ways. The freedom to increase prices is also freedom to reduce prices for traffic unable to bear higher rates. A profit oriented firm has an incentive to lower rates to enable low-valued traffic to move so long as it covers variable costs. A great deal of Western traffic fits this category: traffic unable to bear high freight charges. The flexibility of VOSP and the profit-orientation of railways has facilitated the growth of Western Canada. Alternate rate making regimes do not have this flexibility nor the managerial incentives built in to the present VOSP system. (Alternate bases for rate making are discussed briefly in the subsequent section). This flexibility of VOSP and the profit-orientation of railways has implications for rate structure as well as rate levels. As mentioned, there have been persistent fears or

allegations that discrimination in VOSP could act as a deterent to the development of processing industries and diversification in the West. By definition, VOSP is a discriminatory rate structure, but the key issue is whether or not VOSP would systematically distort efficient economic development. The logic, outlined briefly as follows, suggests otherwise.

VOSP is expected to be consistent with efficient economic development and industrial diversification. The more profitable is an industry, the more it can afford to pay for transportation. So long as railways are free to practice VOSP, it is in the railways' interest to have the efficient location of industry. The selling price of a product is determined in the final market. The lower the cost of production, the greater the potential profit and greater share of this potential profit which the railway could capture via VOSP. If processing raw materials at the site instead of at the market were more efficient, then more money could be made hauling processed goods rather than raw materials. If there is no difference, a value of service rate structure would have a neutral effect on location (which is not necessarily the same as equal rates or markups since there could be weight-gain or loss in processing raw materials and different transport costs could be involved).

In sum, the traditional Western concerns that a VOSP rate structure might discriminate against and interfere with efficient diversification and expansion of industry do not appear to have a logical foundation. Transport costs do affect the location of industry in an economy. VOSP is a cost-based rate structure, so

the broad pattern of rates will be consistent with the cost conditions which underlie both transportation and regional industry. The value-of-service components or markups of freight rates are not themselves determining factors in the industrial structure of a region. The causality is the reverse. The value-of-service elements reflect the underlying industrial structure of the economy. The cost and market conditions in industry determine their ability to bear freight charges, and this is what VOSP reveals.

Some Western disenchantment or fear of value-of-service railway pricing is likely to remain. This is because the desire for industrial diversification and increased processing and manufacturing can be different from an efficient allocation of resources. That is, political and social aspirations can differ from economic efficiency. The unpopularity of VOSP with those seeking non-economic goals is understandable. The free reign of VOSP will not be consistent with these goals. But it is important to keep clear the nature of the disenchantment with VOSP. It is likely that many fail to appreciate that the conflict between VOSP and industrial development objectives is not a question of economic efficiency but is a conflict between economic and social-political goals. This is not to denigrate social objectives. It is not in the economist's domain to question the social objectives. But it is relevant to question of desirability of using freight rate policies as a mechanism for

achieving non-economic goals, especially since the existing VOSP system is consistent with economic efficiency.

There are two grounds for questioning the use of freight rate policies. The first is that, as mentioned, freight rates generally constitute only a small portion of the total delivered costs of higher-valued processed or manufactured goods. The efficacy of freight rates in promoting their development is questionable. Even large interference with freight rates could be insufficient to achieve desired developmental effects. The pursuit of non-economic industrial developments probably is most effectively achieved by direct government assistance rather than via indirect and uncertain measures such as freight rate policy.

The second grounds for questioning freight rate policies for economic development goals concerns the costs of interfering with an efficient pricing system. Not only are there the direct inefficiencies induced by causing freight rates to be uneconomic, there are the potentially-high costs of interfering with the managerial incentives for efficiency inherent in a VOSP system. This is a potentially serious cost.

8.6 ALTERNATE PRICING REGIMES

There are two general categories of alternate pricing schemes: (1) arguments that rates should be tied to costs; and (2) arguments that rates should not necessarily be tied to either costs or value-of-service elements, but should reflect social or political objectives.

Consider cost-based pricing arguments first. It should be reemphasised that modern VOSP is a cost-based pricing scheme. Traffic is expected to be compensatory, that is, cover identifiable costs. But the markups above costs reflect value of service elements. The economic efficiency arguments for VOSP were presented in the previous section. The arguments for cost-based pricing of interest here are those which maintain that value-of-service elements should not enter into rate making at all, that rates should be set equal to costs (or at some uniform markup). These arguments are founded on traditional economic efficiency concerns for the misallocation of resources which results when price-cost divergences exist in the economy. But this standard economic argument is based on theories of single-product firms. The connection between costs and prices is more complicated in multiproduct firms; demand considerations are a necessary part of efficient pricing.

Any proposal for setting prices equal to costs is open to challenge because precise determination of the costs of carrying particular traffic usually cannot be measured precisely. There are unavoidable ambiguities in transportation cost estimates. A rate structure "based on costs" would not be the scientific and precise rate structure which it might sound. Rate negotiations and disputes would centre around disagreements over how to carry out cost estimates, each side advocating whatever method placed them in the best light. One might also note that VOSP often does not require precise cost measurement. So long as rates are thought to exceed variable costs by a significant margin, no

accurate cost estimate is needed. More careful cost analysis is reserved for situations where low rates are necessary to attract traffic.

If prices are to be set equal to marginal cost estimates, a subsidy will be required to cover the constant costs and overheads. This raises various efficiency (and equity) considerations. If financial viability is sought, VOSP is the economically efficient pricing system. If value-of-service elements are ruled out, then some means of "allocating" otherwise non-recoverable costs must be included. This leads to some form of "fully distributed costs." That is, rather than (implicitly) distributing constant or overhead costs on the basis of value-of-service, it would be distributed on some other basis such as a weight-distance formula. But here is the fundamental flaw in all cost allocative rules. They result in the rate to be charged on some traffic being raised to a level above the value-of-service, i.e., ability to pay. The limit on what price can be charged (the value-of-service) could be determined by competition by other carriers or by competitive conditions facing the product carried. In either event, the traffic is lost to the railway if the rate is set above this level along with the contribution, albeit small, which that traffic otherwise would have made to the constant costs. In the event that the competitive constraint is market competition, the shipper might be forced out of business. This situation is most likely to occur for shippers of low-valued commodities located far from major markets and able to contribute little beyond variable costs.

In sum, pricing rigidly according to some weight-distance formula or other cost-based approach is not pricing at costs except by chance. The average cost experience of diverse rail operations does not often equal the marginal costs of serving a specific traffic.

In contrast to a cost-based approach, prices could be set according to some social or political principles unrelated to costs or value-of-service. For example, the railways might be treated as a quasi social service in which cheap railway service is regarded as a right. Users would pay rates equal to direct operating costs while overhead and infrastructure costs would be borne by the taxpayers. (Such an approach might make the costs of distance relatively more serious since rates would be almost exclusively tied to distance). Or one might call for a "postage stamp" rate structure, where all pay the same freight rate irrespective of distance. (This policy would be impossible unless private transport was outlawed).

It should be noted that VOSP is consistent with certain social-political goals. As mentioned earlier, given the desire for railways to be financially viable, the most efficient method of recouping unallocable costs is via VOSP. This minimises the "burden" of constant or overhead costs on all traffic by levying higher charges on that traffic most able to pay. This is a pricing system consistent with certain social-political objectives: the full costs of railways are paid for by rail users with minimum interference to the efficient allocation of resources.

Given the competitive conditions which result in low railway profits even under VOSP, this means that any other pricing regime will result in less revenues accruing to the railways. Thus public subsidy must accompany any alternate pricing scheme which might be proposed. The old practice of cross-subsidisation among traffic would not be possible. Railways do not have sufficient monopoly power in some markets to compensate for losses in others. (And the economic costs of cross-subsidy might not be acceptable even if it were still possible).

The merit of pursuing various social and political goals is not in the usual domain of the economist. Rather the economic issues to consider in using freight rate policy to achieve non-economic goals are:

(1) whether or not freight rate policy will work as intended;

(2) how effective this policy is relative to alternatives;

(3) the costs of using freight rate policy relative to other alternatives.

These questions need to be addressed for specific policies and specific applications, but there are grounds for scepticism for all three. Freight rates are relatively unimportant for many products, therefore manipulation of freight rates may have limited effects. More direct policies to achieve social goals may be more effective than indirect policies such as altering freight rates. And there are various costs which would be incurred if present pricing policies were abandonned.

Any of the pricing approaches cited above have potentially serious implications for rail management and performance. The great diversity of rail services provided, and the variety of costs incurred, calls for considerable decentralisation of decision making including pricing and service decisions. A profit-oriented system such as VOSP gives incentives for efficient operation with clear criteria for assessing performance. Alternate pricing frameworks greatly reduce managerial discretion over pricing and service decisions. With rates set by formula or by some centralised organisation, the incentives for efficient operation suffer. A rate structure with a "take it or leave it" basis generates similar attitudes among staff. The main performance measure for evaluating both overall and individual traffic performance would be lost. It calls for a railway of rate clerks rather than managers seeking to optimise. There can be no question which managerial environment would better facilitate the economic growth of Western Canada.

9.0 CONCLUSION

Transportation is an important component in the economic life of all nations. It has been important in the development of the Canadian West and this is likely to continue. But transportation includes a very diverse set of activities, and transportation factors differ in importance among industries and regions. Transportation can be the catalyst for particular industrial developments; but more typically, it is just one of many elements necessary for the functioning of an interdependant economy including law and order, communications, banking services, and so on. There is wide public interest in transportation matters. This is not surprising. Transportation touches most of us directly both in private and professional lives. There is inevitable government involvement in transportation and this attracts public attention as well. Occasionally, concepts and ideas can catch the public's imagination. Transportation issues can become "political footballs." In these circumstances the political importance of and preferred solutions to transportation problems may not reflect their real economic significance. Rail passenger service is a good example. There is widespread emotional attachment to passenger trains. This translates into willingness to commit government attention and money to the issue. Yet the real economic benefits are confined to a few special interests.

This review has attempted to identify the transportation issues of greatest significance for the future development of Western Canada. The future is unknown so any such review is a

speculative venture and opinions must be greeted with caution. But there appears to be considerable consensus about several of the issues which have been identified. There are issues common to all modes as well as mode-specific ones.

All modes face challenges in the coming decade: the continuation of high energy costs; major investment requirments face both the private sector and governments at all levels; major regulatory reforms are under consideration or underway; R&D expenditures are below what most think are necessary.

Probably the issue of greatest importance to Western Canada is the adequacy of the rail system. Traffic growth has out-stripped investment for years. Part of the problem has been the losses associated with the statutory grain rates and related grain-handling inefficiencies. The rail system survived as well as it did because traffic growth could be accomodated with relatively modest levels of investment. But time and growth has caught up with rail system capacity. Massive investments are needed. So large are the investment requirements that their financial viability are not assured. Compensation and reform of the uneconomic Crow rates is the first major hurdle to improve the rail system. But the financial strain to provide capacity to handle expected traffic growth is likely to persist for years to come.

There are important issues facing each of the modes. Infrastructure requirements promise to be important for all modes. As with railways, there is a need to upgrade and replace existing capital stock as well to accomodate projected growth.

Some infrastructure investments will be associated with small communities and/or remote regions; this raises the ongoing debate over the feasibility and extent to which users can bear the full costs of infrastructure provided on their behalf.

A prominent issue facing air and road transport is the possibility of changing regulatory regimes. There is growing support for at least some deregulation. The Canadian economy has matured considerably from times when, arguably, regulation may have been more necessary. Even if Canada were not to deregulate, the substantial deregulation in the U.S. affects Canadian carriers, not only by example, but because of the overlap of the two countries' regulatory structures as they apply to the substantial trans-border trade. This could be the source of considerable conflict depending on how dissimilar are the relevant regulations and public policies in the two countries.

This paper is more than a descriptive review of transportation issues. The paper also focuses on the connections between transportation and economic development. This is an important topic because much of the public interest in transportation issues arises because of widespread belief -- particularly in Western Canada -- that transportation is a primary influence on economic development.

There is both historical and contemporary instances where transportation has been the vital catalyst for a development to take place. But it can be misleading to generalise from particular events. Transportation can be an important catalyst to development. But it does so in particular circumstances and

primarily for products for which transportation is a major part of the final delivered price to the buyer. This excludes most manufacturing and processing industries. For most industries, transportation can be important but no more so than other factors including knowledge of techniques, resource endowments, market information, finance, managerial skills, etc..

Special attention was focused on rail value-of-service pricing (VOSP) and economic development. There has been a widely-held view in parts of the West that discriminatory elements in rail rate structures are a major factor inhibiting industrial development and diversification. But this paper argues that the logic of value-of-service pricing is expected to be consistent with efficient economic development. The ability of traffic to pay high freight rates reflects the underlying profitability of the products being transported. High costs and/or lack of markets are what inhibit development. The discriminatory elements in commercial freight rates reflect rather than determine these underlying economic conditions. Industrial development and diversification are often sought in response to political-social concerns, i.e., apart from the economic merit of the proposals. But efficient markets, including those in transportation, will not foster uneconomic developments. Public intervention will be necessary to override commercial considerations. Such industrialisation strategies probably are most effectively pursued via direct assistance to desired industries rather than via indirect -- and often ineffective -- methods such as freight rate policies.

Finally, one topic has not been explicitly addressed in the paper. Nothing was written about transportation education or the management skills which might be associated with future developments in Western transportation. Major decisions are to be made in coming years both in the private sector and in government at all levels: major investment programs are forthcoming in all modes; technologies are changing in response to high energy costs and more R&D is to be undertaken; different regulatory regimes are being considered; historical policies such as the Crow rates are to be revised; the list could continue. These are major challenges to both industry and government personnel to ensure that they have the knowledge and skills necessary to make the most appropriate decisions. This is true for all of Canada, not just the West. The public and political representatives have important roles and responsibilities as well. Public perceptions and politics can clash with economic considerations. This is inevitable; it is reality. Better information can clarify both benefits and costs of policy proposals and lead to better decisions. This is true both for the market-place and in houses of government. In a sense this is the greatest challenge of all. Ultimately it is the human agent which must understand the problems, identify alternatives, make decisions, and implement them. How well we do this is the greatest influence on economic affairs. This is true for transportation and the future of Western Canada as it is for other industries and other countries.

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