WORKSHOP ON
GRAIN TRANSPORTATION RESEARCH

Proceedings of a Workshop held in Winnipeg
September 8 and 9, 1986

Edited by A. G. Wilson

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FOREWORD

The University of Manitoba Transport Institute was established in 1984 with a mandate to stimulate and coordinate transport research and education at the University of Manitoba, and to bridge the gap between traditional academic research and teaching activities and the needs of the transport industry, policymakers, and users of transport services.

A key component of this mandate is the publication of the results of research, workshops, and conferences sponsored by the Transport Institute. The Institute's publication series consists of three categories: research bulletins, occasional series, and reprint series. All publications in these categories are reviewed under the auspices of the Publications Review Committee of the Institute, and must meet high standards of academic quality.

This publication represents the Proceedings of a Workshop on Grain Transportation Research sponsored by UMTI and held in Winnipeg on September 8 and 9, 1986. The objective of the Workshop was to provide a forum for the discussions of current grain transportation issues and to identify future research needs. Forty-four participants from the grain industry, railways, federal and provincial governments, and universities discussed issues relating to efficiency, economic and social impacts, and policy in the areas of grain transportation and handling. It is hoped that these Proceedings will be useful not only to the people who attended the Workshop but to others with an interest in grain transportation research.

Many people contributed to the Workshop and the Proceedings. I wish to acknowledge a number of these: the Workshop planning committee - Elwyn Hopkin (Transport Canada), Andy Gemmell (Canadian Transport Commission), and Brian Davey (Agriculture Canada); the speakers and discussants for their informative and thought-provoking presentations; Art Wilson for editing the Proceedings; and the support staff of the Transport Institute (Doreen Goddai, Gerry Calthorpe, and Betty Smith) for Workshop logistics, and preparation of the Proceedings.

The financial assistance of Transport Canada, the Canadian Transport Commission, and Agriculture Canada towards the costs of the Workshop is appreciated. The publication of this Proceedings is made possible by the on-going financial support provided to the Transport Institute by the Manitoba Department of Highways and Transportation. This is gratefully acknowledged.

E. W. Tyrchniewicz
Director

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I. WORKSHOP OVERVIEW

Grain Transportation and Research

Yves Dubé**

Introduction

For the past ten years, as Vice President (Research) of the Canadian Transportation Commission, I have had the pleasure of leading a multi-disciplinary team of professionals who have investigated many of the issues confronting transportation in Canada. As some of you may know, I have just retired from this position. While the memory of our efforts is still fresh, I should like to reflect upon these years and identify what I think are the concerns which you, as individuals deeply involved in grain transportation, will have to address in the future and, in this context, to present my personal preferences for continued government involvement in transportation research.

Having been the commissioner responsible for the Commission's Research Branch, I feel somewhat qualified to discuss these matters with experts such as yourselves, inasmuch as we have a long and amicable reputation as investigators cum problem solvers, and a particular familiarity with grain transport as witnessed by the presence of two of my former staff members at this workshop. I think it obvious to all that if there exists a Canadian theme which requires a comprehensive analytical approach and which has benefited from the studies of the Research Branch, it is grain.

Grain Related Research Branch Activities

The Branch's involvement in grain-related research began in 1972 when Marion Fleming and some of her staff started to create a system that would allow the Commission to assess the impacts of grain delivery point closure on grain producers. Naturally enough, the first concern was to understand the impacts of prairie branch line abandonment, but the Hall Commission on Grain Handling and Transportation used the system in 1975-77 to gain an understanding of the broader context of grain handling and transportation, as subsequently did the Prairie Rail Action Committee.

In recent years PHAER has been used extensively by the following:

1. The (Gordon Hall) Committee of Inquiry into the Method of Payment of the Crow Benefit which culminated subsequently in four Re-

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* Session chaired by E. W. Tyrchniwicz, Director, UMTI.
** Formerly Vice President, Research Branch, Canadian Transport Commission.
search Branch publications.  

2. The Transport Canada sponsored study which led to the consultant's report on the Role of Trucking in Grain Transportation (IBI Group).

3. The short line railway inquiry (the inquiry into Railway Branch Lines—the McDonough Report).

4. The McQueen study to find a way to bring the benefits of grain delivery system rationalization to all participants in the system; this will be issued as a Research Branch report this fall and Dr. McQueen will be talking about his ideas this afternoon.

5. A study of the costs of transporting grain by lake vessel (the Yee Model).

6. Another study by Peter Yee on the possibilities of transporting Canadian grains on the Mississippi River Barge System; this will also be issued as a report in the late fall, and I understand it will provide ideas on ways Canada can reach some international markets more cheaply.

7. A Branch study of the benefits that might accrue from the use of unit trains to transport grains for export.

8. Another Branch study on the possibilities of using branch line rationalization as a means of encouraging the use of longer, heavily loaded trains of hopper cars as a way to increase efficiency.

Given the preceding usage, it should come as no surprise that the Research Branch has made a major financial and human commitment to a continuing effort to improve the PHAER Model. Recent revisions have included:

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1. Upgraded primary elevator cost estimators.
2. More current grain trucking costs.
3. Improved rail cost estimates.
4. Inclusion of the lake vessel operating costs from the Yee Model.
5. Estimation of the costs of terminal and transfer elevator operations.
6. Extension of the analyses to address the costs of Canadian bulk export commodity ocean shipping.

When these revisions and studies are complete, the PHAER Model will have the capacity of estimating the costs of grain handling and transportation from farm gate to destination port, by a variety of routings, and to estimate the economic impacts of disrupting or altering the existing routings.

While the PHAER Model has been a major focus of Branch attention with respect to grain transport, it has not been the only one. In the past few years CTC research has also concentrated serious efforts on railway capacity in western Canada through a series of three major studies, each in association with the governments of the western provinces, Transport Canada, and the railways.

The Vancouver Rail Access Study started this series identifying what could have been serious impediments to traffic flows through the lower mainland area of British Columbia. Investments by the railways seem now to have eliminated the causes of concern, but the sponsors have continued to review the situation each year, and may do a major review of the entire study in 1987.

The second study was the Thunder Bay Rail Capacity Study. With the participation of the government of Ontario, it was found that at existing 1983 volumes, the system had ample capacity, although there were some opportunities for improvement in road/rail interfaces and in grain handling. This led to the creation of the Thunder Bay Rail Issues Task Force, and its report. As you know, the Task Force concluded its work last year and recommended to the Senior Grain Transportation Committee that further beneficial work could be done on the concept of an improved grain car unloading facility at the intercity elevators in Thunder Bay. The Senior Grain Committee has recently declined to undertake this work and has turned the matter over to the Lakehead Terminal Elevator Association and the Lakehead Harbor Commission.

The third of these capacity studies was the Joint Track Usage Study of railway infrastructure in the Thompson and Fraser Canyons. The report has suggested that ways of expanding capacity other than full double tracking would be much more economical, and it would seem that the railways, as full partners in the study, have agreed. Intermediate signalling and limited double tracking and long siding construction is expected to give all the capacity needed for several decades to come.
I feel it worth dwelling on these capacity studies because grain is one of the major users of railway capacity, especially westbound through the mountains. If there were to be a crisis of capacity, grain would suffer, as would every other commodity. In the context of Section 29 (2(b)) of the Western Grain Transportation Act, each year the Commission is required to review the investment plans of the railways, and to assure the Minister that those plans are appropriate, and that he should make the payments due the railways from the government for the transportation of grain. The Research Branch has been instrumental in helping the Railway Transport Committee set up a methodology for reviewing the current and planned investments of the railways for this purpose, and in preparing a report to the Minister of Transport.

One of the outcomes of this last activity with the RTC, and the earlier work on the Joint Track Usage Study, has been the accumulation of a library of computer models from Canadian sources (such as CIGGT) and international sources (such as the World Bank) to estimate railway capacity in a variety of ways. We are presently assessing and modifying these models with the expectation that in the near future we will be able to provide an idea of the impact on railway capacity of suggested changes in operation and construction. It is fair to caution, however, that these studies are not intended to replace railway company analyses or decisions about their future, but to give the observer a feeling for the accomplishment of the changes proposed, and an ability to understand some of the ramifications of apparently small changes on the overall system. Of course, it will also enable the observer to ask more intelligent questions!

Future Directions

These various facets of grain transport which the Research Branch has been studying will, I have no doubt, assume even greater importance in the future as the grain producers and shippers as well as the various modes involved in its movement respond to a variety of changes in their operating environment, including the initiatives of the federal government to lessen the regulatory burden and enhance the competitive process in transportation. Clearly, the need to achieve the most cost effective means of getting to market is paramount for a product whose international access confronts subsidized interference by European and American governments. As such, research like the PHAER Model, enhanced by inclusion of appropriate rail, truck and vessel facts and placed within the context of an examination of capital investment alternatives to ensure there are no bottlenecks to impede the movement of grain, will continue to be required if Canada is to maintain its role in the international marketplace.

Nevertheless, while there is an obvious ongoing need for this type of study, it is doubtful if the existing Canadian Transport Commission's Research Branch will be able to continue to meet this requirement. Although many of the proposed reforms of national transportation policy are much needed, I must admit to being somewhat disappointed that there does not appear to be any recognition of the vital contribution a research organization can make. In fact, there is no provision for a continuation of the Research Branch.
Coinciding with my retirement, the rather dismal prospect that the Research Branch with its accumulated expertise may soon be lost has prompted me to reflect on the alternative means by which the required analyses may be provided. Of prime consideration in any process which may be formulated is the requirement to ensure that the research to be provided is relevant to the issues, is communicated to the decision makers as well as to the concerned public, and has an influence on policy.

As an initial proposition, locating the research function within another government department would appear to meet the preceding criteria and, following this logic, we have pursued discussions to this end with Transport Canada and, as befits our Agricultural Products Division, Agriculture Canada. However, the recent Nielsen Task Force reported, "There is a large body of opinion which supports the view that research carried out within the strict confines of a bureaucratic structure is of limited value..." and, "Experience shows that research organizations within TC eventually become part of the structure and cannot retain long-term independence and objectivity." if, at times, I felt that research was being sacrificed to support the regulatory activities of the Commission, then placing the activity in other departments might be to condemn it to an eternity of bureaucratic and political interference. Consequently, this is but a second-best solution in my opinion.

Further to this, one of my criteria envisages a flow of information between the research function and the concerned public like yourselves. In my experience, large government departments have a tendency to sequester their investigations as well as any studies done for them by external parties, all of which doesn't enhance the attractiveness for a transfer to achieve my objectives. For the most part, this has meant the best solution is the establishment of a separate organization where researcher independence and objectivity will be guaranteed, while simultaneously ensuring performance and financial accountability as is required by those funding its activities. Feasible structures meeting the criteria can be categorized as the National Transportation Institute, the Transportation Research Council, and the Bureau of Transport Economics models.

The National Transportation Institute is particularly suited to the requirements of a centrally focussed nation wherein the national role can be entrusted to a university or a para-public institution. Reflecting the diverse sources of funding, the institute acts as a forum for co-operation in interdisciplinary research programs amongst industry, government and the university. In this same context, the Institute's staff must be nonpublic servant professionals.

The Transportation Research Council was originally proposed by our host, Ed Tyrchlewicz, in 1968, and it recently has been recommended by the Nielsen Task Force. The Council, with an annual budget of $10 million, would be comprised of ministerially-appointed representatives of the private sector (including labor), provincial governments and the research community. A small, permanent staff of professionals would constitute the Council's secretariat with the established research community guiding its endeavors and setting its priorities through reference to
perceived broad national interests as well as specific requests by the Minister.

By way of comparison, the Council and the Institute are somewhat akin to mirror images of each other—the Council represents dispersed employment of funds from a single central source, while the Institute constitutes a central concentration of effort utilizing funds from dispersed sources.

While both of the preceding models have attributes to recommend their adoption as future bases for transportation research, I have come to the personal conclusion that, with modification, an organization like the Australian Bureau of Transport Economics is perhaps the most appropriate for Canada. To this end, my last months as the Commission's Vice President (Research) have been spent formulating the nature of such an organization and, in consultation with the transportation research community, refining the proposal before submitting it to the Minister for his consideration. Through these deliberations I have arrived at what is an obvious hybrid, incorporating the best features of an Institute, a Council and the BTE.

The proposed Bureau would be an element of government and, hence, staffed by professionals who are public servants, but with a view to ensuring both independence and objectivity, it would report to Parliament through the Minister rather than directly to the Minister or the department. Its activities would be guided by an advisory council appointed by the Minister and composed of representatives of industry (both carriers and shippers), labor, consumers, the department, the proposed National Transportation Agency, provincial officials, and the research community. As for the scope of its undertakings, it would address socio-economic transportation issues of significant or regional interest and its specific responsibilities would include co-ordination of activities with equivalent research agencies in other countries and with Canadian university transportation centres. The actual program which might be undertaken would be determined by the Advisory Council with reference to requests made directly by the Minister, by the Parliamentary Committee, by the Council, and by any researcher with the Bureau. I have initially proposed that the federal government assume responsibility for funding the Bureau with a sufficient amount set aside to support university research, provide research fellowships, fund consultative studies and joint ventures and compensate for secondments and sabbaticals from the provinces, industry and academia. I note that a number of people to whom I have referred the original proposal have suggested that the budget for such activities be greater than the $1 million I have identified, and that the transportation community—especially carriers and shippers—become involved in direct financial support of the bureau, thereby enhancing their interest in its activities and broadening its base. As a final concern, with due regard to data confidentiality and access to government and private data sources, the Bureau's research studies would normally be published and publicly distributed.

As I have mentioned, I have referred this proposal to various senior members of the Canadian transportation research community and, with one
or two exceptions, the response has been universally supportive of my
initiative. Beyond agreeing "... that the most appropriate approach
is that of a research bureau" and that a move "... by government poli-
cy in this direction ... would be a marvellous contribution to make to
the transportation industry and to the interested research community"
they have made a number of welcome suggestions to improve my thoughts,
for example:

"I would heighten the importance of the Bureau by having its
legislation require it to present on a certain date an annual
report on its activities, and require also that the report be
the subject of hearings by appropriate Parliamentary Commit-
tee(s)."

and

"... appointments to the advisory council should not be
solely in ministerial hands,—e.g., require that they come
from 'recommended' lists proposed by specified interests; or
subject to some check on competence and suitability."

While I forwarded the original proposal to the Minister on the eve of my
retirement, because replies are still coming in from my contacts, I have
informed Mr. Crosbie that a final proposal, incorporating the views of
my colleagues, will be prepared and sent to him in October.

Concluding Comments

In times of government financial restraint in which all research is
an obvious target because it is deemed to be expendable in the short
term, I have no doubt that it will take a concentrated and sustained ef-
fort on the part of the Canadian transportation research community to
persuade those in power that continued funding of such a program is es-
sential and that establishing a Bureau to carry it out is likewise re-
quired. I am sure that having benefited from the activities of the CTC
Research Branch, those gathered here today recognize the inappropriate-
ness of curtailing practical research programs in times of difficulty.
It is only through investigative mechanisms, such as PHAER, that the al-
ternatives may be evaluated and a direction selected to achieve maximum
economic benefit for producers and shippers. As I carry my idea for-
ward, I invite your comments on the proposal in order that it may be
strengthened, and I solicit your support in order to demonstrate to
those who will decide its future the appeal it carries.
II. RESEARCH ON EFFICIENCY ISSUES*

Efficiency and Regulation in Grain Handling
and Transportation

A. G. Wilson**

The topic assigned for this presentation, and indeed the thrust of the section within which it is being given infer that efficiency and regulation are not necessarily compatible concepts as applied to the grain handling and transportation system. The credibility of this inference should therefore be examined. This requires at the outset that efficiency and regulation be defined so that a logical assessment can be undertaken.

The regulations applied to the system affect producers, elevator companies, transportation firms, international traders and government organizations and arise primarily from the actions of government. Over time the system has been molded by these regulations and some conclusions can therefore be drawn concerning their effects on the evolution of the present system and upon system efficiency.

Definitions

Efficiency can be defined in terms of output relative to input. Economic efficiency is maximized when pure competition prevails, i.e., where many independent firms sell identical products to many independent buyers.1 While pure competition is virtually nonexistent in the real world it provides a valuable benchmark against which the economic efficiency of a system or industry can be judged. Economic efficiency is reflected in performance which has several facets including, among others, production efficiency, progressiveness, product suitability, profit rates, level of output, cost of sales promotion and any unethical prac-

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* Session chaired by J. Murray Cormack, Chief Executive Officer, Manitoba Pool Elevators
** Professional Associate, UMTI, and Professor, Department of Agricultural Economics, University of Manitoba

1 Scitovsky argues in Welfare and Competition, Richard Irwin, Homewood, 1971 that "free" competition has shortcomings in the areas of job allocation, excess capacity and bias against capital intensive methods of production. These are more than offset by the numerous benefits that flow from "free" competition.
tices engaged in by system participants.\(^2\)

When competition prevails, each market participant is forced to innovate, to take risks and to upset the status quo in order to prosper or even to survive economically. Participants in the system are driven by competition rather than being in control of the system. Consequently no one organization bears sole responsibility for the performance of an industry. It should be recognized that competition and free enterprise are not necessarily synonymous. Free enterprise can indeed be non-competitive where business concentration prevails.

Regulation may be defined in various ways. Those provided by Mitnik\(^3\) appear particularly appropriate.

1. Regulation is the intentional restriction of a subject's choice of activity by an entity not directly party to or involved in that activity.

2. Regulation is the policing, with respect to a goal, of a subject's choice of activity by an entity not directly party to or involved in that activity.

3. Regulation is the public administrative policing of a private activity with respect to a rule prescribed in the public interest.

Regulation can therefore be described as restrictions imposed to accomplish a particular purpose. But what purpose?

The rationale for regulation as imposed by government rests according to Reschenthaler\(^4\) upon three general propositions:

1. Certain industries are perceived as so important as components of the infrastructure of the economy that the competitive market has been rejected in favor of direct public control. This is so in the case of industries such as the public utilities which experience economies of scale, other industries being dependent on these for growth.

2. Certain industries have economic characteristics which qualify them as "natural monopolies".


3. Competition for one reason or another is simply unworkable.

Each of these propositions can be used to justify regulation of various components of the grain handling and transportation system by those desiring a degree of control. Several components of the system are vital to the economy. Some experience decreasing costs with volume. Competition may not appear to work in certain situations.

The purpose of the regulation is important. If used to increase the efficiency of the system through fostering workable competition it is desirable. Otherwise, regulation becomes a burden on the system.

Preliminary Observations

In a mixed enterprise system such as exists in Canada social control is achieved either by competition or direct regulation. Achievement of the most appropriate mixture of competition and regulation becomes critical since regulation can foster workable competition. A search for the proper mix can be intelligently made only by taking into consideration the inherent characteristics of the problems attached to the means used to regulate. This gives rise to such questions as, "What are the advantages and shortcomings of the means?" "What kinds of incentives or distortions do the means produce?"

Over time there is the possibility that those responsible for administering regulation will become subservient to those being regulated or that regulation will take on a life of its own. There remains the risk also that regulation will be substituted directly for competition as the instrument of control. The competitive market requires risk taking and innovation for survival whereas regulation of itself places emphasis upon stability and the status quo thereby tending to stifle change. Once introduced, even for the purpose of making competition workable, regulation tends to grow and it is difficult to reverse the trend. An appropriate analogy of regulation is a glacier. It is slowly built up as precipitation occurs. The pressure increases and the glacier flows steadily forward, the ice grinding over obstacles in the way and destroying the landscape. Once the glacier stops it slowly melts leaving the landscape strewn with boulders. Regulation when introduced tends to require further regulation for enforcement and gradually layers are built up and regulation spreads. Once the decision is made to reduce regulation a legacy of problems is left behind which must be cleared away before a more free and competitive environment is obtained. In no case is this more aptly illustrated than in grain handling and transportation.

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Evolution of Regulation in the System

Regulation of the grain handling and transportation system has evolved over time in reaction to producer agitation, the legislative process, political opportunism and the desire for control. Insights into the progression of regulation in the system may be obtained from several publications, notably among many being those by Patton and Wilson. The progression of regulation takes place largely when competition is being restrained thereby. Participants will attempt to overcome restraints on their competitive position and additional regulation will have to be introduced to curb such activity. When tariffs are held by regulation above marginal costs new entrants will be encouraged and these may engender regulation. If tariffs are held below marginal costs the system will deteriorate and investment will flow from the system to areas of greater return. The associated reduction in plant will necessitate rationing in the "interest" of equity, bringing about a further extension of regulation.

Some of the regulation presently imposed on the system was introduced to prevent perceived abuses of unbridled free enterprise. Such regulation fosters a more competitive environment and should be encouraged. Unfortunately, not all of the regulation falls into this category. Some participants in the system favor the stability which follows from regulation and support further regulation. Other competitive minded and innovative participants are opposed to any extension of regulation and point to the potential gains in efficiency arising from greater competition. This conflict in views provides politicians with an opportunity to exploit the situation to their own ends and this may be reflected in legislation. Under such circumstances co-ordination of participant activities can be expected to be difficult to achieve thereby requiring coercion, essentially through regulation, to obtain its antithesis, cooperation. Efficiency is not fostered in such an environment, one typical of the grains industry at this time.

Regulation in Grain Handling and Transportation

Government is the primary source of regulation in the grain handling and transportation system. The regulations imposed by the federal government are more onerous and pervasive than those imposed by either the provincial or the municipal governments. This follows from most facilities of the system being deemed to be "works for the general advantage of Canada" and therefore under federal jurisdiction. Provincial and municipal governments are confined to making regulations which apply within their own borders, those with respect to road transport being of most significance to the system, differences in the regulations applied by the individual provinces creating artificial barriers.

A review of the regulations currently applied to the grain handling and transportation system indicates that not all are conducive to efficiency. A few examples of regulations affecting performance and thereby efficiency may be appropriate. These will be categorized as those affecting grain handling, marketing and transportation and are classified as being either advantageous or disadvantageous.

1. Grain handling

Advantageous - regulations with respect to the enforcement of standards of quality - these have resulted in grain from Canada being renowned for cleanliness and uniformity throughout the world, any practices considered unethical being suppressed.

Disadvantageous - single minded concentration on one standard of quality in wheat - opportunities for exploiting the growing demand for other "qualities" are foregone, product suitability being affected.

- the imposition of tariffs not necessarily consistent with marginal costs - giving rise to concentration in the industry, suppression of innovation and discouragement of new entrants.

2. Marketing

Advantageous - organized single desk selling of wheat in an environment notable for buyer concentration and government intervention - real competition in the world market is enhanced thereby contributing to exchange efficiency.

Disadvantageous - concentration on achievement of "equity" by regulation through such devices as the quota system - individual initiative is suppressed, decision making on the farm is influenced adversely thereby affecting production efficiency.

- grain merchandisers are made subservient to the regulators - profit and output levels being affected and competition thwarted.

3. Transportation

Advantageous - enforcement of safety standards which result in Canada having an enviable safety record, such regulation protecting the public interest while ensuring the service offered is acceptable.

Disadvantageous - rail rates on grain assessed users are not in accordance with the marginal costs of service resulting in revenue shortfalls - political influence is apparent with the most appropriate means of transport not being sought by users resulting in inefficiencies in use of transport services and distortion of related industries.
- maintenance of a rail transport network beyond the financial capacity of users to support - resources being misallocated since the cost of service is not minimized, an example of lack of product suitability.

Some Concluding Comments

The examples given indicate that the performance of the grain handling and transportation system is affected by regulation. In some cases performance is enhanced, in other cases performance is impaired. This dichotomy of effects follows from an incompatibility of objectives and points to the need to examine the purpose of regulation. Does the regulation imposed contribute to performance and ultimately to efficiency? What regulations are redundant? What regulations have become obsolete with the passage of time? What are the end results of the regulations currently applied? How can a continual review of the merit of existing regulations be mounted?

To answer the above questions a logical analysis must be undertaken to determine the effects of existing regulations upon competition and therefore efficiency. It is essential that the grain handling and transportation system reflects real needs and that the system is productive, progressive and innovative. In a less regulated environment, a comparable system has reacted faster to changing needs suggesting that one of the legacies of regulation in Canada is delayed adoption of more efficient technology.

At the present time there is perceptible movement away from the continual progression of regulation. This movement should be encouraged in order that disadvantageous regulation can be eliminated. In terms of the glacier analogy the glacier of regulation appears to have stopped advancing and is now about to recede due to the refreshing winds of change. As the glacier recedes a legacy of debris will be left behind. We should not be deterred by the debris but rather cast it aside as we direct the flow of water from the melting glacier to irrigate the fields of competition. Thus the melting away of undesirable regulation will contribute to greater competition so that the goal of a truly efficient system can be attained. Efficiency and regulation are not necessarily incompatible. It is essential that any regulations applied contribute toward maintenance of workable competition in the grain handling and transportation system. When this occurs the efficiency of the system can be maximized.

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Recent and Potential Efficiency Gains in the
Grain Handling System

R. Weik*

The topic assigned to me for discussion this morning is one with which I am deeply involved. The grain industry takes a great deal of satisfaction in the fact that in recent years the gains in efficiency in handling grain have been substantial. These are becoming of increasing benefit to Canada in a period of intense international competition for markets. Additional gains in productivity are possible but these will require more active involvement by producers in the handling process, and an appreciation by them of the net benefits which could be attained by a further reduction in the number of handling facilities or their replacement by other types of facilities.

Elevator Efficiency

An insight into recent gains in efficiency in the primary elevator system may be obtained from an examination of the data in Table 1 and Table 2. Elevator receipts over the period from 1974-75 to 1984-85 have increased by 41 percent as the level of farm production increased. At the same time the aggregate capacity of the elevators declined, largely as a result of closures, from 9.6 to 8.0 million metric tonnes, a decline of 17 percent. In addition, the number of operating units, i.e., those operated by one manager, declined by 33 percent to 1,885. The greater productivity of these units is apparent in the increased volume handled on average per unit and the higher turnover rates.

Table 1: Capacity and Volume Handled, Primary Elevators, 1974-75 and 1984-85

<table>
<thead>
<tr>
<th></th>
<th>1974-75</th>
<th>1984-85</th>
<th>Change Percent</th>
</tr>
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<tbody>
<tr>
<td>Receipts</td>
<td>19.3</td>
<td>27.2</td>
<td>+ 41</td>
</tr>
<tr>
<td>Capacity</td>
<td>9.6</td>
<td>8.0</td>
<td>- 17</td>
</tr>
<tr>
<td>Operating Units</td>
<td>2814</td>
<td>1885</td>
<td>- 33</td>
</tr>
</tbody>
</table>

* Transportation Co-ordinator, Saskatchewan Wheat Pool.
Table 2: Productivity, Primary Elevators, 1974-75 and 1984-85

<table>
<thead>
<tr>
<th></th>
<th>1974-75</th>
<th>1984-85</th>
<th>Change Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnover Rates</td>
<td>2.0</td>
<td>3.4</td>
<td>+70</td>
</tr>
<tr>
<td>Volume per Operating Unit (tonnes)</td>
<td>6850</td>
<td>14420</td>
<td>+110</td>
</tr>
</tbody>
</table>

The impact on cost of these productivity gains is substantial. A decline of 929 in the number of operating units represents a substantial saving in managers' salaries, these estimated at $30,000 each per year or a total of $29.9 million. This is approximately $1.00 per tonne handled. Each closed manager unit had an average capacity of 1,700 tonnes. The average replacement cost of construction of these 929 units over the period is $500,000, representing the saving of a total investment of $465 million. The interest saved by not having to make this investment is approximately $46.5 million at 10 percent or $1.75 per tonne; $69.75 million at 15 percent or $2.56 per tonne; and $93.0 million at 20 percent or $3.50 per tonne. The savings in cost as a result of increased productivity have therefore been substantial. At the same time a high level of service to the producer has been maintained.

The sources of these productivity gains are worthy of examination. These gains may be classified as those arising from consolidation, capital investment, use of larger trucks and introduction of computers. Most of the consolidation arose from elevator closures. In other cases elevators were either sold or traded to other elevator companies and this was reflected in an increase in the volume handled per manager unit. Capital investment in facilities by the primary elevator companies is estimated at more than $500 million over the 1974-75 to 1984-85 period. These funds were used to modernize or replace elevators, to increase the number of car spots, to install larger scales and to increase the rate of unloading and loading. During that period also there was considerable experimentation in the design of more economical and efficient elevators as reflected in the use of steel and concrete; design of the Buffalo and Buffalo 2,000 bins and construction of a limited number of "large" elevators. At the same time considerable capital was expended in making elevators safer and healthier places in which to work. As a result of the enlargement of farms, producers upgraded their trucks to larger capacity units. The average volume delivered per unit increased enabling managers to handle an increased volume with the same effort. The introduction of the computer reduced the time spent by the manager on paperwork. In addition, errors were reduced and more rapid transmission of information to head office was made possible. The number of accounting staff required declined. All these changes have rendered operation of the average primary elevator much more efficient.
The Potential for Future Gains in Elevator Efficiency

Various scenarios can be projected for the primary elevator system in the future. Three will be brought to your attention: a highly centralized system, the "status quo," and a system based on extrapolation of current trends. All appear to have the potential for further increasing elevator efficiency. In looking to the future an aggregate volume of deliveries of 38 million tonnes is assumed.

Highly Centralized System

One highly centralized system which could be considered would have elevator facilities located at one hundred locations, each having a 100-car spot. Average receipts per facility would therefore be 380,000 tonnes or 14.5 million bushels. The elevator system could be expected to be required to handle 20 percent of the total volume during a five-week period. This would require a capability of 15,200 tonnes or 179 cars per week. Assuming average deliveries of 20 tonnes this represents receipt of 750 loads or 6.8 loads per hour over a sixteen-hour day. Such an elevator facility could be designed to be highly efficient. A system of 100 such facilities, on the other hand, would entail a greater average trucking distance and the associated additional cost to the producer along with higher road maintenance costs, all of which will be examined later in this workshop. Depending upon the location of these facilities rail costs would be significantly reduced. The dispersion of these facilities could be expected to encourage interception by competitors of the flow of grain so that the number of facilities could increase. Producers themselves will determine whether a highly centralized system is acceptable.

The Status Quo

Under this scenario all present delivery locations would be continued. As elevators closed for one reason or another they would be replaced with a minimal investment loading facility. Assuming 1,885 operating units were maintained each would handle about 20,000 tonnes on average per year. While such a system could be attractive from a cost standpoint several factors need to be considered. Foremost amongst these is the acceptability to producers of such a system. Will they be willing to spend additional time and labor in shipping their grain? Will peak demands on the system be able to be met? Will it be possible to draw forth the class of grain required? There appears little potential for such a system to result in any savings in rail costs.

Extrapolation of Trends

The grain handling system can be expected to continue to evolve in the future. An extrapolation of past trends may therefore provide some indication of the shape of the system in the future. If the trends established between 1974-75 to 1984-85 continue to 1994-95 the system will appear as in Table 3.
Table 3: Grain Handling System on Basis of Extrapolating Current Trends, 1994-95

<table>
<thead>
<tr>
<th></th>
<th>1984-85</th>
<th>1994-95</th>
<th>Change Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Elevator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receipts (million tonnes)</td>
<td>27.2</td>
<td>38.0</td>
<td>+40</td>
</tr>
<tr>
<td>Primary Elevator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacity (million tonnes)</td>
<td>8.0</td>
<td>6.6</td>
<td>-17</td>
</tr>
<tr>
<td>Number of Operating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Units</td>
<td>1,885</td>
<td>1,260</td>
<td>-33</td>
</tr>
<tr>
<td>Turnover Ratio</td>
<td>3.4</td>
<td>5.8</td>
<td>+70</td>
</tr>
<tr>
<td>Volume Per Operating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit (tonnes)</td>
<td>14,420</td>
<td>30,200</td>
<td>+110</td>
</tr>
</tbody>
</table>

Such a system should be more efficient than the present system. Indeed many of the more efficient existing elevators exceed a 5.8 turnover ratio and a handle of 30,200 tonnes. The reduction in the number of operating units would require greater use of trucking with increased length of haul. Road maintenance costs would therefore be increased. Depending upon the location of these elevators rail costs could be reduced significantly. Competition, on the other hand, could result in additional elevators being constructed at particular points. The question remains as to whether producers are willing to accept such a system.

Concluding Comment

The efficiency of the grain handling system continues to increase as elevators are closed and additional technology is introduced into both existing and replacement elevators. Significant additional gains in efficiency can be expected. These gains will largely arise from further centralization of the system. The acceptability of a highly centralized system to producers remains in doubt since there will be gainers and losers. Delivery and road maintenance costs will be increased. These could be more than offset by savings in elevator and rail costs. Each producer will tend to judge the merits of such a system on the basis of how he will be affected. In the past there has been a reluctance to make the adjustment associated with a more centralized system.
Grain Transportation and Railway Efficiency Gains

R. B. Boyd*

Why is Efficiency Such an Important Issue?

Transportation efficiency is always important, more so for bulk commodities where the transportation cost makes up a large proportion of the selling price. The average cost of transporting W.G.T.A. grain is currently $29 per tonne, and that is a sizeable percentage of a product whose selling price now ranges from $86 to $130 per tonne. Moreover, referring to the average obscures the fact that there are numerous movements which are of much more than average cost. Finally, large portions of Canada's western grain distribution network are known to be obsolete and inefficient. All these factors indicate there is a significant potential for savings.

Are the railways interested in achieving these savings? Definitely. Even though the Western Grain Transportation Act rate formula compensates CN and CP fully for associated costs, there are three important reasons why we want to reduce those costs:

1. To achieve better utilization of our plant and equipment. The grain car fleet and grain-related track assets are a fixed resource, which will require scarce capital to renew—thus it makes good sense for the railways to economize on them.

2. CN cannot prosper if the grain industry does not prosper. There must be an efficient distribution system in order to support Canada's competitive marketing thrust in grain products.

3. The railway has to maintain an efficiency lead over the highway line-haul carrier. If we do not, as producers pay a larger percentage of the total freight bill, we will lose business to more efficient competitors. We cannot stay as we are now and expect to thrive in a world where everyone else is progressing rapidly.

How Can Railway Efficiency be Achieved?

In the context of grain transportation, there are only five possible alternatives to make a railway movement more cost-efficient:

- larger trains
- more tonnes per carload
- more efficient utilization of assets: cars, locomotives and track
- less switching or marshalling of cars
- improved technology (including smaller train crews, cabooseless trains, etc.)

* Manager, Grain Transportation, CN Rail, Winnipeg.
Apart from future potential improvements in technology, the efficiency pinnacle for railway bulk commodity movements is the regularly scheduled unit train of 100 ton cars with rolling load/unload. In many ways, railway grain movements are already there. For one thing, the predominant rail car is the "100-ton" hopper, the heaviest possible car for our 263,000 lb-limit track. For another, trains now run at their maximum (siding) length for the majority of their journey, and cars are frequently grouped into solid trains of grain going to a single destination.

In significant ways, however, the railways have not been able to achieve this efficiency ideal. Many of the reasons pertain to limitations imposed by an out-of-date gathering system at the origin of the grain movement: that is, branch lines that limit car loadings well below the 100-ton level, or where volumes are too low to permit full-length trains without extensive marshalling upon reaching the main line. Some factors pertain to the destination, such as the lack of loop-track continuous unloading facilities. Inefficiencies at origin and destination add greatly to car cycles and switching (marshalling) costs.

What is the Record Thus Far?

Setting aside these limitations for a moment, CN has made strides in improving grain transportation efficiency since the passage of the Western Grain Transportation Act, and I'd like to describe some of the ways, past, present and future.

The 1984 versus 1980 costing review for grain traffic tells us that average train weight has increased by 12.6 percent and car switching time has been reduced by 20.5 percent. A significant factor in this is the spread of what CN calls the "true grain block" train operation. Simply put, this is an operating procedure which compacts the old three- or four-day branch line place/pickup operation into a 24-hour period.

Under this arrangement a train crew places a complete trainload of empty cars at the various points on a branch line during a single 8-hour shift (usually midnight to 0800), then ties up for rest at the end of the line. The cars are loaded by the elevators during the 0800-1600 shift; then the train returns and picks up the original cars, newly loaded, and moves them to a main yard on the 1600-midnight shift. Implementation of this requires changes in CN's crew operating procedures, and also the co-operation of elevator companies and the Canadian Wheat Board. Instances of the true grain block operation are numerous and increasing at CN. It helps reduce switching and car cycles and improves the efficiency of the initial train run.

CN has also been working to achieve greater car loads by experimentally raising loading limits on selected lightweight branch lines. We have increased gross weights per car from 220,000 to 250,000 lbs on lines where rail was lightweight but the underlying track structure was of high quality. The experiment is still being monitored by our Engineering Department, but efficiency gains are already evident in terms of moving equal grain volumes with fewer cars.
What More Has to be Done?

CN is working hard to achieve further productivity gains. In addition to the reasons mentioned before, there is a further one pushing us. CN has a longer average haul to port than does CP, and has more branch line weight limitations which reduce our average weight per car below CP's.

Under the averaging provisions of Western Grain Transportation Act rates this means our grain compensation is slightly less than CP's, and provides a strong inducement for CN to close the gap.

Using technology, we are further improving the efficiency of our trains. Advanced train control systems and fibre-optic radio transmission will reduce train dispatching costs permitting the removal of cabooses from our through trains when C.T.C. approval is received. We are constantly investing in more fuel-efficient locomotives. Track structure improvements are helping reduce track maintenance costs.

Furthermore, CN is working within the regulatory system to make grain movements more efficient. We see the appropriate use of incentive rates to be a powerful tool in this regard, sharing the cost savings of changes in loading procedures or other factors with shippers who are willing to make those changes. CN's short-lived introduction of an incentive rate package in 1984 has left an indelible mark on the grain industry's planning, and many discussions of efficiency now have reference to the use of rate incentives.

CN has been an active participant in the work of the Senior Grain Transportation Committee, particularly the ACSE (Administrative Constraints to System Efficiency) subcommittee. The SGTC functions as the grain industry's "board of directors" and ACSE has been the working group on the leading edge of seeking changes for the sake of efficiency.

The first subject addressed by ACSE was high-cost branch lines, and how to achieve an equitable solution for all to a system feature which acts as a millstone around the neck of productivity gains. The approach, an analysis of options using all participants' costs, from trucking to elevator to railway, has now become part of the mainstream of discussions involving branch lines. Subsequent work of the ACSE subcommittee will involve car allocation rules, demurrage, and other issues.

This leads to a fundamental question. Regulation, which is so much a part of Canada's grain distribution system and which provides insurance and stability to many participants, also beyond doubt provides serious impediments to efficiency. Researchers and industry members alike will have to address the questions of whether regulation should remain so much a part of the system, and which aspects should be reduced.

CN is committed to efficiency; we are also committed to operating in a commercial environment. We are prepared to take our lumps—or our
gains—in a world where regulation forms less a part of the distribution system and competition forms a greater part.

I invite the thinkers who will be planning the coming years of this industry to address this issue in the interest of a stronger position for Canada in world grain markets.
Recent and Potential Efficiency Gains in
Grain Related Rail Operations: Focus on Branch Lines

David J. Craig*

Many things are being done by CP Rail to improve efficiency in its operations and on its main lines. They include work on such diverse projects as:

- an advanced train control system;
- a computer-aided design/drafting and manufacturing system;
- diagnostic computers on locomotives;
- alternating current traction motors on locomotives;
- increased facilities for in-train inspections; and many more.

While each of these projects has a potential for increasing efficiency, they all apply to total railway operations, not just to grain. However, the lower variable costs they produce will benefit grain at the same time as they benefit all other railway traffic.

One other factor common to each of these projects is that the motivation for undertaking each of them has a commercial basis. The investments required to develop and implement the various measures must be justifiable on the basis that they will improve returns to the railway. This may result from cost savings the railway can retain or from enabling us to improve earnings through keeping or gaining business from competitors.

The rules that apply to rail transportation of grain are different. The commercial motivation is the same, but the ability to implement change--to invest in measures to promote greater efficiency--is often restricted to a large or small degree by the regulations affecting grain transportation.

Nevertheless, there are many special measures that can be undertaken to reduce grain transportation costs specifically. Several of these are being studied and tested, but reducing the size of the grain-gathering network--the branch line system--has far and away the biggest potential for reducing costs.

I will, therefore, direct my remarks to examining that potential.

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* Assistant Superintendent, Grain Development, CP Rail, Winnipeg.
Under the *Western Grain Transportation Act*, the costs of maintaining the branch line network, along with the costs of operating trains on those lines, contribute to the level of grain freight rates.

The *Act* provides for the averaging of all costs incurred in transporting grain. That includes the basic costs related to retention and maintenance of grain-dependent lines, as well as to operating costs which fluctuate according to the volumes of grain being moved. Rates for shipping grain are fixed each year at levels which aim at covering all of these costs, including the branch line costs.

A portion of those rates are paid by the federal government, through its Crop Benefit subsidy. The balance is paid by the shipper.

The rate-setting formula ensures that any reduction to overall costs that would result from eliminating branch lines would be reflected mostly or entirely in reducing the shipper portion of the rate. Thus, the savings from rationalizing the branch line network would, in the most part, go directly to shippers and grain producers. However, the benefits would be greater than the value of the line-related costs alone.

Eliminating a branch line from the network would reduce other system costs as well. Volume related costs would decline as rationalization allowed the use of larger collector trains and, eventually, solid train operations. Furthermore, there would be fewer primary elevator costs.

At the same time, there would be some offsetting additional costs, such as highway and trucking costs and capital costs for upgrading or replacing primary elevators at centralized delivery points to ensure that satisfactory service is maintained.

We recognize that identifying highway costs is difficult. It is not a purely scientific issue. This is an area where we are hampered by lack of an acceptable approach to highway costs. In my mind, the approach taken in the Senior Grain Transportation Committee study of the Inwood Subdivision is a reasonable treatment of the issue. However, a study has been done with federal and Manitoba government involvement, and it will be interesting to see what it shows.

Nevertheless, the key to achieving overall savings through rationalization of the grain-gathering system lies in identifying the potential for both savings and added costs, and comparing the two with a view to selecting those areas where savings exceed costs.

This work is well under way, both by collective and by individual efforts. A wide range of industry representation took part in a subcommittee study for the Senior Grain Transportation Committee. The result is known as the ACSE report—an acronym for "Administrative Constraints to System Efficiency"—and it has been distributed for consideration by all parts of the industry.

The ACSE report illustrates the potential for savings through replacing specific branch lines with trucks as part of the grain-gathering
system. The savings indicated would be sufficient to provide an overall benefit to the rates, even if allowance is made first to offset additional costs that might be produced for some participants.

The SGTC studies call for the costs of grain dependent branch lines to be ranked. The industry will then be able to review these rankings and seek some consensus on goals for rationalizing to increase overall efficiency and minimize overall costs.

The process is well underway now and, for its part, CP Rail has completed the first stage in the ranking of its own branch line network. We have determined the costs for each of our train runs on a per-tonne-mile basis. The data are presented in Table 1.

The 89 lines or line segments are ranked from highest cost to lowest cost in order, and are then listed in four groups or quartiles. This information has been illustrated in a map, a copy of which is provided in the pocket of the back cover of the Proceedings.

Looking at this map the rankings can be seen at a glance. The color blue represents the highest cost group of lines. Their average cost is 103 cents per tonne-mile.

Brown is for the next highest cost group or quartile at 26 cents per tonne-mile. Average cost for the lines in pink is 11 cents per tonne-mile, and for the lines colored gold, the average cost is 4 cents per tonne-mile.

The solid colored lines on the map are classified as grain dependent. Broken lines indicate those which are not.

This ranking is based on actual 1984 costs, which naturally reflect the operational patterns that were in effect then. The picture created, therefore, is like a snapshot which shows what things looked like at that moment in time.

The ranking also uses train runs as a basis, and reflects only the on-line costs of moving grain over the line segment to its junction with the remaining network. Those on-line costs include the costs of ownership, maintenance and property taxes together with costs which vary with the volume of grain moved on the line. The latter include crew costs, fuel, motive power, car maintenance, etc.

The A.C.S.E. Committee study employed a trucking rate of 18 cents per tonne-mile as a conservative estimate. This falls between the costs of CP Rail's second and third quartile lines, which are 26 and 11 cents per tonne-mile respectively.

Depending on the availability of back-haul traffic and length of haul, truckers may be able to offer rates for the movement of grain in the order of 10 cents per tonne-mile which falls below CP Rail's third quartile average of 11 cents per tonne-mile.
## Table 1: Train Run Cost Ranking Model. CP Rail and Gathering Costs - 1984

### Quartile I

<table>
<thead>
<tr>
<th>Line Segment</th>
<th>Miles</th>
<th>*Grain Dependent</th>
<th>Train Run Costs (cents per tonne mile)</th>
<th>Volume (in tonnes)</th>
<th>Tonnes /Mile</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Altawan Sub. (Notukeu-Manyberries)</td>
<td>55.3</td>
<td>1</td>
<td>No traffic</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>2 Empress Sub. (Empress-Leader)</td>
<td>23.6</td>
<td>1</td>
<td>No traffic</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>3 L du Bon Sub. (Beauséjour-B Hill)</td>
<td>28.4</td>
<td>1</td>
<td>No traffic</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>4 Kisbey Sub. (Stoughton-Weyburn)</td>
<td>36.8</td>
<td>1</td>
<td>316.52</td>
<td>6885</td>
<td>187.09</td>
</tr>
<tr>
<td>5 Coronation Sub. (Kerrobert-Major)</td>
<td>20.6</td>
<td>1</td>
<td>302.70</td>
<td>46661</td>
<td>2274.81</td>
</tr>
<tr>
<td>6 Fife LK Sub. (Coronach-Big Beaver)</td>
<td>17.7</td>
<td>1</td>
<td>214.86</td>
<td>5412</td>
<td>305.76</td>
</tr>
<tr>
<td>7 Kisbey Sub. (Arcola-Stoughton)</td>
<td>24.9</td>
<td>1</td>
<td>210.14</td>
<td>9377</td>
<td>376.59</td>
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<tr>
<td>8 L du Bon Sub. (Molson-Lac du Bonnet)</td>
<td>22.1</td>
<td>1</td>
<td>131.56</td>
<td>9956</td>
<td>450.50</td>
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<tr>
<td>9 WPG Beach Sub. (Riverton-Gimli)</td>
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<td>1</td>
<td>131.56</td>
<td>8578</td>
<td>348.70</td>
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<td>10 Stirling Sub. (Manyberries-Etzikom)</td>
<td>20.6</td>
<td>1</td>
<td>122.31</td>
<td>18045</td>
<td>875.97</td>
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<td>11 Glenboro Sub. (Carman Spur)</td>
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<td>1</td>
<td>102.05</td>
<td>13952</td>
<td>930.13</td>
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<td>12 Russell Sub. (Russell-Inglis)</td>
<td>12.8</td>
<td>1</td>
<td>97.07</td>
<td>30869</td>
<td>2411.64</td>
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<tr>
<td>13 Colony Sub. (Rockglen-Kildee)</td>
<td>24.6</td>
<td>1</td>
<td>88.52</td>
<td>8641</td>
<td>351.26</td>
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<tr>
<td>14 Neudorf Sub. (Esterhazy-Neudorf)</td>
<td>43.6</td>
<td>1</td>
<td>86.15</td>
<td>96939</td>
<td>2053.65</td>
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<tr>
<td>15 Reford Sub. (Kerrobert-Wikie)</td>
<td>42.8</td>
<td>1</td>
<td>75.98</td>
<td>56208</td>
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<tr>
<td>16 Assiniboia Sub. (Amulet-Assiniboia)</td>
<td>65.1</td>
<td>1</td>
<td>73.32</td>
<td>58749</td>
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<tr>
<td>17 Langdon Sub. (Cosway-Carbon)</td>
<td>18.2</td>
<td>1</td>
<td>66.42</td>
<td>35420</td>
<td>2186.42</td>
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<tr>
<td>18 Amulet Sub. (Ormiston-Crane Valley)</td>
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<td>1</td>
<td>65.85</td>
<td>17878</td>
<td>2321.82</td>
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<tr>
<td>19 Lomond Sub. (Vauxhall-Hays)</td>
<td>14.9</td>
<td>1</td>
<td>65.76</td>
<td>25015</td>
<td>1678.86</td>
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<td>20 Dunelm Sub. (Player-Simmie)</td>
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<td>1</td>
<td>60.04</td>
<td>28403</td>
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<tr>
<td>21 Russell Sub. (Binscarth-Russell)</td>
<td>11.1</td>
<td>1</td>
<td>59.54</td>
<td>44583</td>
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<td>22 Burstall Sub. (Schuler Spur)</td>
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<td>1</td>
<td>50.28</td>
<td>23584</td>
<td>4203.53</td>
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</table>

Weighted Average: Quartile I

<table>
<thead>
<tr>
<th>Miles</th>
<th>*Grain Dependent</th>
<th>Train Run Costs (cents per tonne mile)</th>
<th>Volume (in tonnes)</th>
<th>Tonnes /Mile</th>
</tr>
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<tr>
<td>103.67</td>
<td>1</td>
<td>120.38</td>
<td>3627.52</td>
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</tbody>
</table>

*GRAIN DEPENDENT line segments are indicated by the number one. All non grain dependent line segments are indicated by a zero.
# Quartile II

<table>
<thead>
<tr>
<th>Line Segment</th>
<th>Miles</th>
<th>Grain Dependent</th>
<th>Train Run Costs (cents per tonne mile)</th>
<th>Volume (in tonnes)</th>
<th>Tonnes /Mile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furness Sub. (Epping-Paradise Vly)</td>
<td>19.5</td>
<td>1</td>
<td>46.25</td>
<td>33177</td>
<td>1701.38</td>
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<td>Macleod Sub. (Macleod-Aldersyde Jct)</td>
<td>73.8</td>
<td>1</td>
<td>44.75</td>
<td>121456</td>
<td>1645.75</td>
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<td>Bassano Sub. (Empress-Bassano)</td>
<td>118.4</td>
<td>1</td>
<td>42.83</td>
<td>86458</td>
<td>730.22</td>
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<td>White Fox Sub. (Nipawin-Sharp)</td>
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<td>1</td>
<td>36.36</td>
<td>130908</td>
<td>1783.49</td>
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<td>1</td>
<td>35.01</td>
<td>81241</td>
<td>3008.93</td>
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<td>Gretna Sub. (Rosenfeld-Gretna)</td>
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Weighted Average: Quartile II

| Overall | 25.59 | 2138.08 |
|         | 12.72 | 3627.52 |

*GRAIN DEPENDENT line segments are indicated by the number one.
All non grain dependent line segments are indicated by a zero.
<table>
<thead>
<tr>
<th>Line Segment</th>
<th>Miles</th>
<th>*Grain Dependent</th>
<th>Train Run Costs (cents per tonne mile)</th>
<th>Volume (in tonnes)</th>
<th>Tonnes /Mile</th>
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Weighted Average: Quartile III

| Overall | 11.21 | 3293.12 |
|         | 12.72 | 3627.52 |

* GRAIN DEPENDENT line segments are indicated by the number one. All non grain dependent line segments are indicated by a zero.
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<th>Line Segment</th>
<th>Miles</th>
<th>*Grain Dependent</th>
<th>Train Run Costs (cents per tonne mile)</th>
<th>Volume (in tonnes)</th>
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Weighted Average: Quartile IV
Overall

4.12

12.72

6402.21
3627.52

*GRAIN DEPENDENT* line segments are indicated by the number one.
All non grain dependent line segments are indicated by a zero.
Figure 1 compares the range of truck costs of from 10 to 18 cents per tonne-mile with rail costs and it shows that trucking could be cheaper than rail movement for 50 to 75 percent of CP Rail lines. Line by line analysis, however, will be necessary to determine those lines whose abandonment would result in net system savings to the producer. The purpose of the map is to give an indication of where to start.

It is fair to say that the first step has been taken to identify the high cost lines. However, even after consensus is reached regarding the lines that should be removed from the network, there will still be another hurdle to vault before we can move effectively to remove those high-cost lines from the system. That measure is change in the legislation governing line abandonment.

Traditional procedures require a railway to show that a line is losing money before abandonment can be considered. Because W.G.T.A. traffic is now compensatory, the interests of the grain industry would be better served if abandonment decisions were to be based on demonstrating that the line is not required in a lowest-cost grain-gathering system. This would simplify the process of branch line abandonment and thereby reduce overall grain transportation and handling costs. It would, in this way, help speed up evolution of a lowest-cost system.

Bill C-126, tabled before the last Parliament, includes some measures regarding branch line abandonment.

It seems to me that it would be important to the grain industry to see that those measures work, and that they can be applied to grain-dependent branch lines. EP Rail is concerned that these provisions will not be very effective, and that some will not apply to grain-dependent lines. We will try to encourage the legislators to have another look at it.

If that is done, the process of identifying branch lines to be eliminated in the overall interests of the grain industry and the producer will have more significance. Applications for unfreezing any lines so identified can then proceed with confidence that it will be possible to achieve the desired reduction in system costs.
Figure 1: Train Run Cost Ranking Model. Truck/Rail Comparison
Discussant: Paul D. Earl

I would first of all congratulate all the speakers at this session for their fine papers. They give us an excellent starting point for the remainder of the conference.

I will start with Dr. Wilson's paper on efficiency and regulation, and I'd like to refer first to the quotations which he draws from Miltik. While this is a useful place to start in considering regulation in the Canadian grain industry, we have what I believe to be a further dimension to the regulatory environment in the grain trade which goes beyond these things which Dr. Wilson has quoted from Miltik, viz. the car allocation system. Under the allocation system, the flow of grain through country elevators is almost completely controlled by the regulatory agencies (the CWB and the GTA). The Board controls what moves into the elevators through the quota system, and the GTA and the Board control what moves out by car allocation. Dr. Wilson points out that the "competitive market requires risk taking and innovation," and in my view this very high degree of control exercised by the regulatory bodies makes it difficult to impossible for the grain handling companies and the railways to effect significant changes in the system.

This can be readily illustrated by imagining a grain handling company wishing to negotiate a unit train rate with the railways. Setting aside for a moment the legal difficulties under the Western Grain Transportation Act, such negotiations would usually require the shipper to commit himself to certain "conditions of carriage": minimum volumes; a certain number of cars to be shipped at one time; a limited number of destinations, etc. However, the grain shippers have only the most limited control over these kinds of things, and certainly not sufficient control to enter into meaningful negotiations with the railways. To ensure such conditions, the shipper would have to gain the co-operation of the Wheat Board. However, such co-operation is virtually impossible, because for the CWB to be party to such negotiations with one shipper would almost certainly raise charges of favoritism. The GTA ran into precisely this conundrum when trying to facilitate the movement of unit trains of feed grains to Thunder Bay.

So you can see that although Dr. Wilson's observations are very cogent, we have a situation in the regulatory environment in the western grain industry which is probably unique. Certainly I am not aware of another industry where the regulatory bodies have the kind of 'hands-on' day-to-day control that they do in the grain handling and transportation industry.

* Executive Director, Planning and Development, Grain Transportation Agency.
Turning to Mr. Weik's paper of course reminds us that the situation is not all bleak when looking at the introduction of efficiencies. The statistics which Mr. Weik presents are sometimes forgotten or ignored by critics of the present system. There has been a great deal of consolidation in the country elevator system, and a corresponding realization of efficiency.

On the other hand, we have to consider the figures Mr. Weik gives us with a critical eye. He suggests for example that the 5.8 times turnover which he projects for 1994/95 is "a very acceptable figure by today's standard." However, according to his projection, it is going to take us 10 years to get there. One wonders with the kind of cost squeezes that the farmer is facing, whether he can wait 10 years to get those kind of efficiencies into the system.

Let me now turn to Mr. Craig's paper. The first thing I would want to note is that this paper gives the lie to the contention that all the necessary studies in grain transportation have been done. Nothing like this kind of information has ever been put forward before, and it is extremely valuable. One or two years ago, as some of you know, one of the subcommittees to the Senior Grain Transportation Committee did some work on branch line abandonment, and this was precisely the kind of information which the subcommittee itself could have used and is precisely the kind of information which the subcommittee said should be made available in the country for producers.

I think there are a couple of key things to note in the information which this paper provides. The first is the comparison which can be made between the costs on the branch lines—which according to Craig's paper range from an average of $0.04 per tonne-mile in the lowest cost quarter to an average of $1.03 per tonne-mile in the highest cost quartile—and the average costs in the system—which can be very roughly estimated at $0.03 per tonne-mile (i.e., approximately $30 per tonne at an average haul of just under 1,000 miles). It is very evident from even this rough comparison how very inefficient the high cost branch lines are. It is amazing to think that we have pieces of branch lines that are costing more than 20 or 30 times the average—and note that is an average which includes in it some of those high cost portions—and we are asking producers to pick up inflationary costs on those pieces of line.

The second key point to note is the comparison which Craig's paper makes between rail costs and trucking costs. It is obvious again just how far we have to go to squeeze efficiencies out of the system to keep the system competitive.

Mr. Boyd's paper reminds us that there is no mystery about the way the grain handling and transportation system has to go. If we are going to keep our system competitive, and if we are going to minimize the costs involved in moving the grain from the farm to the market, we have to consolidate the system, make maximum use of scarce capital resources and introduce the most efficient rail and elevator techniques which we have at our disposal and we know almost exactly what that entails. It
means, as Boyd's paper points out, getting rid of the high cost branch lines and concentrating handling facilities to the point where they can support unit train and other kinds of multiple car movements. Boyd's paper also points to the pivotal role that incentive rates should be able to play in bringing about the kind of changes to which he refers.

Finally, Mr. Boyd echoes Art Wilson's paper in pointing out the costs of regulation.

Well, let me now try to bring some of these points together, and see what kind of a picture these papers present to us and what the picture tells us about future research needs.

First, both Weik and Boyd remind us that the system is not stagnant, and that all parties are working very hard at introducing efficiencies into their own systems, within the constraints of the regulatory system as it has developed.

Second, as is shown by Craig's paper and which is illustrated by Weik's 'acceptable' turnover figure that we are ten years away from, we aren't doing nearly as well as we have to in order to minimize costs between the farm and the ship.

Thirdly, regulation is impeding us in getting the kind of system we need. Our pricing system for rail service hides the costs of those $1.03 per tonne-mile branch lines by averaging them into the overall costs with the result that no one has any direct incentive to get rid of them. The restrictions on branch line abandonment, and the impediments which the Senior Grain Transportation Committee study I referred to identifies, make it difficult to impossible to get rid of high cost lines. The car allocation system, to which I alluded earlier, inhibits risk taking and innovation, and by concentrating control with central agencies (which have no responsibility for system efficiency) we have robbed the elevator companies (who do have the responsibility) of the necessary management freedom to implement efficiencies.

Now, although the papers paint quite clearly a picture of where we are, what they don't tell us—and perhaps we will get that from the rest of the conference—is where do we go from here, and what are the future research needs? In my view what is needed is more research on institutional issues. I think the SGTC study which I referred to on high cost branch lines provides one model for the way this kind of research can and might be done. A group of knowledgeable people, who are willing to take off their corporate hats, are brought together under this model, and asked to develop ways of breaking some of the regulatory logjams which prevent us from introducing some of the efficiencies we know, as an industry, we have to introduce.

I would also suggest that there are yet some information needs which we have to fill in our research efforts. Craig's paper provides the model here, and to generalize, I think we have to know more about the costs of regulation. Craig's work tells us something about the costs of branch line regulation. What are the costs of car allocation regulation?
Discussant: Gene C. Griffin*

The underpinning of Art Wilson's paper is the implicit assumption that economic efficiency is the holy grail of public policy. I personally find that acceptable in its application to grain transportation because of the internationally competitive nature of the world grain trade in which both Canada and the United States are major participants. If a country's grain and oilseed production must compete in international markets for a finite demand it should be allowed to do so in the most efficient manner possible.

Art Wilson lists three reasons why regulation is imposed by government which are as follows:

1. Certain industries are perceived as so important as components of the infrastructure of the economy that the competitive market has been rejected in favor of direct public control.

2. Certain industries have economic characteristics which qualify them as "natural monopolies".

3. Competition for one reason or another is simply unworkable.

A great deal of caution must be exercised when applying the third rationale, competition is simply unworkable. It becomes a justification for those who desire regulation when none is necessary for the good of the body politic as a whole. Such a rationale which is not based on a general proof can be used to support regulation which serves special interests.

Art's assertion that regulation stifles innovation and aggressiveness in the marketplace and encourages stability and the status quo is applicable to grain transport. Several changes have improved efficiency in the United States grain transportation system since the advent of deregulation of the railroad industry. Furthermore, it has been my personal observation that multi-car rates have also stimulated innovation in grain buying and handling as well as in grain transportation.

Art relates the problems of dislocation after deregulation takes place to a field of boulders which are left after a glacier recedes. There is no doubt that when regulation is significantly diminished or eliminated it will have an impact on firms and individuals that are in some state of equilibrium. However, I would caution against too much concern; but not to the point of being callous. The industries and firms in grain transport and merchandising affected by deregulation, both directly and indirectly, seem to be quite resilient and probably can adjust to change far easier and better than they are given credit for.

* Director, Upper Great Plains Transportation Institute, North Dakota State University.
In the section addressing the "evaluation of regulation in the system," Art refers to the effect of tariffs being set above and below marginal costs. The analysis should be extended beyond that of the base case of a single product firm to that of a multi-product firm which practices price discrimination to maximize its profits. This is, in essence, what transportation firms achieve by establishing class and commodity rates.

Art Wilson's conclusions are consistent with what has taken place and has been observed in the United States. Deregulation has resulted in a far more efficient grain transport system responsive to the needs of producers and merchandisers. Maybe efficiency and regulation are compatible, but it seems that it is terribly difficult to predict when that will occur in a dynamic economy which continually experiences technological, social, political and economic change.

Ron Weik's paper documented significant gains in efficiency in the country grain handling industry. It appears that the motivation for increased efficiency and the resultant change was profit. Although this is consistent with sound business practices and goals that should be encouraged, an outside stimulus may improve the system further. One cannot rely on the goal of profit maximization as the sole motive for increased efficiency. At some point profits and efficiency will stabilize, given no change in technology because individuals will begin to trade off leisure time with profits. Thus, competition within and amongst industries is important as well as incentives offered by industries that serve the country grain handling industry such as the railroad industry. One of the incentives for efficiency offered to the country grain handling system by the railroad industry in the United States is multiple car rates. Multiple car rates for 25, 50, 75 and 100 cars have resulted in efficiency gains of major proportions in the United States country grain merchandising system in the past fifteen years.

Ron speculates whether farmers will accept continued change in the country grain handling system. I would suggest that it will depend on whether the producer is convinced that he will end up a gainer or a loser and/or of the absolute necessity of the change. If it can be shown to producers that they will receive sufficiently higher prices to cover increased farm trucking costs, they will accept such changes. Additionally, there will probably be acceptance of the changes, albeit grudgingly, if they are necessary to remain competitive in the international market.

A word of caution should be made regarding Mr. Weik's projections of efficiency gains in the future. The projected gains are partially based on a forty percent increase in volume. I would be very hesitant in today's international economic and technological environment to make such an assumption. Furthermore, this puts one in a vulnerable business position if corporate policy and decisions are based on such an assumption and it is not fulfilled.
Both Rick Boyd and David Craig focused on efficiency gains as a result of operational, equipment or technological changes. They did not address potential gains from improving management and labor productivity or potential gains from improvements in transportation. In a regulated environment changes in these areas were stifled in the United States. After railroad regulation was significantly relaxed both of these areas proved to be very fruitful in terms of efficiency gains.

Mr. Boyd referred to the level of competition in the international grain market. He is absolutely correct in his assertion that "there must be an efficient distribution system to support strong market competition for Canada's grain products." All of the players in the international grain market will be either advantaged or disadvantaged by the efficiency of their distribution system.

More emphasis needs to be put on the role that marketing can play in creating efficiencies. Questions such as whether solutions have to be equitable to be implemented and can you compete with the present regulatory system must be asked of yourself.

Mr. Craig was critical of the regulatory system for he believed ultimate efficiency gains would not be achieved if the test for branch line abandonment was profitability was used as compared to evaluating the rail network in more of a systems context. There is no doubt that network design should be evaluated in systems context; however, if rates and service were determined by market forces the issue would probably be self resolved. Branch lines which were not viable in the long run would become unprofitable and therefore could be abandoned in such an environment. I'm not suggesting that you would allow railroads to price discriminate between line segments, but to discriminate on the base of efficiency, i.e., volume rates.

Future grain transportation research should encourage and address competition. None of us exist in a closed economy but in a much larger world economy. Regardless of institutional and political constraints on the system we must all strive for efficiency gains if we hope to survive in the future.
III. ECONOMIC AND SOCIAL IMPACT RESEARCH

Road Impacts of Heavy Oil Trucking:
Some Lessons for Trucking of Grain

Gordon A. Sparks

Introduction

In the past ten to fifteen years there has been considerable debate about the impact that increased trucking of grain would have upon the cost of providing and maintaining the rural road network. This debate has at times been highly emotional and sometimes very political. A somewhat disturbing feature about most of the debate is the lack of understanding of the engineering details exhibited by most of the participants, plus the lack of any credible empirical data to support the positions put forward.

In a general context, the issue of quantifying the impact of heavy truck traffic on gravel roads and thin pavements has been a subject of considerable interest not only in the developed world but also in Third World countries in the early stages of development. Further, road impact has also been a subject of interest in western Canada in the context of the development of the heavy oil industry in north central Saskatchewan and east central Alberta.

Conventional light and medium crudes are typically pipelined from the wells to cleaning facilities and/or pipeline terminals. The crudes in the heavy oil areas of western Canada are so viscous that they cannot be pipelined more than about one-half mile. As a result, much of the oil produced in these regions must be collected by truck and hauled over the rural road networks in the producing regions.

* Session chaired by D. F. Kraft, Professor, Department of Agricultural Economics, and Director, Solomon Sinclair Farm Management Institute, University of Manitoba.
** Professor, Department of Civil Engineering, University of Saskatchewan.

1 This paper is in part a summary of a project commissioned by Saskatchewan Energy and Mines in 1985 undertaken by Sparks and Associates Ltd., Saskatoon. The project report was entitled: "The Impact of Heavy Oil Development on Highways and Municipal Roads in Saskatchewan," January 1986.
In 1985, the Saskatchewan Department of Energy and Mines in co-operation with Saskatchewan Highways and Transportation and Saskatchewan Rural Development commissioned a project to assess the impact of heavy oil development on regional highways and municipal roads within six rural municipalities (RMs) in the heavy oil producing areas in the west central portion of the province. In connection with this project a theoretical framework was developed and considerable empirical data was presented relative to the impact of increased heavy truck traffic upon gravel roads and thin pavements. Limitations of time and space preclude the presentation of all of the project results here, therefore the following will focus on the essence of the empirical data. As will be noted in a later section, many if not most of the conclusions reached for the heavy oil situation are directly transferable to the issue of road impact associated with grain assembly.

Traffic Volumes

Figure 1 illustrates the locations of the RMs with heavy oil production relative to the province generally. Many main roads have in excess of 100 vehicles per day and some of the heavily travelled have 300–500 vehicles per day as illustrated in Figure 2, RM Heart's Hill No. 352.

Few of the roads, even the main ones, have traffic volumes greater than 100 vehicles per day in RMs having light to medium crude oil production. An example of such traffic flows is provided in Figure 3, RM Oakdale No. 320. Few roads in agriculture-based municipalities have traffic volumes that exceed 100 vehicles per day, RM Fish Creek No. 402 being a good example (Figure 4). Figure 5 identifies the location of the RMs involved in the study.

Figure 6 presents a comparison of the total travel in terms of total vehicle kilometers travelled per day for each of the RMs with heavy oil, with light-medium oil and with agriculture only. This comparison illustrates as one might have concluded from the traffic flow maps, that in general RMs with heavy oil production experience significantly more traffic than do RMs with light-medium crude or only agriculture.

Figure 7 illustrates the composition of the traffic found in each of the six RMs under study having heavy oil production. It may be noted that in all RMs with significant heavy oil activity (i.e., all RMs except RM 501 where heavy oil activity is limited), that 30–40 percent of all traffic is heavy truck traffic (i.e., larger than 1/2 tonne) with much of this (i.e., probably about two-thirds on average) associated with heavy oil and the remainder associated with agricultural and other activity.

Figure 8 summarizes the monthly production of crude oil in the Lloydminster area between 1980 and 1984. It will be noted that production has generally increased over the four-year period from 160,000–180,000 cubic meters per month to 250,000–280,000 cubic meters per month. It will also be noted that there are not any dramatic differences between the production in one month compared to the next, with the exception of March and/or April each year when road bans are implemented. This ob-
Figure 1: Study Area Location
Figure 2: Traffic Flow Map
R.M. of OAKDALE NO. 320
(LIGHT/MED OIL)
W OF 3RD

Figure 3: Traffic Flow Map
Figure 4: Traffic Flow Map
Figure 6: Total Travel in RM vs. RM Type
Figure 7: Composition of Traffic - % Total Traffic by Type for RM's
Figure 8: Monthly Crude Production. Area 1 - Lloydminster
servation related to production indicates that the truck traffic associated with oil assembly does not exhibit dramatic seasonal variations. This is important relative to determining road impact.

Table 1 summarizes the monthly produced fluid arrivals at typical cleaning plants within the region. It is noted that the total fluids arriving vary substantially in volume from plant to plant, volume varying from a low of about 1000 m³ (50 truckloads per month, or two a day) to a high of about 15,000 m³ (750 truckloads per month, or 25 per day). As a point of interest, 750 trucks/month translate into about 100 equivalent 18 kip axle load repetitions (ESAL's) per day. This exceeds the truck loadings on many of Saskatchewan's secondary highway systems. Put another way, some of the roads in the heavy oil areas are being subject to very heavy truck traffic. To illustrate, in the context of grain assembly, an elevator would have to handle about 9 million bushels per year to generate the same truck traffic as that generated by a cleaning plant handling 15,000 m³/month of trucked fluids.

Costs of Maintaining Gravel Roads

During the course of the heavy oil road impact project, detailed data were assembled related to the costs of maintaining gravel roads. Figure 9 illustrates the results of the analysis of this detailed data related to regravelling and blading costs as well as an empirical model developed over the years by the Saskatchewan Department of Rural Development.

It is noted that regravelling and blading costs are approximately equal and that on average it costs a minimum of about $400/km/year at low volumes (i.e., less than 100 vehicles per day) and increases to $1,000-1,200/km/year at high volumes (i.e., 500 vehicles per day).

Table 2 summarizes and Figure 10 illustrates the total average expenditures by RM type for the RMs studied. Figure 11 illustrates the functional relationship between total annual transportation services expenditures and average total vehicle travel for the RMs studied.

Clearly, on average, RMs with heavy oil production and therefore greater heavy traffic spend more on maintaining roads than do RMs having light/medium oil or only agriculture traffic. Some considerable care must, however, be taken in interpretation of these results. For example, from Figure 10 it is noted that RM 501 and RM 502 spend about the same (i.e., $500,000) per year on transportation, yet RM 502 has twice the total traffic. Similarly RM 501, RM 352 and RM 469 have about the same total travel (i.e., 20,000 vehicle km/day), yet RM 501 spends $500,000 per year while RM 352 and RM 469 spend about $350,000 per year to do presumably the same job (i.e., each RM has about 240-270 kms of total road).

Costs of Maintaining Thin Pavements

While the mechanisms of distress and failure are similar for gravel surfaces and thin pavements or oil surfaces, it is much more expensive to repair the thin pavements or oil surfaces. That is, the requirement
### Table 1: Monthly Produced Fluid Arrivals at Typical Cleaning Plants (in cubic meters)

<table>
<thead>
<tr>
<th>Cleaning Plant</th>
<th>Alberta Truck</th>
<th>Saskatchewan Truck</th>
<th>Total Truck</th>
<th>Flow-Lined</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1558.4</td>
<td>1558.4</td>
<td>1157.4</td>
<td>43%</td>
<td>2721.8</td>
</tr>
<tr>
<td>2</td>
<td>811.4</td>
<td>811.4</td>
<td>6206.9</td>
<td>89%</td>
<td>7114.6</td>
</tr>
<tr>
<td>3</td>
<td>21.6</td>
<td>-</td>
<td>5252.0</td>
<td>100%</td>
<td>5852.0</td>
</tr>
<tr>
<td>4</td>
<td>5284.8</td>
<td>5306.4</td>
<td>2129.8</td>
<td>29%</td>
<td>7436.2</td>
</tr>
<tr>
<td>5</td>
<td>59.2</td>
<td>1688.2</td>
<td>1747.6</td>
<td>22%</td>
<td>2242.3</td>
</tr>
<tr>
<td>6</td>
<td>11037.1</td>
<td>11037.1</td>
<td>9013.0</td>
<td>45%</td>
<td>20050.9</td>
</tr>
<tr>
<td>7</td>
<td>-</td>
<td>-</td>
<td>24411.1</td>
<td>100%</td>
<td>24411.1</td>
</tr>
<tr>
<td>8</td>
<td>-</td>
<td>-</td>
<td>4935.7</td>
<td>100%</td>
<td>4935.7</td>
</tr>
<tr>
<td>9</td>
<td>15102.6</td>
<td>15102.6</td>
<td>3727.6</td>
<td>20%</td>
<td>18830.2</td>
</tr>
<tr>
<td>10</td>
<td>801.9</td>
<td>6543.3</td>
<td>7345.2</td>
<td>36%</td>
<td>11465.8</td>
</tr>
<tr>
<td>11</td>
<td>1161.6</td>
<td>1161.6</td>
<td>122.9</td>
<td>10%</td>
<td>1284.5</td>
</tr>
</tbody>
</table>

Source: Industry Representatives
Figure 9: Annual Cost for Blading and Gravelling vs. Traffic
<table>
<thead>
<tr>
<th>RM No.</th>
<th>1983</th>
<th>1984</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy Oil Developments</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>352</td>
<td>344,000</td>
<td>329,000</td>
<td>337,000</td>
</tr>
<tr>
<td>469</td>
<td>365,000</td>
<td>288,000</td>
<td>327,000</td>
</tr>
<tr>
<td>471</td>
<td>516,000</td>
<td>633,000</td>
<td>575,000</td>
</tr>
<tr>
<td>472</td>
<td>778,000</td>
<td>945,000</td>
<td>862,000</td>
</tr>
<tr>
<td>501</td>
<td>439,000</td>
<td>530,000</td>
<td>485,000</td>
</tr>
<tr>
<td>502</td>
<td>542,000</td>
<td>462,000</td>
<td>502,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>515,000</strong></td>
</tr>
<tr>
<td>Light/Medium Oil Developments</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>715,000</td>
<td>505,000</td>
<td>610,000</td>
</tr>
<tr>
<td>66</td>
<td>218,000</td>
<td>384,000</td>
<td>301,000</td>
</tr>
<tr>
<td>139</td>
<td>285,000</td>
<td>212,000</td>
<td>249,000</td>
</tr>
<tr>
<td>168</td>
<td>480,000</td>
<td>363,000</td>
<td>421,000</td>
</tr>
<tr>
<td>320</td>
<td>410,000</td>
<td>404,000</td>
<td>407,000</td>
</tr>
<tr>
<td>321</td>
<td>118,000</td>
<td>160,000</td>
<td>139,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>355,000</strong></td>
</tr>
<tr>
<td>Agriculture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>73</td>
<td>342,000</td>
<td>270,000</td>
<td>306,000</td>
</tr>
<tr>
<td>245</td>
<td>-</td>
<td>-</td>
<td>255,000</td>
</tr>
<tr>
<td>246</td>
<td>357,000</td>
<td>185,000</td>
<td>271,000</td>
</tr>
<tr>
<td>340</td>
<td>232,000</td>
<td>275,000</td>
<td>254,000</td>
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<tr>
<td>402</td>
<td>191,000</td>
<td>218,000</td>
<td>205,000</td>
</tr>
<tr>
<td>436</td>
<td>219,000</td>
<td>253,000</td>
<td>236,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>255,000</strong></td>
</tr>
</tbody>
</table>

Source: RM Financial Statements
Figure 10: RM Transportation Services Expenditures (Average of 1983 and 1984 Expenditures) versus RM Type
for regravelling and regrading of gravel roads is primarily associated with subgrade failures. While these can be easily repaired in the case of a gravel road, this is not the case with thin pavements or oiled surfaces. Subgrade failures in thin pavements and oil surfaces require that the subgrade be excavated, dried and recompacted for repairs to be effective. Repairs of this nature not only require an expensive rework of the subgrade, but also require the replacement of the paved or oiled surface. Similar problems with a gravel road, on the other hand, require only blading and perhaps the addition of some gravel. While it costs a few hundred or maybe a thousand dollars per kilometer per year to maintain a gravel road subjected to heavy truck traffic, it has been found to cost several thousand dollars per kilometer per year to maintain a comparable thin pavement (i.e., in one RM it cost $40,000 to repair 4 kms of thin pavement and it required redoing each year).

Thin pavements do not have any more, and in fact may have less, structural strength than gravel roads. Failure of the subgrade is common for both gravel roads and thin pavements when subjected to the stresses imposed by heavily loaded trucks. The repair of failed subgrade under thin pavements requires in essence reconstructing the road.

Implications for Grain Assembly

The truck volume traffic patterns and the concentration of trucks involved in grain assembly are a direct function of the number and location of delivery points.

If one assumes that a rationalized grain assembly system would result in delivery points handling 5 million bushels per year, delivery points would be spaced at about 30 km (i.e., one per RM) and require 5,000 - 5-axle semitrailer truckloads per year to deliver the grain. Similarly if the annual handling increased to 10 million or 20 million bushels, the spacing would increase to about 50 and 70 kms respectively (i.e., one for every 2 RMs) and require 10,000 and 20,000 semi loads per year to deliver the grain. Since seasonal delivery is clearly a consideration in grain assembly (while it isn't in the case of heavy oil), it is probably reasonable to assume that the grain is delivered over about 200 days per year. Therefore on average, a delivery point handling 5 million bushels per year would cater to about 26 semitrailer trucks per day. Points handling 10 million and 20 million bushels per year would on average handle 50 and 100 trucks per day, respectively.

The above noted truck volumes are clearly comparable or exceed those currently observed serving the oil cleaning plants and/or pipeline terminals in the Lloydminster heavy oil area. Further, with the exception of seasonality, the characteristics of the hauls are in many ways very similar (i.e., many origins spread out over the RM to a few destinations).

While it is impossible to make specific conclusions by comparing the experience with the oil haul with the situation expected to evolve relative to grain, some general conclusions are possible. They include:
1. The roads in the RMs with heavy oil development have been subjected to substantial increases in heavy truck traffic with, in many cases, gravel roads handling as much traffic as many provincial highways.

2. In general it has been possible to provide an acceptable level of service on gravel roads subjected to heavy truck traffic. However, dust is a problem (safety and general nuisance) and it costs more to provide and maintain the roads than it would without the additional truck traffic (i.e., it costs on average $515,000 per year in the heavy oil RMs to provide and maintain the roads compared to $255,000 per year in RMs with only agriculture). To give an order of magnitude estimate of the total cost of road impacts, if all RMs in Saskatchewan experienced the same increase in costs of providing roads for grain assembly as did the RMs in the heavy oil area for oil assembly, the annual increase would be about $75 million (i.e., $250,000 per RM x 300 RMs).

3. Thin pavements and oil treatments will not perform satisfactorily if subjected to truck traffic (i.e., a single heavily loaded farm truck could fail a thin pavement throughout its entire length in a single pass). It can cost several thousand dollars per kilometer per year to maintain a thin pavement or oiled surface if heavy trucks are permitted to use the roadway.

4. In general, gravel roads can be expected to perform acceptably at reasonable additional cost if subjected to increased traffic associated with grain assembly; however, thin pavements and oil treatments can be expected to be a serious problem in terms of both level of service and costs. Given that there are several thousand kilometers of this type of road in Saskatchewan, it is a matter that should not be ignored or taken lightly, particularly in light of the fact that much of the concentrated truck hauls would probably be on these types of roads as opposed to gravel or heavy duty pavements.

5. In summary, the road impact associated with rationalizing the grain handling and transportation system is an important consideration particularly in light of the RMs inability to incur increased costs without some financial assistance from senior governments. On the other hand, the necessary understanding does exist to rationally determine the road impact and should therefore be done as part of the analysis related to rationalizing the grain assembly system. Further, while the road impact can be anticipated to cost some money, there is every reason to believe that this impact can be properly managed and relative to the hundreds of millions of dollars being thrown at other components of the system, the road impact is probably a minor problem.
Changing Grain Freight Rates and The Impact on Livestock

Andrew Schmitz and Ken Rosaasen

Introduction

The outcome of the pay the producer or pay the railway debate will have an impact on Canada's livestock industry. This paper discusses the regional implications of freight rate changes for grains. It also places the Canadian livestock industry in perspective by focussing on profitability and policy uncertainty.

Proposed Grain Freight Rate Changes

The following discussion deals with the regional location of livestock production in Canada as a result of freight rate changes as contained in Bill C-155. Under the former Crow rate schedule, there were only small freight rate differences among various regions of the prairies. This is no longer the case under Bill C-155 especially if the pay the producer approach is adopted. Figure 1 shows the base rate (which is similar to the original Crow rate but with modest adjustments) and a multiple of these rates (e.g., 5x and 7x). The rail revenue shortfall in transporting grain in a given year will determine the multiple for the base rate. For example, a shortfall of $659 million may require a multiple of 5 to generate the required revenues; a shortfall of $920 million would require a multiple of roughly 7 under pay the producer approach. At zero inflation and with the volume cap provision not being exceeded, the producer costs under pay the railway approach would remain at the base level in Bill C-155, thus producer freight costs would be similar to the former Crow rates.

* Professors, Department of Agricultural Economics, University of Saskatchewan.

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3 However, with positive increases in transport costs due to inflation and/or volume increases, the size of the railway revenue shortfall increases beyond $659 million. Part of this cost increase is paid by producers; the government picks up inflationary increases beyond the 6 percent level. A higher rail revenue shortfall cannot be covered by 5 times the base rate. Thus, despite the pay the railway provision, normal inflation rates will increase freight costs to producers.
Figure 1: The Freight Rate for Various Distances under Bill C-155, at 5 Times and 7 Times the Base Rate.
Producer enterprise choices within the prairie region (i.e., intraregional) are affected by the rate structure in Bill C-155. For example, a livestock producer at Lloydminster would experience a greater reduction in feed costs than a livestock producer at Winnipeg under a pay the producer method of payment. Implementation of Bill C-155 establishes the pattern for freight rate increases in the future. As shown, future rates are a simple multiple of the base rate. If a pay the producer scheme is adopted, these are the rates which a farmer will face. Consider a pay the producer approach and assume that the rate rises to 7 times the base rate. The freight rate at Winnipeg would then rise from 14.36 cents/cwt (base rate) to 100.52 cents/cwt but at Lloydminster, the rate would increase from 24.19 cents/cwt to 169.33 cents/cwt. A wheat producer in the Winnipeg area would experience a 51.7 cents/bushel increase in transportation costs, the increase at Lloydminster would be 87.1 cents/bushel. Costs increase more rapidly for distant shippers.

Table 1 shows how the incentive to shift production, for example, from wheat to canola or from export barley to barley for local use differs between Winnipeg and Lloydminster. The returns per cropped acre for alternate crops at Lloydminster versus Winnipeg are given in Table 1. Yields of 25 bushels/acre of canola, 40 bushels/acre of wheat, and 60 bushels/acre of barley are assumed. Canola has a lower yield per acre and a higher value per bushel than wheat or barley. At 7 times the base rate, assuming the relative world prices for the three commodities provide the same profit potential or loss as in the recent past, a producer at Lloydminster could reduce his loss from $41.80 per cropped acre exporting barley to $18.14 per cropped acre of canola for export. However, for a producer at Winnipeg the shift from exporting barley to canola has a smaller saving of $14.04 per cropped acre. Likewise diverting acres from wheat to canola would save a producer at Lloydminster $16.79 per cropped acre ($34.93 - $18.14), whereas at Winnipeg it would only save a producer $9.90 per cropped acre. Thus, the incentive to grow high value crops is much greater at distant shipping points such as Lloydminster relative to nearer export positions such as Winnipeg.

There is also an incentive to avoid the freight cost by using the grain locally. Thus, the freight cost increase will mean more cattle feeding and hog production in the distant regions, as compared to low freight cost regions. The change in the Crow rate does not simply change resource allocation between east and west: it also affects allocations within western Canada.

Most have argued that the change in freight rates might affect the east-west production pattern of livestock in Canada. However, the impact within the prairie region could be even more significant. For example, a 7 times the base rate at Lloydminster relative to Winnipeg (which is not the lowest freight zone in Manitoba) results in a change in relative grain prices within the western region which is almost as large as the relative price change between Winnipeg and Montreal. The

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* This illustration ignores the safety net provision, which may be triggered under assumptions of low grain prices.
decline in grain prices at Winnipeg versus Montreal for barley is $18.99/tonne. The decline at Lloydminster versus Winnipeg is $13.00/tonne. Livestock production in Lloydminster and Winnipeg are in the same regional market on the prairies. Distant prairie points (i.e., the Saskatchewan-Alberta order area) will have the greatest incentive to increase livestock output based on feed grain price reductions. The pay the producer option clearly triggers greater resource shifts than would pay the railway option under every transportation cost increase scenario because the freight costs that are visible to the producer are much greater under the pay the producer approach.

Table 1: The Impact of Bill C-155 (with 7 x Crow) on Returns per Cropped Acre for Selected Points

<table>
<thead>
<tr>
<th>Point</th>
<th>Wheat Export for</th>
<th>Canola Export for</th>
<th>Barley Export Used</th>
<th>Barley Export Locally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lloydminster</td>
<td>1,084.5 miles to Thunder Bay, New Rate Scale</td>
<td>-34.83</td>
<td>-18.14</td>
<td>-41.80</td>
</tr>
<tr>
<td>Winnipeg</td>
<td>419.1 miles, New Rate Scale (7 x base), 100.52¢/cwt</td>
<td>-20.67</td>
<td>-10.77</td>
<td>-24.81</td>
</tr>
</tbody>
</table>

$ Returns/Cropped Acre


Consider three farms: (1) a two-section specialized grain farm that exports all of its grain, (2) a one-section grain/hog farm that grows all of its own feed plus a small amount of grain for export, and (3) a specialized stand-alone hog operation that purchases all of its feed. For example, if all of these farms are in the Lloydminster area, and one assumes 5 times the Bill C-155 base rate, the decline in income for the two-section farm is $17,835 per year (Table 2). If one assumes that under present conditions each of the farmers make a net income of $35,000 (the wheat farm), $30,000 (the hog-grain farm) and $25,000 (the straight hog operation), then after the freight rate increase, prior to compensation, the income adjusts as follows: the grain farmer's income would fall by $18,835, the hog-grain enterprise's income would be unchanged but its wheat export value would decline by $3,536; the stand-alone hog operation would increase returns by $14,352. Under these assumptions,
Table 2: Comparison of Farm Incomes at Lloydminster for Three Enterprises

<table>
<thead>
<tr>
<th></th>
<th>Assumed Income at Base Freight Rate (prior to compensation)</th>
<th>Income with 5 x Base Rate</th>
<th>Income with Producer Compensation</th>
<th>If a Producer Payment Results in 20 percent Dilution</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Section (Straight grain)</td>
<td>$35,000</td>
<td>$17,165</td>
<td>$34,957</td>
<td>$31,373</td>
</tr>
<tr>
<td>1 Section Grain/Hog (55-Sow Operation)</td>
<td>30,000</td>
<td>26,464</td>
<td>35,360</td>
<td>33,568</td>
</tr>
<tr>
<td>A Stand-alone Hog Operation (110 Sows)</td>
<td>25,000</td>
<td>39,352</td>
<td>39,352</td>
<td>39,352</td>
</tr>
</tbody>
</table>

1 These incomes are assumed only to show the relative shift when freight rates are adjusted. The assumptions are constant product prices for grain and market hogs.

2 A Crow benefit of $13.90 per acre is assumed for the Lloydminster area and no dilution is considered. The added cost for a grain producer due to elevator rationalization and longer trucking distances would be an income loss to a straight grain producer but is not considered. Likewise it would be a further incentive for a mixed hog grain producer to expand his hog operations.

3 Assuming a 20 percent dilution factor since historical production exceeds shipments due to seed, feed waste and dockage and grain utilized locally. This could differ for each producer depending on his level of production, soil quality and the base chosen for estimating producer payments.

Grain production would become the least profitable, even though initially it was assumed to be the most attractive enterprise. With an assumption of some dilution in the acreage payment so the grain farmer's income is not restored, the straight grain farmer's income falls to $31,373 and the specialized hog producer's income rises to $39,352. With the pay the producer method of payment the specialized hog opera-
tion and mixed enterprises gain relative to a straight grain farm. 4

The implications for resource use shift within the prairie region become apparent if one were also to construct comparable budgets for the Winnipeg area. The positive impact for livestock production is reduced as is the negative impact on grain producers under a pay the producer approach.

Studies published to date that incorporate the projected impacts of Crow changes do not explicitly consider any subregional effects within the west. It is surprising that the research on a subject so important as the freight rates for each prairie point was undertaken and completed so quickly, given the tremendous impact of the rates on production activities and enterprise units within the prairie region. In analysis of the impacts of changing freight rates, the prairies are often treated as one homogeneous region with respect to the other parts of Canada.

As shown above, freight rate changes affect the relative profitability of enterprises. However, there are important questions concerning the freight rates in Bill C-155.

1. The new rate assumes that the cost per mile of transport is identical whether moving east or west, even though it costs less to move 800 miles east versus 800 miles over the Rocky Mountains. At one time the mountain territory had a higher scale of rates known as the mountain differential; it was one and one-quarter times the rate of moving east from the prairie territory.

2. "The new rate treats the distance from Calgary to Vancouver as equal to the distance from Edmonton to Vancouver, as was the case with the former Crow Rate. The mileage difference is about 124 miles. This is presumably to allow for competition between the railways by allowing them to charge the same rates. The ports of Vancouver and Prince Rupert are assessed the same rates in order to allow port parity despite the difference in mileage. Are not the distortions listed above the same kind of distortions that advocates of change sought to avoid in order to encourage economic efficiency? These rates, in the authors' view, are not cost-related and therefore create distortions similar to those of the past." Rosaaen and Schmitz, p. 68.

3. The new rate structure makes provision for the use of incentive rates which may result in the closure of some shipping points and some branch lines. This could cost an additional 10 to 15 cents per bushel. A producer who is 50 miles from Lloydminster and has his point closed may now have an additional incentive to grow higher-valued crops or to feed livestock.

4 The pay the railway method would maintain the income levels if zero inflation were assumed. With inflation it slowly provides decreased income to straight grain farmers and increased incomes to livestock or mixed grain-livestock operators.
4. As shown earlier (figure 1), under the new rate structure of Bill C-155, the rates begin to increase more rapidly per 25 mile increment beyond the 1,250 mile distance. The result is a "dogleg" in the rates. However, why should it cost more to travel the 1,300th mile than it does to travel the 800th mile? One would expect the opposite in that rates should decrease with distance because of the high cost of loading and unloading at the terminal points. This distortion becomes particularly important under the pay the producer approach. In addition to the earlier discussion, there are other considerations. For example, the port of Thunder Bay is closed for approximately four months of the year between mid-December and early April. The result is that shipments from, for example, Yorkton during the winter months may no longer be feasible because of the extremely high rates assessed in going the greater distance to Vancouver (particularly if the rates are those in place using a pay the producer method of payment). The Wheat Board may, in consideration of these costs, only open quotas to points that can access the Vancouver and Prince Rupert ports during these winter months.

"The above discussion indicates that many of the important changes triggered by the Task Force Report on rates have not been covered by or included in the analysis of the impact of higher rates on income and resource shifts. Neither have the impacts of increased hauling distances for grain producers been considered as a factor causing them to change their cropping mix or to enter livestock production." Rosasen and Schmitz, pp. 69-70.

The study recently released by Horner recommended that the freight rates established in the WGTA be reviewed. The authors strongly concur with this recommendation.

A further complexity was added to the Method of Payment debate when the Canadian Wheat Board proposed that all prairie points have their freight charges deducted to Vancouver in determining their elevator price. The use of proportional rates plus the "dogleg" introduced into Bill C-155 by the Task Force on Rates results in extremely high freight rates to producers in Manitoba shipping to Vancouver. The freight rate from Calgary to Vancouver is $25.26/tonne and the producer share is $5.41/tonne. The freight rate from Winnipeg to Vancouver is $44.70/tonne and the producer share is $9.35/tonne. Under a pay the producer method, the freight rates would be the full rate of $25.26/tonne and $44.70/tonne, respectively. In this case, the decrease in the price of feed grain at Winnipeg is much greater than at Calgary. The feed grain price charges between Montreal and Calgary ($19.85/tonne) now become similar to the charges between Calgary and Winnipeg ($34.35 - $19.85) of $14.50/tonne. The calculations of regional impacts of freight charges for east versus west were based on average grain price charges of $20.00/tonne. When the pay the producer method is combined with the Canadian Wheat Board freight back-off proposal, the price charges for feed grains are almost twice the average for the prairies. This should trigger greater resource shifting and larger increases in livestock production. The previous estimates of shifts from east to
west would therefore appear to be low. A feed price change of $35.00 to $40.00/tonne would change returns to labor and management to hog and fed cattle production considerably ceterus paribus. Further updating of this empirical work is required.

These kinds of policy uncertainties make it extremely difficult to plan to enter a specialized livestock production enterprise because of the fixed costs and the low salvage value because of lack of alternative uses. Although one can suggest that the west is increasing its competitive advantage in livestock production, it is difficult or impossible to determine where the best location to build will be in the next 2-10 years.

There are also several problems related to the concept of dilution which has affected the tone of the debate in western Canada by pitting the prairie Pools against livestock producers. The argument of the Pools is that if a pay the producer scenario is adopted, then the volume of grain produced is greater than the volume of grain exported by rail because of seed and feed uses. The result would be a smaller payout per tonne of grain produced than per tonne of grain exported by rail. Instead of a payment of $35.00/tonne to the railways on the volume of grain exported by rail, the production subsidy might only be $12.00/tonne. The short term effect would be a smaller subsidy to a straight grain farmer who sells all of his grain via the elevator system.

One must recognize, however, the long run effects of not changing resource allocation. If a farmer at Humboldt quits producing his 1,000 market hogs and decides to export barley and wheat, the volume of grain marketing will increase. If the volume cap is exceeded with average marketing being 35 million tonnes, every decision of a producer to terminate livestock production and export grain will increase producer freight rates. A wheat farmer at Swift Current will have his subsidy "diluted" when a hog producer shuts down his operation and exports barley.

Academics and others should examine more closely the dilution which is present under the pay the railway scenario as it may be equal to or greater than under pay the producer scenario depending upon assumptions of yield variability and long term production levels for hogs and feed beef.

Livestock Profitability

To place the above in perspective, Table 3 gives data on feedlot costs in Alberta and Ontario. Similar relationships among cost categories also hold for Saskatchewan. Note that total feed costs are not as important as the cost of the feeder animal (less than one-half the
Table 3: Break-even Prices on A-Grade Steers

Ontario (Jan. '85 prices)
Yearling steers (700 lb.) ... $69.42/cwt.
Corn silage ... 23.27/ton
Cost of gain (feed) ... 51.66/cwt.
Cost of gain (all costs) ... 72.52/cwt
A-Grade steers ... 88.37/cwt
Break-even (July '85) ... 92.31/cwt

Alberta (Jan. '85 prices)
Yearling steers (700 lb.) ... $82.56/cwt.
Barley ... 3.09/bu.
Barley silage ... 38.65/ton
Cost of gain (feed) ... 54.29/cwt.
Cost of gain (all costs) ... 78.89/cwt
A-Grade steers ... 80.65/cwt
Break-even (June '85) ... 81.16/cwt

cost). In addition, not all of the feed costs relate to barley. If one allows 40-50 bushels of barley for finishing at $2.50/bushel, the barley costs constitute at a maximum $125 which is only slightly more than one-quarter the cost of the feeder animal. Thus even though barley is an important component in feeding cattle, it is not the most important cost item. Suppose that due to a change in transportation rates, under pay the producer approach a feedlot operator pays 40 cents/bushel less. In the example, the reduced cost for the barley at 50 bushels is $20.00, or less than 8 percent of the cash cost. Compare this with the effect of a weak beef market which say decreases the price of fed cattle by $.05/lb. For a 1,100 lb animal, the decrease in value is $55.00. Thus a decrease in the price of fat cattle can easily offset reduced feed costs. In this regard, one often hears the statement that it isn't that the price is too high in Saskatchewan, but rather the price of beef is too low for a profitable livestock industry.

In an absolute sense the level of feed grain prices is important for the profitability of the livestock sector. Low feed grain prices result in high feeder-calf prices and generally increased profitability to the feedlot sector and to the hog-finishing industry. A reduction in barley prices, for example, due to pay the producer approach not only has regional effects but also affects profit levels. However, price volatility of feed grains also plays a major role in livestock production about which transportation can do little other than guaranteeing that the product can be made available. A change in freight rates for feed grains changes the level of prices but generally not the relative degree of instability. Table 4 shows barley prices for the years 1974/75 to 1981/82. Note that the degree of price instability is not nearly as great as if the early 1970s had been included. Barley dropped below 50 cents/bushel off-board. During this period the livestock sector flourished in the prairies. The increase in prices beginning in 1972/73 was, in part, the reason for the decline in hogs and cattle in the prairie region. It is interesting to note that the price of barley in 1971 could be roughly equal to the drop in barley prices at Lloydminster if a pay the producer approach is adopted.

Policy Uncertainty and Market Penetration

A viable livestock industry for Canada requires export markets. Canada has attempted to penetrate the Japanese market but with little success in beef (less than one percent of Japanese imports of beef come from Canada). However, hog exports to Japan have increased significantly. The major export market for both hogs and beef is the United States. Its future remains uncertain. There is general agreement that consumer preferences have shifted away from red meat, especially beef. In addition, it is unclear the extent to which the United States' countervailing duty law will affect future exports. The recent ruling on hog exports resulted in a tariff imposition on live hog exports to the United States but not on processed products. Currently, on beef there is a quota in place but it is not binding. However, there is no guarantee that the United States will not bring countervailing duty action against beef. The United States alleges that the livestock industry in Canada is being subsidized as a result of various government stabiliza-
tion programs. On the other hand, one could argue that many of these programs do not provide true subsidies since they are not known with certainty when the producer joins a program. Also there are certain taxes in place. For example, a pay the railway approach to transportation is a tax on livestock producers. In addition, in the legal disputes the issue of the level of subsidies given United States' producers does not arise.

Table 4: Barley Prices (Thunder Bay and Prairie Corn Formula, CWB, Street and Off-Board) 1974/75 - 1981/82

<table>
<thead>
<tr>
<th>Year</th>
<th>Thunder Bay Price</th>
<th>Corn Formula Price (Thunder Bay less $5.28/bushel)</th>
<th>Final Realized CWB # Fd</th>
<th>Street Price</th>
<th>Off-Board Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>74/75</td>
<td>2.73</td>
<td>2.41</td>
<td>2.11</td>
<td>2.34</td>
<td>2.45</td>
</tr>
<tr>
<td>75/76</td>
<td>2.66</td>
<td>2.38</td>
<td>2.03</td>
<td>2.00</td>
<td>2.23</td>
</tr>
<tr>
<td>76/77</td>
<td>2.12</td>
<td>1.84</td>
<td>1.75</td>
<td>1.70</td>
<td>1.91</td>
</tr>
<tr>
<td>77/78</td>
<td>2.05</td>
<td>1.77</td>
<td>1.67</td>
<td>1.38</td>
<td>1.52</td>
</tr>
<tr>
<td>78/79</td>
<td>2.31</td>
<td>2.03</td>
<td>1.72</td>
<td>1.40</td>
<td>1.40</td>
</tr>
<tr>
<td>79/80</td>
<td>2.56</td>
<td>2.28</td>
<td>2.08</td>
<td>2.11</td>
<td>2.21</td>
</tr>
<tr>
<td>80/81</td>
<td>3.32</td>
<td>3.04</td>
<td>2.91</td>
<td>2.75</td>
<td>2.98</td>
</tr>
<tr>
<td>81/82</td>
<td>2.66</td>
<td>2.38</td>
<td>2.56</td>
<td>2.30</td>
<td>2.57</td>
</tr>
</tbody>
</table>

* Unweighted prices.

The above discussion provides an example of policy uncertainty facing Canadian producers. There are several others:

1. Producers face the uncertainty of the method of payment itself.

2. The United States Farm Bill along with additional export grain subsidies has put the world grain industry in turmoil. At the moment the resulting low grain prices in Canada have created a very strong market for feeder cattle. However, in view of the experience in the 1970s when the livestock industry was caught with rising grain prices, producers may be reluctant to expand output.
3. There is political uncertainty at the provincial level. For example, Saskatchewan has introduced tax credits, feeder association loans and venture capital corporations as devices to stimulate cattle feeding in Saskatchewan. The effectiveness depends in part on producer predictions or election outcomes. A change in political party might well end these stimuli.

If a pay the producer option were used, there are two important aspects worth noting. First, it is interesting to speculate how the United States and other countries would view this action. They might well list it as a Canadian production subsidy. The implications are clear for GATT and further United States countervailing duty action. Second, while there are regional effects as discussed earlier where cattle feeders, say in the Lloydminster area, gain relative to others, one has to bear in mind that barley is not the only ingredient in feeding cattle. Carter and Schmitz found that many of the successful feedlots in Alberta have an excellent silage base located near the feedlot. They truck barley reasonably long distances which is not true for silage. Thus a drop in barley prices due to freight rates reduces the value of production from this silage operation because of reduced opportunity cost. The picture thus becomes cloudy. However, for cow-calf operators and hog producers a lowering of feed grain prices due to transportation rate changes is clearly beneficial.

Conclusions

It is hypothesized that if a pay the producer approach is adopted, there will be a significant change in resource use in the prairie region. Livestock production will increase in, for example, the Lloydminster area relative to areas surrounding Winnipeg. However, if and when the methods of payment controversy is ended and one approach is adopted, one policy uncertainty facing producers will have been removed. However, there will remain many other uncertainties facing livestock producers including uncertainty in feed grain prices due to factors other than transportation costs and border crossing disputes including United States' countervailing duty action. Grain freight rates within Canada are only one of the factors influencing the development of the Canadian livestock industry in the future.

References


Gainer and Losers in Grain Transport Policy Changes:
A Public Choice Analysis

David McQueen*

What, you may well ask, is a professor from Toronto, of all places, doing poking his nose into western grain transport? This is the sort of thing that could start a Manitoba separatist movement.

I am not sure but what my least dubious credentials for being here are that I grew up in this city and spent many hours as a teenage railfan in locations such as Portage Junction and St. James Junction. There, in the course of watching the action and chatting with railway men, I must have seen some hundreds of thousands of tonnes of grain roll by, drawn by that fascinatingly varied complement of locomotives, ancient and modern, that made up the Canadian National roster in the age of steam.

More seriously, I think that what chiefly persuaded the Canadian Transport Commission, and then Ed Turchniewicz, to involve me in this matter was some of my previous work on economic policy, including policy for VIA Rail, and on the theory of public choice. They perhaps hoped that out of that background, and also out of that naive optimism which sometimes characterizes people who have not undergone a prolonged and frustrating immersion in the detail of difficult policy issues, might come one or two faint shafts of new light on the basic problem before this workshop. That problem I take to be how we, as researchers, may best help from here on to bring about a further modernization of the transport system for western grain--one that will be to the benefit of the western economy, and of western farmers in particular. I take it as read that if we did not think that modernization would help the farmer--in fact, help him a lot--none of us would be here. I certainly would not be. At the present low ebb of the irregular, up-and-down, gyration course of world grain prices, the last thing the prairie grain grower needs is one more net economic burden.

Having been asked to perform on western grain transport, I naturally went first to the considerable published literature on the subject. I was impressed by two things. The first was the amount of hard, slogging research into the substance of the matter that had been done over the last 15 or 20 years by western agricultural economists and other specialists. The second was the degree of consensus that appears to exist, certainly amongst the academic fraternity and other relatively dispassionate back-room analysts, about the general lines along which the cost-effectiveness of the system can and should be improved. I shall

* Professor, Economics Department, Glendon College of York University.
summarize my perception of those general lines in just a moment. For now, let me just say that, casting an eye not only upon the Canadian research literature, but upon the real-life confirmation of that literature that is actually applied to moving grain in the United States today (I praise only their physical transport of agricultural products, not their subsidization of them!), I conclude that a very convincing case for modernizing the Canadian system has been made already.

People like you and I are not the only ones most in need of convincing. Farmers most notably are not at present convinced that they will end up ahead. Looking at modernization scenarios, what they perceive for certain are longer and more costly average truck hauls to fewer and more distant delivery points. The rest, by comparison—the projected system benefits, and even more the share of those benefits received by particular farmers and local communities—seem vague and conjectural, almost on a par with forecasts of better weather and better world markets next year, or the year after, or some time in the 1990s.

One of the great virtues of public choice theory is the way in which it discourages you, when confronted with a situation of this kind, from simply expounding loudly about irrationality, narrow-mindedness, enslavement to tradition, lack of technological farsightedness, etcetera, etcetera. What it tells you instead is that when you examine more carefully the position taken by any given interest group, putting yourself into their place, into their particular economic and political environment, they usually prove to be acting a lot more rationally than you at first thought.

Before we go further, however, I must roughly define and illustrate public choice theory. (For those who want a fuller but still not too long outline of the field, let me recommend Dennis Mueller’s excellent survey, Public Choice.) Briefly, public choice theory attempts to explain the widely varying degrees of success with which different groups in our society enlist government to accommodate and further their particular economic interests. By way of example let us take that grand old Canadian issue, the tariff. If we think of it in terms of body counts—or, as is more often the case, of voter counts—the tariff at first seems a puzzle. Take a textile tariff: who are the obvious gainers by it? A limited number of Canadian textile manufacturers and their shareholders and employees, plus other citizens of highly textile-dependent towns and cities—a few tens of thousands of people at most. Who are the losers? Millions of textile and clothing consumers, not just in western Canada, but right across the country.

How can this be in a democracy? It can be because people vary so widely in the amounts they individually have at stake in a political economic issue like the tariff. They also vary greatly in their ability to perceive the nature of their interest in the matter, and in their ability to organize and press that interest home with government.

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We consumers of textiles have at stake individually at most a few dollars each either way. For the textile producers, however, what can be at stake are jobs, and in some cases also the economic fortunes of whole communities. For purposes of organization, their small numbers and lack of geographical spread are positive advantages: their people can be much more readily rallied, and may also be well positioned to put up for electoral bidding politically well-defined marginal or "swing" constituencies. Organizing all the consumers on the other side to bring to bear really effective pressure on their own behalf can be a far more formidable task: just ask the Consumers' Association of Canada!

It will be obvious to you that as we move from our simple tariff example to the more complex case of grain transport, our public choice theory needs some adaptation. First, though, let me outline the plan for the rest of this presentation. I shall begin by advancing a public choice explanation of why the different groups at interest have at present such widely different perceptions of the consequences for them of grain transport modernization. Then I want to advocate a relatively simple scheme (simple enough to be credible) for channeling some proportion of the efficiency benefits of modernization so that substantial numbers of farmers and others will be induced to transfer their opinions from the negative and doubtful columns to the "maybe yes" and positive columns.

Finally, I want to appeal for an expanded grain transport system research model, and for a properly networked, cross-country family of transport institutes and other organizations to run the model, so that we may crunch out the additional numbers we need for a more convincing case for system modernization. Right now, the federal government seems to be moving in the opposite direction: towards breaking up and disconnecting some of the publicly accessible transport research infrastructure that we already have. One thing I hope comes out of this workshop is a strong protest against this exceedingly ill-timed tendency.

Now to the application of public choice theory to grain transport. The main problem here does not, like the tariff problem, lie in a collision of interest between producers and consumers. Consumers, while they stand ultimately to gain something from more efficient grain transport, do not enter directly and significantly into the present debate—in part, of course, because so many of them live abroad and do not vote in our elections. Our problem is, rather, a "micro/macro" one on the producer side: a big difference of perception, depending on whether you are looking, as many researchers might, at the grain transport system as a whole, or whether you are looking at it from the standpoint of a particular farmer or other system "player" located near a particular branch line.

We need to remember that system modernization—as envisaged in the Canadian research literature, as has actually occurred to some degree in Canada, and as has occurred to a considerably greater degree in the United States—involves four main interlinked elements:
1. Greater use of unit and solid trains for long distance line haul.

2. Further replacement of high-cost rail branch line movement by lower-cost truck movement.

3. Further consolidation of country elevators into larger and more efficient units.

4. Reduction of the tonne/kilometer cost of trucking through better utilization of the existing truck fleet, and through profitable investment in new, larger and more efficient trucks in response to longer hauls.

These elements are strongly interlinked and interactive. Break into the system at any one point—modernize any particular element of it—and you cannot avoid bringing about modernization in all of the other three elements as well. Suppose, for example, that you hypothesize the abandonment of some high-cost branch line. That will force further consolidation of elevators, most likely at some medium- to long-term cost saving through scale and other elevator economies. It will also force longer truck hauls, but reduce the average cost per tonne/kilometer of those truck hauls. By concentrating primary deliveries at fewer points, it will reduce rail pick up and set out costs, and improve opportunities to run long, solid and even unit trains directly to major ports at a saving in cost.

Viewed that way, as from a great height, it sounds wonderfully synergistic—almost magical. However, if we come down to earth, with its population of particular people living and working in particular places, perception alters significantly. The A.C.S.E. Working Group of the Senior Grain Transportation Committee puts the matter well in its High Cost Branch Line Study. Having concluded that retention of high-cost branch lines costs farmers generally and also the federal government amounts in the millions of dollars, while saving local farmers and on-line municipalities amounts in the hundreds of thousands, the Group asks how, in a democracy, this situation manages to persist. Their answer is:

However, over against the savings which accrue to grain producers generally, are the costs which are incurred by local producers and municipalities whose rail line and elevators would disappear and whose road maintenance and upgrading costs would increase. As the case study demonstrates, these costs in aggregate can be far less than the total savings, but are borne by a much smaller segment of the farm community. Thus for local producers, the costs of abandonment exceed the benefits. This fact creates both a political and an economic problem. There is at present no way that the costs borne by the local groups can be offset by a transfer of some part of the total savings achievable by abandonment.²

² A.C.S.E. Working Group of the Efficiency Measures Subcommittee of the Senior Grain Transportation Committee, High Cost Branch Line Study—
Break into this interactive system at some other point, and the above argument still basically holds. For example, let CN, CP and BCR go the way of the Burlington Northern and offer 18 percent discounts on 52-car lots moving from the central plains to the Pacific coast. Again, you will need further elevator consolidation, longer truck hauls, and de facto branch line abandonments. However, you will again get added trucking and other costs to certain local groups. That is where the opposition chiefly originates to so-called "variable rates," which manifested itself so strongly at CTC's Saskatoon hearings in 1985.

Delay in system modernization is costly. On the basis of the partial estimates presently available to us, we forego technologically available savings between the farm gate and the ports of well over $100 million a year. Under the W.G.T.A. as it operates over a number of normal years, noncaptured saving becomes more and more obvious. Nevertheless, as the A.C.S.E. Working Group argues, some means must be found to make visible the general efficiency gains from modernization at the local level.

Let us look at some of the chief system participants who would be affected by a more vigorous drive toward modernization:

1. Grain farmers. Collectively they would be clear net winners, but at the local level, as we have noted, their increased costs, especially trucking costs, would have much greater visibility than their share of system-wide benefits.

2. Railway companies. Whether within the present system or a modernized one, their costs are guaranteed to be covered by the federal government and the farmers. They must, however, worry about how long the taxpayers will be prepared to participate in the financing of unnecessary costs. As a former westerner, I am fully conscious of the fact that the railways have 150 years' experience at lobbying and certainly deserve no special privileges. I do wonder, however, at the anomaly of the W.G.T.A. asserting the principle that contributors to system efficiency gains should be appropriately rewarded, but then effectively exempts the railways from the application of this principle in the longer run. My impression is that while the railways hesitate for political reasons to push too hard for modernization, they would feel more

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In his 1986 unit train study for the CTC Research Branch Grain Unit Trains—Estimated Potential Cost Savings on a System Basis, J. Kruger conservatively estimates a saving of $58 million annually from a switch to unit train haulage. As he notes, this makes no allowance for related savings within the interactive system, such as reduced line-related costs of operating branch lines, and scale-economy capture by consolidated elevators. Some participants in the workshop for which this paper was written expressed a belief that total potential savings could be on the order of $200-$300 million a year.
comfortable having it—partly, perhaps, because of inevitable "spillover" or side benefits to their handling of nongrain traffic.

3. Elevator companies. Through consolidation, they have been the greatest single force for modernization to date. However, their participation in this trend is growing more complex. Fears of loss of market share, uncertainties about the real future pattern of usable rail lines, and reluctance on the part of the co-operatives to go too much against the wishes of their members in local areas, inevitably operates to make attitudes more ambiguous.

4. Federal government. This government shares with producers collectively an interest in cost reduction, but must also be responsive to local concerns, constituency by constituency.

5. Provincial governments. These have strong concerns about the increased road costs arising from modernization, the more so since their current structures of motor vehicle license fees and fuel taxes do not provide automatic cost recovery.

6. Municipal governments. These have common concerns with the provincial governments regarding road costs, and many also fear loss of tax assessment and general economic vigor through branch line abandonments and elevator closures.

7. Custom and commercial truckers would experience enlarged scope for their operations as longer hauls enhanced the economic advantages of the more complex, high-capacity equipment which such operators tend to own.

8. Railway and elevator employees. These would suffer job loss; how much of this loss could be offset by attrition is a matter well worth knowing.

Other items could be added to this list; for example, items covering certain impacts at Thunder Bay. Perhaps we now have enough to keep us occupied.

The picture is basically one of some definite winners by modernization, some definite losers, and some mixed winner/losers. The basic challenge is to raise the win ratio, and to compensate some deserving losers, while still capturing major efficiency gains for the system. I simply make this bald assertion, while being fully prepared to discuss it during question period. It relates to a general philosophy that I have developed over these last few years, covering far more than just grain transport (Ontario manufacturing, for example, is most definitely included). That philosophy is to the effect that, as this century draws to a close, we in Canada must make a major shift in our handling of technological and other economic change. Learning, to some extent, from people like the Japanese, we must move away from an economic juggernaut theory, whereby people are simply invited to be rational and public spirited and lie down in the path of inevitable progress, and towards
active policies (as opposed to abstract theoretical talk) of positive adaptive assistance. That is forward-looking adaptive assistance, not backward-looking bailouts: I'd like to double-star that point! The weakness of the juggernaut approach is that independent minded Canadians with votes often refuse to lie down in front of it. Quite rationally, given the limited, two-way choice available to them, they instead stand up, yell and throw two-by-fours into the spokes of the juggernaut. This produces much conflict, little progress, and a further falling behind in technology compared to our international competitors.

Very briefly, my proposed program for adaptive assistance in the particular case before us would involve the conversion of the System Improvements Reserve under the W.G.T.A. into a revolving fund. Into this fund would be paid some designated proportions of the system savings realized from high-cost branch line abandonment, and from increased use of solid or unit trains elicited by the offer of "variable rate" quantity discounts by the railways.

Out of the revolving fund would come two kinds of payments. The first would be transferable trucking credits to compensate producers and governments for the longer truck hauls occasioned by the two types of system modernization mentioned. The credits would be payable at elevators, after deduction of tax there on behalf of provinces and municipalities, to cover increased road costs. In the case of efficiencies arising from the offer of variable rates, the compensatory payment to the producer would actually take the form of a lower, quantity-discounted rail freight rate, but there would still have to be a charge against that to take care of road costs and community redevelopment (see below).

The second type of payment from the revolving fund would be for community redevelopment in towns losing their branch lines and elevators as a result of new modernization initiatives. It might be hoped that the funds would most often be used to reinforce the convenience centre and/or dormitory-suburb functions which are now the chief economic bases of many of these communities.

There is, of course, a "grandfathering" problem to all this—what about costs to producers and communities that have already lost elevators?—that is not, for now, addressed.

As to implementation, I would be very much against trying to do this in terms of one big master plan for the whole prairie region. There should certainly be offered a basic equality of treatment in respect of rates of trucking credits and of community redevelopment payments. But there should also be ample room for local option and local input. To that end, I would be inclined to divide up the prairie and Peace River regions into "Grain Transport Improvement Districts," along somewhat the lines developed by the Hall Commission, and leave much of the initiation of change to the grain growers of each district. As net benefits manifest themselves in early mover districts, others would follow their lead.
Those familiar with the A.C.S.E. Working Group's High Cost Branch Line Study will notice some important similarities between their proposals and mine—for example, the district-by-district approach. Believe it or not, many of these similarities originally emerged independently. But there are also differences. In respect of trucking compensation, they use a one-time-only payment based on discounted present value. I believe that is too technically unstable and hard to explain in an era of up-and-down interest rates and fuel prices, and would not be sufficiently credible to farmers and to governments concerned about road costs. Also, the Working Group would not make community redevelopment payments, whereas I would.

I am fully aware that there is research to suggest that the road costs and community costs of transport system modernization may have been greatly exaggerated. That may well prove to be so in fact (though let it be noted that road costs have turned out to be something of a problem in the United States, due in part to a lack of appropriate fiscal arrangements between state and local governments). There is also another cost to be concerned about here, and that is the very significant cost of system modernization delayed, in part because of fear of road costs and community costs. Laying that fear to rest by providing in advance for appropriate compensatory measures could prove to be a rewarding investment.

Lastly, I would like to talk briefly about numbers, models and research organizations. Thanks to hard work by various parties, we have available some very useful estimates of unit train savings, branch line costs, trucking costs in relation to distance, and so on. To people like ourselves, these are highly suggestive of very worthwhile gains to be had from general system modernization. But to be convincing with government, farmers and the general public, we need more numbers still. At the macro level we need good system-wide estimates of total potential savings. At the micro level we need to provide at least rough estimates of benefit/cost impacts on local areas. In part, to estimate possible compensatory payments, we also need more cost, employment and income numbers to place in our "win/lose" columns.

When I started researching this matter for the CTC, I foolishly assumed that because there existed some quite good numbers relating to some aspects of modernization, these could be put together with others to give some tentative but useful orders of magnitude. It could not be done. Above all, the interactive nature of the system defeated me. You cannot, for example, simply add estimates of branch line savings to estimates of unit train savings: they interact, overlap and make for serious double counting. Also, as you calculate the consequences of abandoning successive high cost branch lines, you must somehow allow for the way in which the resulting diversion of grain to alternative delivery points alters the cost profiles of the remaining lines.

What this calls for is a computerized model, and teams of researchers to access and operate it. It calls for something like an expanded version of the existing PHAER model, plus alternate "hand made" scenarios of present and future delivery points. I emphasize "alternative" be-
cause it must be made very clear indeed that the purpose of the model would not be to run the grain transport system, but rather to identify for us the various costs and other consequences of different ways in which the human participants in the system might want to think of running it. The model ought to be accessible from a number of geographical locations including as a minimum, Saskatoon, Winnipeg and Ottawa.

If we have a model, we must have a proper research organization and coherent research teams to make it work. This is the most urgent gap we confront. In recent months, the federal government has withdrawn certain base funding from transport research institutes at universities, and has indicated an intention, not only to terminate the Canadian Transport Commission, but to disperse the Commission's existing research team. This seems to me a ridiculously costly victory of existing vague, "downsize government" ideology over the practical needs of Canada. We do not have enough good transport and agricultural economists in this country to be able to afford to spread them more thinly over the landscape and to lessen their effective contacts with each other.

What we should rather be looking to do is to strengthen the teams that we have, and the network links between them. At the Ottawa end, we badly need a successor to the CTC in research, doing high quality model building and other team type work, and--most importantly--making the results of its work promptly and generally available via publication and other means of communication.

Meanwhile, since Ottawa based efforts, while highly necessary, also tend to be Ottawa biased (I know: I worked in Ottawa for 17 years, then left and discovered a significantly different Canada), we also need strong transport research centres in places like Winnipeg.

Ever since the early days of the cod fisheries and the fur trade, transport has had a peculiar importance for this country. That importance remains today. This is no time to be reorganizing ourselves to know less about transport, and in "knowing less" I include in this the squirrelling away of more of what a few people know in ministerial offices and other places where it is more difficult for the rest of us to get at and evaluate. More, not less, transport research--and more of it in the open--should be the watchword at this point in our history.
My response to the presentations is framed within the context of perception. Just as your second eye gives you a better sense of depth, so should my remarks add to the vision of the speakers' papers.

The relative balance of my comments should not be taken as an indication of the calibre of the papers. I'm not going to talk about the highway impacts of trucking as I'm not a geotechnical engineer.

Dr. Schmitz has a perception of the marketplace, and the factors that influence livestock production. He is concerned about Canada's lack of inroads in the Japanese market. He noted we do not have guaranteed quota-free, tariff-free market access to the United States. He suggested rising freight rates will increasingly favor the western Prairies. He noted that Crow Benefit is a factor in the economics of livestock—but most importantly, he basically spoke of the uncertainty surrounding cattle in particular.

I heartily concur that we have not taken a hard enough look at livestock markets. The issue of where our livestock goes is not unrelated to transportation.

World grain trade is not growing. We are in a battle for market share. Price pressures are intense. Putting grain in a skin is another way of marketing it. This has implications for grain volumes.

Method of payment boils down to being a livestock issue. Quebec, the biggest hurdle in the payments debate, is concerned that more western livestock production will take away from Quebec's market opportunities—either directly or indirectly. The research done so far on prospective livestock markets is not conclusive. More needs to be done.

I would disagree with Dr. Schmitz on how poor the economics of feeding are in Manitoba. The Canadian Wheat Board's initial price proposal could change comparative economics quickly. We should remind ourselves that the Crow Benefit applies from Manitoba all the way to the Pacific coast; it does not apply from Manitoba to the equivalent eastern position, namely the St. Lawrence. A final note regarding Manitoba is that its expertise in feeding may be unfairly understated. United Grain Growers' experience in feeding cattle in the first year of operating United Beef Feeders was very satisfactory.

Dr. David McQueen noted the nub of the branch line problem is a matter of perception within the farm community. His solutions involve compensating the "losers" from branch line abandonment by paying transferable trucking credits, and supporting community development. He calls strongly for more research to provide the politician with more proof.

* Manager, Farm Decision Resources, United Grain Growers Ltd.
While I agree very much that the "winners compensating losers" approach—as outlined further by ACSE—could be an important tool in breaking the abandonment logjam, I strongly disagree with Dr. McQueen's specific solution.

Dr. McQueen assumes farmers are reasonably well versed in transportation issues. I respectfully disagree. I would submit there is an amazing lack of awareness at the farm level of how the Western Grain Transportation Act works, and what each of the major parties is responsible for in the future.

This lack of understanding of how the Act works is in my opinion the direct result of the elaborate and incredibly complex nature of Western Grain Transportation Act. What we need to do is to get away from complexity; get away from elegant calculations; get away, quite bluntly, from the smoke and mirrors.

Dr. McQueen's trucking credits and community development grants would take the industry in the wrong direction. It would add more bureaucracy and regulation. As we have noted from our involvement at Corning, Saskatchewan, farmers are very sharp once someone takes the time to cut through the smoke and mirrors and explain how the rate system has been designed. I submit we must encourage simplification, and thereby give farmers a better basis for making decisions that impact directly on their operations.

Dr. McQueen's recommendation does not give farmers knowledge. It maintains the smoke and mirrors. It is not resource neutral. It encourages deliveries to the elevator, at a time when this might not be consistent with market conditions. It works top-down, not from the grassroots. It doesn't enhance farmers' choices.

Give farmers the money, and they will make better decisions.

And as for the need for even more "pure" research, as Dr. McQueen noted, there has already been a great deal of work, and there is a good consensus on what needs to be done.

In closing and addressing future research needs, I would suggest the following:

1. We don't need a great deal more "pure" research. We have enough numbers.

2. We need applied research; research like the ACSE group; research into markets.

3. Let's keep things in perspective. We are in the midst of a major collapse in prices, and possible structural adjustments on a scale we haven't experienced in some time—perhaps ever. Initial prices dropped $30. Another $20 is quite possible. Transportation is—at best—a $5 issue. Let's not divert scarce resources to solve a $5 problem when our true priority is a $50 problem.
Discussant: Nell Petrovich

Gordon Sparks made important and key points concerning estimation of road impact costs due to increased trucking of grain:

1. Lack of engineering details by most of the participants in the debate.

2. Lack of any credible empirical data to support positions.

3. Cost of maintaining gravel roads dependent upon level of service as well as level of traffic.

I would agree with the key points outlined above and would add the following:

1. Using "average" road maintenance and/or capital costs and extrapolating to a large population of roads will result in inaccurate cost figures. This is because no two miles of road are identical. The roads available at site for reconstruction, differences in rainfall and geography all play a part in capital and maintenance costs.

2. Use of technology, i.e., truck equipment, can have a dramatic impact on roads. Heavy oil movement occurs in vehicles with the proper number of axles and tires to properly distribute the load across the surface of the road. However, single axle farm trucks, in many instances somewhat overloaded, can have a very detrimental impact on the surface of thin pavements as well as the subgrade of both gravel and thin pavement roads resulting in failures.

I agree with the conclusions arrived at in the Sparks paper:

1. Gravel roads are easily repairable and inexpensive to repair.

2. Oiled or thin pavement roads have to be reconstructed at the site of failures including resurfacing and are not easily or inexpensively repaired.

3. In general, gravel roads can be expected to perform acceptably if subjected to increased grain truck traffic.

4. Oil treatment and thin pavement can be expected to be a serious problem in terms of level of service and cost.

* Director, Transport Policy Branch, Saskatchewan Department of Highways and Transportation.
5. In summary, road impact costs associated with rationalizing the grain handling and transportation system are an important consideration particularly due to rural municipalities' inability to incur increased costs without assistance from senior governments.

However, I disagree with Sparks' conclusion that road impacts are probably a small problem. Road impacts may be a relatively small expense compared to the hundreds of millions of dollars being spent by railways and grain companies but are a large expense to financially strapped provincial and rural municipal governments. There are also the real problems of reduced levels of service and safety as well as the increased costs arising from operation of vehicles driven over roads in need of repair.

Why is Saskatchewan so concerned about road impacts associated with consolidation of the grain handling and transportation systems? Because changes in the rural transportation systems are continuing. Grain shipping points are likely to reduce by one-third. Grain exports are projected to increase by one-third from 30 to 40 million tonnes, while producer payments/variable rates and the railways freedom to manage will reduce the branch line system. All of these divert more grain to the roads. It can logically be expected that road maintenance costs will increase and that where diverted traffic aggregates on common collector roads leading to alternate delivery points some road surfacing adjustments or reconstruction will be necessary.

In Saskatchewan we have five pavement types totalling 18,700 kilometers. The lower three pavement types total 14,300 kilometers and are fragile and sensitive to farm truck traffic. If all these roads were to be resurfaced and/or upgraded the estimated cost is $2 billion. Every mile would, of course, not be upgraded. However, if one percent of mileage must be improved the cost is $20 million, if 10 percent must be improved the cost is $200 million, if 30 percent must be improved the cost is $600 million. Due to the large proportion of thin pavement, 3,120 kilometers, and oil treatment, 8,850 kilometers, in Saskatchewan's highway system, the possibility of high levels of rail and elevator consolidation, and scarce resources make Saskatchewan very concerned about the road impacts arising from future consolidation.

Regarding future research needs:

1. Empirical evidence concerning the impact of single axle and tandem axle farm trucks and semitrailers on lower order surface types—gravel, oil, AMOS, light pavements, e.g., off-track elevator experiment Interlake area Manitoba for semitrailers.

2. Queuing problems at country elevators, impact on the safety of the travelling public, associated redesign of access roads to country elevators and estimated costs.

Andy Schmitz made some key points with which I can certainly agree:
1. The profitability of the prairie livestock industry is very volatile and has been greatest when local feed grain prices have been artificially low due to depressed world prices.

2. Paying Crow Benefit to producers would be an important incentive to future livestock production.

3. The need to develop strong markets for livestock and red meat, offshore as well as United States.

I question the proposition that higher grain freight rates would result in increased production of livestock and red meat in Saskatchewan unless the following questions and issues can be satisfactorily resolved:

1. As grain freight rates are increased an incentive is created to avoid the freight cost by feeding grain locally. Livestock production is projected to increase in response to lower feed costs created by higher grain freight rates.

Currently, according to the Saskatchewan Beef Stabilization Board, feed costs are 25 percent of the costs of producing cattle and 22 percent of the costs of producing hogs. With producers paying the full grain freight rate feed costs would become 21 percent and 18 percent, respectively, of the costs of production.

Is this sufficient economic incentive for Saskatchewan wheat farmers to shift into livestock production?

2. Livestock production should increase assuming payment to the producer of the Crow Benefit. The question is where will production increases be experienced? In Saskatchewan where the economic incentive is greatest because the grain freight rates are highest or in locations such as Alberta where capital investment, producer knowledge/experience, geography, climate and water are readily available? Or will political pressures/considerations override natural economic advantages and prescribe where livestock production and processing will occur; e.g., desire of Quebec to be not only self-sufficient in livestock production/processing but to develop to the extent that they can access the United States and off-shore export markets?

3. Given that livestock production and processing are increased where will the product be sold? What about the United States Meat Import Law? Would prices received be adequate compensation for higher cost Canadian production?

4. Given the development of non-tariff barriers to trade and foreign government subsidization of agricultural production, will traditional grain producers be encouraged to add a livestock enterprise to their business operation?
5. In very dry areas such as Saskatchewan with few opportunities for development of alternative enterprises will traditional wheat producers add a livestock enterprise to their business operation?

6. Red meat production and consumption has been dependent upon consumers income/economic growth, interest rates, exchange rates, and the price of feed grains. What impact has, and will consumer preference to avoid red meat and substitute poultry and fish, have on long-term production and consumption of red meats in North America?

7. Under a pay-the-producer Crow Benefit scenario, the cost of feed grain would decline the most and an economic incentive would be created for beef production. Assuming more livestock is produced and slaughtered in prairie Canada, would there be any net gain to prairie Canada? Won't the buyers of prairie cattle, hogs, or red meat recognize the decrease in the cost of production and simply bid the price down a corresponding amount? Would not the end result of increased livestock production on the Prairies simply be lower consumer prices for meat?

**Future Research Needs**

1. Comparative advantages/disadvantages of livestock and meat production in Canada versus the United States, Australia, the E.E.C. and elsewhere.

2. Impact of barriers to trade in live animals and meat products, particularly to the United States.

3. Comparative advantages/disadvantages of livestock and meat production between and within regions in Canada.

4. Impact of economic criteria such as growth in personal income, interest rates, and exchange rates on production of and trade in livestock and red meat.

5. Evolving consumer preferences for red meat versus substitutable products.

6. Investigate ways and means of eliminating the Crow hurt from the livestock sector assuming the Western Grain Transportation Act pay the railway Crow Benefit remains.

David McQueen made several points with which I can agree:

1. Farmers recognize their direct added expenses associated with consolidation in the grain handling and transportation system but do not necessarily recognize or understand the benefits associated with consolidation.

2. Change creates winners and losers, if losers are compensated and thus benefit from the change, the change is more likely to occur.
3. There must be agreement by the participants on what changes must occur. The farmers and the public must be convinced of any net benefit.

4. We require information to be placed in the hands of farmers and the public.

5. We need a successor to the CTC Research Branch to generate information and make it publicly available.

I disagree with any central planning being done in Ottawa by government bureaucrats or in Winnipeg by railway or grain company bureaucrats.

Additional Research Needs

1. System modeling to identify winners and losers and quantify gains and losses. Preferably this should be conducted in western Canada.

2. Identify alternative methods of compensating losers through direct involvement of potential losers as well as researchers/planners in the process.

3. Create a forum for system participants, including governments and farmers, to jointly conduct research into system efficiency.

4. Determine best methods of distributing results of research into efficiency gains to farmers and the public so as to encourage public debate and feedback to governments and system participants.
IV. BANQUET ADDRESS

A U. S. Perspective on Developments in
Canadian Grain Transportation

Robert Toisterud

Seventeen years ago this month, Dr. Ed Tyrchniewicz shocked the world—not least this young graduate student's world—when he stated a very simple and obvious fact of economic life: that production and consumption seldom occur at the same place. Later in that class I was to be further rocked by his revelation that production and consumption also seldom occur at the same time. I have never forgiven him, for I was so very content in my pinhead, timeless economy. Subjecting price to the realities of the space and time dimensions just made mincemeat out of all the graphs and equations I had spent years struggling to master.

As an economic fundamentalist, my life had become meaningless. For the next several weeks I wandered aimlessly in the dismal swamp of the dismal science in search of professional security and comfort. I admit I contemplated Veblen's institutionalism, even sociology and, yes, even econometrics. At one point I even contemplated suicide by falling upon a perfectly inelastic demand curve.

It was at the very depth of my despair that I confronted the economist's ugliest realization: the frightening, disgusting thought of getting a job and earning a living. That is, somebody out there may ask me to actually apply what I had learned at the University of Manitoba to justify a paycheck. I yielded and I learned my transportation economics. I mastered the concepts of terminal charges, linehaul costs, joint and common costs. My professional confidence restored, I was ready to meet the real world. And then, with a sinister, almost mean, look in his eye, Dr. Ed said those four little ghastly words . . . "Crow's Nest Pass rates."

I cannot, to this day, bring myself to relive the horror and trauma I experienced following that latest Tyrchniewicz terror. The last thing I remember was grabbing my degree, packing up my wife, Canadian son, and a U-haul and fleeing the country. I figured any society perverse enough to embrace a transportation policy such as the Crow's Nest Pass rates was a real threat to the civilized world. Being a strong believer in perfect competition and the unfettered operation of market forces I fled to the United States and became a specialist in U. S. farm policy and

* Session chaired by E. W. Tyrchniewicz, Director, UMTI.
** Deputy Director, Joint Economic Committee of the U. S. Congress, Washington, D. C.
International agricultural trade—unquestionably fertile ground for my theoretical economic roots. I'm proud to return to Winnipeg and stand before you this evening as an ambassador of the American way—free markets, free trade and a free meal for banquet speakers.

I'm being facetious, of course. There's no free lunch, or banquet meal for that matter. World grain marketing these days reminds me of the definition of a lawyer: he's the guy who incites two other guys to strip for a fight and then runs off with their clothes. In our context, it's the grain importer running off with not an insignificant portion of our nations' treasuries—not to mention our soil and water resources. However, I'm getting ahead of myself.

Given the vastness of this magnificent country of yours, it is not surprising that the government of Canada has made transportation policies a matter of national and provincial concern over the years, viewing transportation capabilities as a primary instrument of growth and economic health. These efforts were an attempt, in essence, to neutralize the space dimension of market price—for farmers to offer wheat for sale as though it had been grown at Thunder Bay or Vancouver. Paying less than full cost for anything—be it transportation services, irrigation, fertilizer or credit—leads to an artificial enhancement of the value of the product produced and therefore stimulates the supply of that product. The demand for resources to produce the good—land, labor, capital rises, and lo and behold you've got economic development. To complete the theoretical cycle, economic development generates economies of size lowering per unit production costs. Once these technical cost savings reach a level equivalent to the magnitude of the artificial promotional enhancement—the original subsidy—the subsidy is removed and the product and the producers of that product are left to fend for themselves. So much for theory and honorable intentions. Subsidies, as we have all learned, tend to become capitalized and clone themselves in competing international as well as domestic sectors. These off-setting subsidies yield yet a third generation of subsidies, these in an attempt to regain the "competitive" advantage. These subsidies, too, are capitalized— they become intrinsic to the supply and demand for the product. As an extreme example, direct government payments to the United States farmers will comprise over 40 percent of total net farm income this year.

Where and when the subsidization of agriculture, directly or indirectly, first occurred would be a matter for an interesting and, I suspect, endless debate. I further suspect that we could list several dozen ways in which agriculture is being subsidized in one way or another around the world.

I was asked to address the topic "A U.S. perspective on developments in Canadian grain transportation." We've always had the view that the statutory Crow's Nest Pass rates were nothing less than a vehicle to provide an income supplement to prairie farmers, thus a supply stimulant not unlike our deficiency payments. We're of the opinion that had prairie farmers been required to pay the full cost of transportation from the beginning, Canada's export activity would be but a shadow of what it is today. For the better part of a century we let this sleeping dog—or
crow-ie and acquiesced to this Canadian freight subsidy system being grandfathered under GATT. You kicked your own dog in November 1983 when Parliament passed the Western Grain Transportation Act. As you are well aware, the WGTA implemented several major changes, effective January 1, 1984, in the Crow's Nest Pass Freight Subsidy Program for moving western grains to points of export. Of major concern to United States interests was the designation of the United States as an eligible export market for agricultural products moving westward through Vancouver under the subsidized rates. Prior to the WGTA, eligible products could move into the United States only via Thunder Bay, at the head of Lake Superior.

The new legislation also increased the number of commodities eligible for the statutory rates. The additions are vegetable oils (linseed, rapeseed and sunflower), sunflower seed, alfalfa meal, pellets and cubes, mustard seed, lentils, beans and triticale. Oilseed cake and meal (linseed, rapeseed and sunflower), crushed barley and barleymeal, bran, corn and cracked corn, feeds and crushed oats, which had previously qualified for Crow rates moving to Thunder Bay alone, were made eligible for the subsidy to Vancouver as well.

United States oilseed crushing and grain milling industries have expressed concern over surges in shipments of low-priced Canadian rapeseed (canola) meal and millfeed into the Pacific Northwest.

Canadian exports of millfeed to the United States under the WGTA rose to 40,800 tons in 1984--up from 10,700 tons in 1983. United States rapeseed meal imports from Canada into the Seattle customs district climbed almost twelvefold between 1982 and 1984. Adding insult to injury, Canadian rapeseed meal exports to Pacific Rim destinations went from virtually nothing in 1982/83 to representing over 40 percent of total Canadian rapeseed meal exports during 1984/85. Showing some sensitivity to the problem the Canadian government imposed a voluntary trade restraint action on millfeed exports in August 1985. The United States trade representative reviewed the WGTA legislation and concluded that the freight rates to Vancouver are an export subsidy because the rates are statutorily tied to exporting. As a result, these new provisions under the WGTA could result in countervail or dumping actions under United States law. I understand it may take an act of Parliament to delist the United States as an eligible export market. In the meantime the government of Canada would be well advised to extend its voluntary restraint action on millfeed to its exports of rapeseed meal to the Pacific Northwest.

Having said all that, while Canadians appear to be more forceful, direct, and persistent in their use of transportation as an agricultural promotion vehicle--so to speak--the United States has shown some imagination in this area as well. Among efforts in the United States to assist agriculture through transportation policies one would have to acknowledge the Hoch-Smith resolution of 1925 mandating the Interstate Commerce Commission to set transportation charges on agricultural goods "at the lowest possible lawful rates;" the Agricultural Adjustment Act of 1938 authorizing the Secretary of Agriculture to bring complaints before the ICC on behalf of farmers; and the exemption from economic regu-
ation of agricultural products transported by motor carriers in 1935. The Staggers Rail Act of 1980—an Act largely deregulating the railroads—contains all kinds of provisions to protect the interest of agriculture. One should also add the "go slow" policy on branchline abandonments and the commandeering by the ICC of railroad owned boxcars for the purpose of moving grain to market during grain harvest. Did I mention land grants or the public support of the inland waterway system?

I think even the railroads would agree that agricultural transportation prices in the United States today are largely market determined and free of public influence and manipulation. I only wish I could say the same for the price of United States wheat. Fortunately confessing to the subsidy characteristics of United States farm policy is beyond the scope of this paper.

Perhaps I can best conclude this way: we don't like your agricultural subsidies, but we like ours even less.

Despite all the brilliant agricultural economists graduated from the University of Manitoba over the last eighty years, the world has regressed in its domestic and international trade policies with respect to the production of food and fiber. Given current projections it appears that during the period 1981 to 1988 the United States will have spent around $125 billion in support of the United States farm sector. Never has so much been done so little. Since 1981, net United States farm income in nominal terms has declined 23 percent and the volume of our exports has fallen 25 percent.

Take little comfort in these numbers. When we're in trouble, you're in trouble. According to the July issue of the World Agribusiness Report, one-fourth of Canada's grain growers may be out of business in the next two years, innocent bystander casualties of the agricultural trade war between the European Common Market and the United States.

The United States Congress answered the European challenge last fall with a five-year bill that aims to reduce surpluses and reclaim lost export markets by forcing the price of wheat down by 27 percent, to a low of U.S. $2.40 per bushel. As a cushion, the United States government will pay its farmers a subsidy of U.S. $1.98 per bushel, thus making the price to the farmer U.S. $4.38. The Common Market responded by approving subsidies that will guarantee its wheat growers the equivalent of U.S. $4.77 a bushel.

In an attempt to keep Canadian wheat competitive, the Canadian Wheat Board retaliated by announcing a new wheat price of U.S. $2.54 as of August 1st, including some minor subsidies. This represents a price decline of 20 percent, and it leaves United States and Common Market farmers with a subsidy-induced profit, while the Canadian farmer is practically guaranteed a loss.

This kind of battle reminds me of Woody Allen's description of a fight he once got into. "First, I punched him in the fist with my eye, then I slammed my groin into his knee."

I contend that one of the greatest challenges facing the democratic world today is bringing back some form of economic rationality to global agricultural production and marketing. Has anybody noticed who the winners and losers, politically speaking, are in this contest?

Let me suggest, only half facetiously, a first step to sanity. Perhaps what we need is an organization like Alanon—Alcoholics Anonymous. In our case we could call it Asanon—Agricultural Subsidizers Anonymous. We need to gather together in a room and publicly confess our addiction and form a support group to help each other fend off domestic political pressures and temptations. When I think about it, the word 'Asanon' is quite descriptive of the situation we, as food exporters, find ourselves in today.

My point is that all of us—the United States, Canada, Australia, Argentina, the European Common Market—must admit that we've got a problem. We're all addicted to policies which will eventually result in economic and perhaps even political ruin. Let's bring to the first meeting of Asanon a complete, comprehensive list of our own indiscretions and begin the process of a multilateral build-down in agricultural subsidies. Clearly we all need to climb on that wagon together if we're ever to have a more sober world agriculture.
V. POLICY RESEARCH ISSUES

Paying the Crow Benefit

G. H. Miles and E. R. Wansbutter

Background

Gilson Consultations

Over the past six years, the focus of policy research in grain handling and transportation has shifted from the resolution of the rail rate issue to determining who should be the recipient of the government payment. The Western Grain Transportation Report, which was prepared by Dr. J. C. Gilson in June 1982, is generally regarded as the major turning point in this area.

The events leading up to Dr. Gilson's deliberations centered around the fact that the railways, because of a severe revenue shortfall, made little or no investment in the grain-related system during the 1970s—a system that by the early 1980s was being taxed to the limit. It was a system that was supported by a series of ad hoc measures, including:

1. the rail rehabilitation program, which was announced in 1977 and is ongoing today
2. the provision of 19,120 federal, provincial and Canadian Wheat Board hopper cars, the last of which was purchased in 1985.

This ad hoc system was set against a backdrop of ever-increasing production and world demand, and concern was expressed as to whether railway capacity could match the production and sales potential. In the early 1980s western farmers witnessed three record years in the movement and sale of grain: 31.5 million tonnes moved in 1981/82, 33.7 million tonnes moved in 1982/83, and 35.0 million tonnes moved in 1983/84.

The policies and programs of the time addressed and focused on symptoms of the problem: substandard branch lines, inadequate rail car capacity, and poor co-ordination and administration. The critical

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The views of the authors do not necessarily represent those of the Grain Transportation Agency.
problem was the impact of statutory rates on rail revenues and investments and in turn, on system capability.

In his report of 1982, Dr. Gilson stated that "the most critical issue facing western Canada ... in its economic development is the future adequacy of the rail transportation system" and the "successful resolution of the statutory freight rate is of paramount importance." Ad hoc programs, such as the ones outlined, were no longer adequate.

However, while the rate issue was paramount, the export bias inherent in a payment made directly to the railways was not ignored. Dr. Gilson noted that "the western livestock producer should not be placed at a disadvantage due to below cost grain rates. Further, crop diversification and processing in the west should be encouraged and certainly not discouraged by transportation policy."

It is often stated by opponents to a producer payment that the Crown Benefit of $658.6 million (1981 base with a movement of 31.5 million tonnes) is a right of the western Canadian grain farmer and should not be diverted to address the other ills such as the livestock hurt. The points to be made are that:

1. The statutory rate was not established or intended as a subsidy but rather a form of rate protection.

2. As long as the statutory rate was nearly equal to or greater than the cost of transportation, the livestock sector was not adversely affected.

3. As the statutory rate fell below the cost of transportation it not only placed an ever-increasing financial burden on the railways, which in turn not only led to a gradual decay of the transportation system, but also placed the livestock and specialty crop producer at an ever-increasing disadvantage.

In attempting to address these concerns, Dr. Gilson examined two methods of payment to the producer:

1. The direct payment option, which does not relate the payment in any way to the concurrent production of any particular crops. Neutrality was to be achieved by relating the individual producer's payments to the cultivated acres in a base year, thereby eliminating any incentive to produce any particular crop.

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1 Western Grain Transportation Report on Consultations and Recommendations, J. C. Gilson, p. 11-2.


2. The producer freight credit option where a freight credit account would be established each crop year for the producer and deductions made from it as grain was shipped. When the producer reduced his freight credit fund to zero prior to the end of a given crop year he would begin to pay the full freight charges; any net balance at the end of a crop year would be paid directly to him.

Gilson recommended that a statutory framework be created and that:

"... the legislative framework include a commitment by the Federal Government to the annual payment of an amount equivalent to the 1981/82 railway revenue shortfall" - the Crown Benefit;

"... the economic distortions within the agricultural sector stemming from the statutory rate should be reduced without recourse to new transport subsidies..." and that

"... the percentage of gross railway revenue shortfall be gradually shifted from payment of the entire amount directly to the railways in 1982/83 to 8% to the producer by 1989/90."

Western Grain Transportation Act

Perhaps it was with some foreboding that Dr. Gilson added: "In principle, it must be noted, that if the Crown Benefit is paid directly to the railways for an indefinite period, there would be a need for some type of agricultural adjustment payments to those producers, including livestock producers disadvantaged by the policy."

The Western Grain Transportation Act of 1983 incorporated into it a good number of Dr. Gilson's recommendations, although some the Act was a disappointment, falling far short of their objectives regarding the method of payment. However, in many ways it was then, and remains today, a major issue of railroad compensation, and it defined the government commitment and the producer's liabilities and responsibilities for future cost increases. In addition, it provided the producer with, to our knowledge, unprecedented protection from excessive inflationary cost increases, i.e., anything beyond six percent.

On the issues of method of payment, the government chose to have the government commitment--the Crown Benefit and its share of inflationary cost increases--paid directly to the railways.

So the Act had addressed what was the critical issue of the rate problem: rail revenues and investment. It had taken a long time for the political situation to ripen to a point where even this step could be completed. In the words of one colleague, "The canker had to gnaw."

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But the inequities identified by Gilson were to continue. The livestock and specialty crop inequities—which were totally unintended side effects of the earlier rate policy—were not addressed by the new legislation. However, these matters were not ignored. That debate on the issue would continue was ensured by Section 62(2) and (3) which provided as follows:

62(2) The Governor-in-Council shall, on or before April 1, 1984, appoint a committee consisting of not less than three and not more than five persons who have expertise in matters affected by this Act and represent various regional interests.

(3) The committee shall examine all matters that, in its opinion, pertain to the method of payment in respect to grain transportation that would be most conducive to agricultural development in Canada.

The focus had clearly shifted from one of rail costs to one of method of payment—and to one of how that payment could best be effected.

Hall Committee of Inquiry

On April 24, 1984, a five-man committee was appointed by Order-in-Council and was chaired by Mr. Justice Gordon Hall of the Manitoba Court of Appeal.

This Committee of inquiry was instructed by the Minister of Transport to take into account the following criteria as a guideline for its recommendations:

1. Resource Neutrality

"... requires that the method of payment not interfere unnecessarily with market forces and producer choices in determining production and marketing patterns in agriculture."

2. Equity

"... requires that the method of payment take into account all losses and/or benefits arising from this change in public policy, and that it provide compensation for losses in a way that will be perceived as generally fair."

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Ibid, page 11.
3. Efficiency

"... requires that the method of payment encourage the efficient use and development of the grain handling and transportation system, and of agricultural resources."

4. Administrative Feasibility

"... requires that the method of payment be capable of being administered without excessive complexity or costs."

Given these criteria, the Committee was faced with the challenge "... to devise a means of making payments to producers that would also permit effective compensation for immediate freight rate increases, that would avoid payments being made outside the grain producing sector, and that would ensure direct accountability for railway performance."

In its analysis the Committee concluded that any acceptable method of payment had to meet two important tests: the removal of constraints to diversification in western agriculture; and the provision of significant and proportional compensation to grain producers who were losing an historical benefit.

In its assessment, "the pay the railway" alternatives failed to meet the first test as they perpetuate unintended incentives for the production of export grains which in turn lead to distortions in the livestock sector and the production of specialty crops. Resource neutrality would not be resolved.

The various "pay the producer" alternatives considered by the Hall Committee met the first test but failed the second, for alternatives such as Dr. Gilson's would result in payments being made to those outside the grain sector who did not suffer any direct loss from a change in the method of payment and, conversely, it would involve disproportionately low payments to grain producers who were the most affected.

The Committee recommended that a Grain Transportation Refund (GTR) equal to $658.6 million and the government's additional commitment due to inflation sharing under the WGTG be paid directly to producers in the Canadian Wheat Board (CWB) designated area. This fund was to be allocated on the basis of net sales of eligible grains in each crop year, with no minimum or maximum limits on the producer's entitlement.

The proposed GTR met both tests. The GTR would be conducive to agricultural development in Canada as it would eliminate the distortions in farm-gate grain prices that have acted as constraints to the diversification and development of western agriculture.

Ibid, page 12.
Ibid, page 12.
Secondly, the GTR would provide "significant and proportional compensation to grain producers."

It was also concluded by the Committee that under the GTR dilution would be half what it would have been under an acreage-based formula. Any dilution that did occur would be entirely among farmers selling grain which would avoid a transfer of benefits from grain farmers to other sectors of western agriculture. Direct compensation to the livestock or other nongrain producers in western Canada would also be avoided.

The Committee also recommended that the GTR be allocated on the basis of net sales of eligible grains on each crop year, with no minimum or maximum limits on the producer's entitlement. Also, the principle of compensation should be recognized as applying equally to eastern Canadian agriculture, where losses from this change of policy are clearly identified.

Subsequent to the release of the Hall Committee Report, in March 1985, the Alberta Government entered into a "Feed Grain Market Adjustment Program." The Feed Grain Market Adjustment Program was designed to offset the distortion in feed grain prices, which livestock producers face as a result of the current method of paying the Crow Benefit to the railways. Whether livestock producers buy or grow their feed grain, they are eligible to benefit in the amount of $21 for every tonne of grain they feed.

The Government of Alberta noted that Alberta's share of Canadian hog slaughter was more or less in the 20 to 22 percent range. Since 1973, Alberta's share of hog slaughter declined from 20 percent to under 12 percent of the Canadian total. During this same period, Quebec's share of hog slaughter increased from 28 percent to 38 percent.

The Alberta Government also contended that the distortion which is experienced by livestock feeders could become more severe in the future if the method of payment is not changed. The Alberta Feed Grain Market Adjustment Program was instituted to prevent this decline. The provincial government maintained that it could not wait any longer for Ottawa to act. The authors do not intend to go into the mechanics of the Alberta Program.

It is worth observing that the Alberta government program has proven to be administratively feasible, and that calls into question the contention by some that "pay the producer" schemes won't work because of administrative complexities. For an 11-month period, August 1, 1985 to June 1986, approximately 139,000 A certificates have been issued, 79,000 B certificates and 14,761 Farm Fed claim forms processed with a payout of over $50 million.
Evaluation of the Hall Committee Report

1. Presentations to the Grain Transportation Agency (GTA)

While there were several briefs which indicated unconditional support for the Hall Committee recommendation of a Grain Transportation Refund (GTR), the majority of the written submissions to the GTA that favored payment of the Crow Benefit to the producer expressed either significant concerns about limitations or unknowns with the GTR, or the desirability of an altogether different form of payment to the producer. On the other side, there was also briefs which were absolutely opposed to any "pay the producer" proposals, maintaining that direct payment to the railways was the only acceptable method of paying the Crow Benefit.

The vast majority of the producer presentations made at a series of meetings held across western Canada opposed payment of the Crow Benefit in any manner other than to the railways. While it is not possible to determine the amount of support that may exist for a "pay the producer" proposal at the producer level, it is known that the organizations that favor "pay the producer" did not make the concentrated effort to ensure attendance and presentation of that viewpoint (as did the "pay the railway" proponents). However, the almost unanimous opposition to the GTR proposal, as witnessed at the producer meetings, had to be taken into careful consideration.

2. Arguments for and Against Hall Committee GTR Recommendation

Points listed in favor of the GTR proposal included the following:

- it would create an awareness of costs for the producer that would lead to a more efficient and lower cost system;
- it would create more options for the producer to market his grain;
- it would create intermodal competition;
- it would be resource neutral and therefore result in a better utilization of the land base in western Canada;
- it would create a greater diversification of the western economy; and
- it would not discourage branch line abandonment and therefore the necessary process of the rationalization of the grain handling and transportation system would be accelerated.

The list of arguments against the GTR recommendation included not only the opposite viewpoint to many of the points listed in favor above, but a few others as well:

- it would not necessarily enhance efficiency;
- it would not guarantee that livestock markets would increase nor that other secondary processing would be developed;
- it would not be resource neutral with respect to field crops, nor would it necessarily be more resource neutral with regards to feed grains;
- it would encourage the introduction of variable rates which would increase the number of lines being abandoned and leave the producer facing the costs of hauling his grain further to an elevator;
- the administrative cost of the compliance and enforcement of the program would be unacceptable;
- the GTR would change the intent of the Crow Benefit from a transportation to a production subsidy, and thereby encourage countervail measures by the Americans;
- the dilution of the Crow Benefit that would take place under the GTR would not be acceptable—in fact, no dilution would be acceptable;
- the process of elevator and branch line rationalization could and would continue without a GTR/"pay the producer" program;
- the upfront cost and the subsequent waiting period for the refund would be unacceptable;
- more money would have to be spent in eastern provinces to compensate for any "losses" that might result from the implementation of the GTR;
- the GTR would discriminate against on-farm feeding and therefore against the producer running a mixed grain/livestock operation; and
- the abandonment of rail lines would have a negative effect on the condition of rural roads, leading to increased costs for local municipalities and provincial governments.

The GTA was very much in agreement with the conclusions of the Hall Committee of inquiry that there were "... significant advantages to the 'pay the producer' approach" and that "... the most important were the removal of the farm gate price distortions that worked to the disadvantage of western agricultural development, and spurs to efficiency that would result from having full freight costs apparent to producers."

The Agency also agreed with the Committee of inquiry that the method of payment:

- must result in the removal of constraints to nongrain agricultural production and marketing activities;
- must confine payment of the benefits to the grain sector itself;
- must not result in unfair or disproportionate advantage to sectors of western agriculture relative to those in other parts of Canada;
- should make producers aware of the full costs of grain transportation;
- should be independent of the mode of transportation used; and
- should not involve complex or costly new administration procedures."

However, while recognizing that the GTR was a good solution to the payment of the Crow Benefit question, the GTA could not recommend its acceptance by the federal government for the following reasons:

1. Many of the briefs and presentations, both written and oral, expressed considerable concern about the mechanics and the cost of the GTR. In addition, a lack of understanding about the purpose and the process of the GTR had resulted in a widespread grassroots distrust of, and resistance to, its implementation.

2. The GTR would require that certain areas and sectors receive compensation over and above the Crow Benefit for any losses, an additional government expense that contravened the GTA mandate to expend no more than $658.6 million (plus government share of inflationary increases).

3. There was a solution that would resolve the problems not addressed by the GTR.

Method of Payment

1. Conclusions

While recommending that the federal government not proceed with the GTR, the GTA was convinced that payment to the producer was the right solution to the problem of payment of the Crow Benefit. However, none of the options identified and considered previously were able to satisfy all of the concerns that had been raised.

2. The Payout

The Committee of Inquiry had considered the possibility of paying out the Crow Benefit to be outside of their terms of reference. However, as the situation of both world markets and the western Canadian farming community developed during the crop year 1985-86, the concept of a payout of the Crow Benefit became more and more acceptable, in that it afforded solutions to all the most pressing concerns:

a) Surety. In a world where governments were coming under pressure to dismantle subsidies, the western Canadian producer would be most assured of receiving the future Crow Benefit commitment by taking an annuitized equivalent today.

b) Efficiency. With a payout, the Crow Benefit funds would be administered by those directly affected by transportation costs, and the increased producer awareness of, and responsibility for, these costs would lead to pressures for a more efficient and lower cost grain handling and transportation system.

c) Resource Neutrality. The payout would remove the bias inherent in a payment related largely to export grains thus enhancing the domestic livestock and secondary processing industry's ability to compete.
d) **Producer Protection.** Freight rates for grain would continue to be administered statutory rates. In addition, inflation sharing and safety net provisions would remain in effect.

**Research Requirements**

In the relatively short period of time from 1982 to 1986, there have been three major reviews of the method of payment issue, albeit with different emphases. The industry is now evaluating another method of payment—the payout of the "Crow Benefit." Reluctance to accept the proposed payout, even by proponents of a "pay the producer" option, has been in part due to the unknowns surrounding the option, and research will have to be directed towards addressing these unknowns.

**Basis**

On what basis will the payout be made? Should the basis be cultivated acres? Should productivity be taken into account? Would it be feasible to use historical deliveries?

One potential form was outlined by Dr. Gilson, which was acreage based. However, this raises the problem identified by Justice Hall, in that payments would be made to those outside the grain sector who did not suffer any direct loss from a change in the method of payment. This is a major factor that has been addressed, but not conclusively, and that is, what is the dilution factor? As noted earlier in this paper, one of the major concerns surrounding the Hall proposal was the issue of intra-farm sales to capture the benefit for on-farm feeding and the resultant increase in dilution.

A payout based on deliveries would require historical data. This would be in contrast to the procedure recommended by Hall, upon which payment is made on current net sales. This question is really no different than under other forms of a producer payment. However, given the potential magnitude of a payout, the impact is multiplied.

**Timing**

Although an immediate payout would be difficult for the federal treasury to absorb, if the payout were in the form of a bond, with some limitation on the freedom to cash in, the government’s financial situation would be no different under bond interest payments than under an ongoing payment. A payout spread over a number of years would allow for adjustments. The second question then becomes—what is an acceptable time frame over which a payout can be effected?

**Size and Form**

Assuming a Crow Benefit of $658.6 million and a 10 percent rate of interest, the government commitment could be in the order of $6.6 billion. However, what are the long-term prospects for inflation and interest? Lower interest rates would require a higher payout, with the converse holding true. Would adjustments be made if long-term trends were significantly different than those assumed for the payout?
It has been suggested that the payment could be in the form of a bond. Would a bond be redeemable at any time; or would the bonds have different maturity dates? It has been noted by some system participants that yearly bond payments result in the same government commitment on a yearly payout. The major difference is that the bonds would be negotiable; therefore, it is conceivable that a farmer could cash in his portion.

Impact

Perhaps one of the largest unknowns is the impact of such a payout on the economy. What could a six-and-one-half billion dollar payout do to land values, or farm input costs such as fertilizer and equipment?

One scenario could include a dramatic short-term increase in land values as farmers would try and expand the base to capitalize on a payout, with farm land prices declining in the long term by a value equal to the Crow Benefit payout.

Future Inflation Sharing Provisions

Under the current W GTA, the producer absorbs the first six percent of inflation and the federal government anything beyond. At present, given these inflation sharing provisions, the Crow Benefit has increased from $68.6 million to over $700 million. If inflation increased beyond six percent then would such payments be administered by the government? Would payments be made to the railways; or would a new bond have to be issued?

Tests

Given the potential size and unknown ramifications of a payout, an experiment within a specific province might be advisable.

One possible form is as follows (assuming a trial in Alberta):

1. Producers would receive a nontransferable, noncashable, but interest bearing bond.

2. The bond would have a "maturity" date five years hence. At the end of five years, or at any time prior, the bond could either become worthless, or could be traded in on a transferable, cashable bond.

3. The bond would be tied to the land it represents, and would be transferred if the land were sold. If the land were subdivided, the bond would be subdivided. [Note: What happens if the land is sold for nonagricultural purposes, and how do you determine what is and is not legitimately "agricultural?"]

4. During the life of the bond, the grain originating on that land would pay the full statutory rate. If the bond were cancelled (i.e., the experiment terminated) the freight rate would revert
to the existing arrangement of a producer and federal government share.

5. Some policing would be required along the Saskatchewan/Alberta border to assure that grain grown on land covered by the bond did not find its way to Saskatchewan elevators as Saskatchewan-produced grain, thereby qualifying for the lower rate. This is not likely to be a large problem, and will occur only with producers who own land on both sides of the border.

Research has a long way to go to address the multitude of questions surrounding a producer payout. This list may be daunting, but once addressed the questions and problems surrounding the dispersal of the Crow Benefit are answered once and for all.

Just as the ad hoc programs of the seventies and eighties, e.g., branch line rehabilitation and hopper car purchases, only addressed symptoms of the problem, and that only in the short-run, so must the problems surrounding the method of payment be addressed and the questions answered for a lasting and long-term solution.
Canadian Wheat Board Price Pooling
and West Coast Capacity

John R. Groenewegen*

Introduction

From time to time the monopoly power of the Canadian Wheat Board (CWB) in the export market is called into question by prairie producer groups. Based on occasional evidence which shows that grain prices at certain prairie points are lower than at adjacent points in the northwestern United States, representation is made for grain exports outside of the CWB system. At issue is not only the exclusive control over exports given to the CWB, but also the pooling by the CWB of Thunder Bay and west coast prices. This paper discusses these issues in the context of the capacity constraint on west coast export shipments.

The paper is organized in the following manner. The following section provides some background facts on the prairie grain market which are used, in the subsequent section, to construct a model of spatial grain pricing in western Canada with an export constraint. Pricing under various institutional arrangements is also discussed. The next to last section illustrates means by which the export constraint on the west coast could be reduced. The last section provides some policy implications and conclusions based on the analysis.

Background and the Inductive Stage

For the present purposes the western grain market can be represented by the following four groups: grain producers, the Canadian Wheat Board, the grain companies (private and cooperative with a grain handling regulatory authority), and the railroads with a railroad regulatory authority.

Grain producers produce the grain and sell it to either the CWB or the grain companies at their elevators. This model does not include the local prairie feed market since the basic results can be obtained without representing this market. The CWB sells most of its grain to the export market, while the private companies can only sell some grain domestically (feed grains) and they have exclusive control of others (oilseeds) and can sell them into both the export and domestic markets. The regulatory authority overseeing the grain companies establishes maximum elevator company tariffs. The railroads provide the transportation to move the grain to either the west coast export market or to Thunder Bay for subsequent transfer to the eastern domestic market or to the east coast export market. The railroad regulatory authority establishes the rates charged to move grain to the west coast and to Thunder Bay.

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Market returns are lower at Thunder Bay than at the west coast export market since the freight and elevation charges required to move grain from Thunder Bay to the St. Lawrence export market are $23.00 per tonne. Figure 1 illustrates a case where St. Lawrence and Pacific export prices are equivalent. In fact for some grains, Pacific prices are higher than St. Lawrence prices (e.g., durum). The horizontal axis in the figure depicts the spatial nature of the prairie grain market.

Regulated freight rates on grain result in two market returns relationships, depending on whether the grain moved eastward or westward. The upper market returns relationship in Figure 1 shows the return to producers on west coast sales from each region of the prairies. For different distances shipped to the Pacific coast, the slope reflects the regulated freight rate charge. (Elevator charges are not included in this analysis.)

The lower market returns relationship illustrates the market returns from export sales via the St. Lawrence and Thunder Bay. The regulated rail rates to the west coast and Thunder Bay are shown in Table 1.

Table 1: Freight Rates on Grain From Selected Prairie Points, 1984-85

<table>
<thead>
<tr>
<th>From</th>
<th>To Thunder Bay</th>
<th>To West Coast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brandon, Manitoba</td>
<td>5.92</td>
<td>11.20</td>
</tr>
<tr>
<td>Scott, Saskatchewan</td>
<td>8.20</td>
<td>8.09</td>
</tr>
<tr>
<td>Lethbridge, Alberta</td>
<td>9.09</td>
<td>7.57</td>
</tr>
</tbody>
</table>

Source: Canadian Freight Association

With the current rail charges at the extreme points less than $12 per tonne, and the Thunder Bay-St. Lawrence margin more than $20 per tonne, there is no natural market equilibrium within the prairies on grain shipments. That is, market returns are always highest on west coast shipments from any prairie point. (Section IV discusses situations where this need not be the case.) However, all grain does not move westward because there is a constraint on the total tonnage of grain that can be exported in that direction. This analysis assumes the constraint is a capacity constraint somewhere in the west coast transportation and handling system (e.g., west coast elevator handling capacity). The source of the constraint is not our current concern, but its identification is important to effectively reduce the constraint. In crop year 1983-84, west coast movements were 12.5 million metric tonnes, (as shown in Table 2). For analytical purposes only, this volume will be used to represent the west coast constraint.
Figure 1: Returns to Western Canadian Grain Sales from Either East Coast or West Coast Sales
<table>
<thead>
<tr>
<th>From</th>
<th>Exports</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pacific Coast</td>
<td>12.5</td>
<td>42</td>
</tr>
<tr>
<td>St. Lawrence</td>
<td>14.8</td>
<td>49</td>
</tr>
<tr>
<td>Atlantic Coast</td>
<td>.8</td>
<td>3</td>
</tr>
<tr>
<td>Churchill</td>
<td>.6</td>
<td>2</td>
</tr>
<tr>
<td>Thunder Bay to United States</td>
<td>.9</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>.3</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>29.9</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: Canadian Grain Commission

During the past decade arguments were made that a total constraint existed on grain shipments from the prairies. The late 1970s expansion in rail car capacity and the current set of incentives to the railroads to expand capacity have eliminated the total constraint. No attempt has been made to estimate the current total constraint on grain movements from the prairies. Consequently, the analysis assumes that any constraint on eastward shipments is greater than current shipments to the East. The implications of this analysis would not be significantly different if a constraint on eastward shipments was also considered. It would only add a level of complexity to the discussion.

The analysis assumes near equivalence of St. Lawrence and west coast export prices, or Vancouver above Thunder Bay returns. This assumption should not be considered a temporary aberration. For example, if west coast prices were significantly below St. Lawrence prices, the west coast capacity constraint would be resolved through market forces. However, this situation should not exist and to illustrate the point, consider the following example. St. Lawrence and west coast shipments both satisfy the European market. For a natural price equilibrium to occur on the prairies, the freight rate differential on these shipments would have to approximate Thunder Bay to St. Lawrence transfer costs (currently $34/tonne). Clearly, ocean freight rate differentials will not likely be that significant. The implication of this extreme example is that a price premium on west coast shipments over Thunder Bay shipments will remain a normal market feature. Moreover, the forthcoming policy implications are not sensitive to small departures ($10 to $15 per tonne) from the assumption of equivalent export prices on both coasts. Twenty years ago, St. Lawrence prices were above Vancouver prices, and Thunder
Bay prices were more on par with Vancouver prices. The shifting nature of demand from Europe to the Pacific Ocean and the low marginal cost of ocean shipping will ensure that the current east coast-west coast pricing relationship will remain during the foreseeable future.

Pricing on the Prairies with a West Coast Constraint

Figure 2 is a slight modification of Figure 1 to illustrate spatial pricing arrangements on the prairies under various institutional constraints. The top horizontal axis is for west coast movements with distance from port proportionately related to tonnage produced. For convenience this analysis assumes that production is uniformly distributed across the prairies. Relationship 'abc' can be thought of as the demand for prairie grain at certain prairie points, which is essentially the export price minus transportation charges. Point 'a' is the west coast price and point 'c' is the price (after transport costs) in the eastern prairies on west movements. Point 'd' represents the Thunder Bay price and point 'f' the transportation adjusted western prairie price on east coast sales. Total grain shipments in this representation are 30 million tonnes.

The vertical line through 12.5 million tonnes represents the supply of west coast capacity. That is, capacity is constrained at 12.5 million tonnes. As previously mentioned, this figure is used because it represents maximum shipments through the west coast. Capacity is constrained because given the price difference between Thunder Bay and Vancouver, an additional tonne would be valued higher when it is shipped westward rather than eastward. In the situation depicted in the diagram, spatial price equilibrium does not exist. Returns to the west of the constraint are $25 per tonne higher than just east of the constraint (i.e., the difference between points 'b' and 'e' in Figure 2). Distributional or equity consequences are dramatic. For example, with present regulations on elevator company and rail company rates, but with no CWB and producers receiving market returns based on location (and spatial arbitrage is prohibited), then 'abed' would represent the spatial distribution of prices across the prairies. In this situation grain producers east of the capacity constraint would likely devise mechanisms to access the higher west coast returns. That is, spatial arbitrage attempts would occur.

Before discussing other pricing possibilities, the current west coast benefits and potential benefits of expansion should be outlined. Foremost, area 'bcde' is a measure of the potential benefits of increasing west coast capacity to 30 million tonnes. In this diagram the annual benefit is $315 million. This analysis does not account for any differing transportation subsidies if more grain is shipped westward. Benefit cost analysis can determine whether the present value of these potential benefits equals the present value of the cost of additional capacity.

Secondly, area 'abef' ($395 million) measures the benefit from west coast capacity. The benefits of the scarce resource of west coast capacity could accrue to farmers, grain companies, or the railroads. The exact distribution of this benefit depends on the economic power of these groups and the extent of regulation in the sector.
With a market arrangement where the grain companies have significant power over setting handling charges, etc., the grain companies could capture the benefit of west coast sales and the resulting spatial configuration of price could be as extreme as 'fed.' This distributional consequence could prevail when grain companies have all the market power since the next best thing to west coast is movement to Thunder Bay.

If the railroads had the power to set rail rates, then depending on whether other transportation modes existed, most of the benefits to west coast shipments could go to the railroads.

When farmers have the lion's share of market power then they as a group can capture the benefit of west coast movements. Two issues arise; first, what market mechanisms are necessary to capture the benefit, and secondly, what are the distributional implications using different mechanisms to distribute the benefits across all farmers? In terms of the first issue, economic power is provided to farmers through regulations on rail rates, regulations on grain company handling charges and through the existence of the Canadian Wheat Board and its exclusive control over exports of wheat, oats and barley. Price pooling by the CWB is the mechanism currently used to distribute export returns to producers.

**CWB Price Pooling**

The CWB distributes the benefits of west coast sales to all grain producers delivering to the CWB through price pooling (i.e., redistributing all export receipts to producers, adjusted for transportation and handling changes). CWB pooling is illustrated in Figure 3. The current method of pooling is to take the export shipment weighted average of Thunder Bay and west coast prices (d and a, respectively). From this average (which are points h, or j and equal to $231.59 in this example), the minimum freight rate from each prairie point is applied. (The minimum and maximum freight rates apply to either Thunder Bay or west coast shipments as shown in Table 2.) The resulting spatial distribution of prices is 'hkij' in Figure 3. This solution produces a distribution of prices with returns lowest in the middle of the prairies and prices increasing as distance to port position decreases. It should be noted that area 'abki' equals 'kijde,' the amount of income ($167.5 million) redistributed due to the capacity constraint. The transfer is based on the prices and capacity constraint utilized in this analysis.

The distribution of pooled prices (hij) affects equity between producers across the prairies. Pooling results in the lowest market returns in Saskatchewan (associated with the middle range of production in the figures) and higher returns in Alberta and Manitoba. However, if all grain could move westward, then Saskatchewan returns would be below Alberta, but above those in Manitoba ('abc' in Figure 3). Consequently, producer groups in the western portion of the prairies could feel that they are subsidizing producers on the eastern part of the prairies and could demand a distribution of export receipts that reflects west coast opportunities. In fact, some Alberta groups have made representations for an Alberta pool by the CWB and for private market exports. The
pressure for this change will likely be minimal if Thunder Bay and Vancouver returns are close to equivalent.

In response to this distributional consideration, another pooling method is to use only the west coast transportation charge to redistribute prices on the eastern prairies with a price relationship of 'Impo' across the prairies. These prices would follow the same spatial relationship as if there were no west coast capacity constraint, except that they are lower. In this option, area 'abnm' equals 'node' ($117.5 million). Thus, somewhat over $100 million is transferred on paper between the eastern and western parts of the prairies. In comparison to the current pooling system, this analysis suggests that around $50 million would be redistributed from eastern prairie to western prairie producers (i.e., area 'pjo' equals area 'mpikh' equals $50 million in Figure 3). The CWB has recently proposed this method of redistributing prices in Grain Matters.

This approach disadvantages grain producers on the eastern prairies and livestock producers on the western prairies relative to the current system. The beneficiaries are eastern prairie livestock producers and western grain producers.

Price pooling can be viewed in another context; namely what configuration of prices would exist on the prairies in the absence of price pooling with a capacity constraint? It is argued here that without sufficient regulation benefiting farmers, the benefits would likely have gone to grain companies or the railroads. That is, in an unregulated market the railroads or the grain companies would have gained the benefit. To acquire these benefits, producers would likely have proposed to the federal government various mechanisms to distribute returns to them. Price pooling across the prairies would most likely have been one of them.

Some Extensions

In this section, the above model is extended to provide a perspective on the canola pricing situation in western Canada and the dual market for barley.

Certain grains have greater access to this west coast capacity. Most of the canola moves through the west coast. On the other hand, this appears to be to the advantage of canola producers since some wheat exports must go through Thunder Bay and receive a lower farm gate price. On the other hand, if canola was exclusively under the control of the CWB, most of the export movement would still be westward because of the location of market demand.

The canola market can be represented by Figure 1. The west coast market returns relationship represents prices received for canola seed exports to Japan. The lower return relationship represents the returns to shipping canola products to eastern Canada, adjusted back to a canola seed basis. In this market the Japanese are usually willing to pay a premium for canola. This premium coupled with the transport costs from
Thunder Bay to central Canada can result in negative returns or margins to prairie canola crushers. Negative margins occur when canola seed purchases for the Canadian market are closely aligned with prices based on the west coast market and canola product sales are based on eastern Canada prices. In this situation the negative margin can be represented by the distance between the two market returns curve in Figure 1.

This canola issue is not related to the transportation constraint per se, but rather to the fact that there is a limit on how much canola can move into the Japanese, or the west coast market. It is conceivable that processing margins are positive in the eastern region of the prairies and negative in the west. In other words, there may be a spatial equilibrium of prices across the prairies with the market returns from both markets intersecting somewhere on the prairies.

Barley producers in Alberta have been recommending a dual export market for barley, meaning the CWB loses its exclusivity of barley exports. This position could result from the realization that market returns to Alberta barley would be higher if all Alberta barley moved into the Pacific market and received those prices. One implication of such a position is that movement in this direction would be at the expense of other grain producers.

Western Canadian barley marketed commercially can be sold into export channels or into the domestic feed market which is predominately based on eastern feed prices. Using Figure 3 the returns from west coast exports are represented by 'abc' and returns from east coast sales are 'def.' The returns to producers selling into the off-Board domestic feed market are closely associated with these east coast returns. Pooled prices from CWB sales are 'hkpj.' The distance 'bk' in Figure 3 (or $13.40 per tonne) shows the perceived cost to Alberta of exporting through the CWB versus exclusively through the west coast outside of the CWB system. The distance 'be' (or $25 per tonne) shows the foregone revenue by supplying the domestic feed market, when prices are based on east coast returns, compared to direct exports by private exporters.

Off-Board and CWB pooled prices cannot be directly compared since the former is a spot price and the latter is an average price for the year and the final payment is received significantly after marketing has occurred. Notwithstanding, this figure does indicate that, on average, off-Board prices will in most situations be below pooled CWB prices. This occurs because the off-Board market cannot access the export market (particularly the west coast market). It also assumes that east coast export and domestic returns will approximate each other.

Reducing the West Coast Capacity Constraint

The first means to reduce the west coast constraint is to simply add more of the limiting factor (elevators, unloaders, etc.). This is shown as a shift from supply of capacity C1 to C2 in Figure 4. Returns to prairie grain producers could increase by the area 'bare.' A 7.5 million tonne capacity increase could enhance prairie grain cash receipts to $165 million/year. Under current institutional arrangements the extra
Figure 4: Reducing the West Coast Capacity Constraint
income would be distributed through the pooling system. Since the benefits of west coast capacity have increased to 'aqff,' the distribution of pooled prices across the prairies would more closely reflect market opportunities. As increasing west coast movements enhances returns, profitability of livestock feeding would decline because of the higher opportunity cost of grain on the prairies.

If the annual benefits exceed the costs of the capacity, an interesting question is why producers by themselves, or through the CWB have not set aside some of the pooled returns to enhance west coast capacity. The above analysis suggests that the Prince Rupert expansion does benefit grain producers and that grain producers could share in some of the costs since they are also beneficiaries.

Under the current regime the grain companies do not have large incentives to increase western capacity since they receive a regulated margin on each tonne exported, regardless of whether grain goes eastward or westward. The CWB does have some incentive to add capacity since they are trying to maximize returns to prairie grain producers. However, the CWB is currently a marketer of grain but does not itself engage in the actual moving, storing and handling of grain. With sufficient producer representation, the CWB could provide grain companies with incentives to move grain into higher priced markets, but have so far refused to do so.

If the prairie grain market had no CWB and its associated pooling of prices, then the western capacity constraint could have been eliminated by the grain companies investing in additional capacity and capturing some or all of the benefits. This of course assumes that a regulatory agency did not restrict their profit margins.

Enhancing Thunder Bay returns from 'd' to 't' in Figure 4b can reduce the extent of the west coast constraint. This could be accomplished by lowering lake shipping rates (through finding back-haul opportunities, reduced regulation, or subsidized lake freight rates). A spatial price equilibrium could exist when the minimum price point on the prairies lies west of the west coast capacity constraint point. The subsidy approach would require a subsidy to lakers of area 'vutdse.' In this situation the potential benefits of enhanced west coast capacity is reduced to 'buv.' Similarly the benefits of west coast capacity is reduced to 'abw.' Pooled prices would also more closely reflect market opportunities than at present.

Paying the Crow benefit to grain producers is a third approach to reducing the capacity constraint. Doing so will increase per tonne-mile charges and could result in an intersection of the east coast and west coast market returns somewhere on the prairies (Figure 4c). In this example, west coast market returns are reduced from 'abc' to 'awx' and east coast from 'def' and 'dwy' with a price equilibrium at 'wl' if the west coast capacity constraint was not effective at this export level. The exact solution depends on the composition of fixed and distance related components of rail costs. The farther west this spatial price equilibrium occurs, the higher the probability the constraint is removed. This method of payment involves direct payments to producers.
which result in farm gate prices (after the payment) that are close to those when the benefit is paid to the railroads. Consequently, the potential benefits of expanding west coast benefits can be measured as the area 'baaze' which is less than current benefits. In all likelihood a change in method of payment would not produce an intersection point between the two market returns.

Combining the three above approaches could eliminate the west coast capacity constraint. This would result in a situation where west coast exports increase and prices on eastern and western shipments equilibrate somewhere on the prairies. This solution is shown in Figure 4d, where west coast market returns are 'ax,' Thunder Bay returns are 'tbb,' and these relations intersect (at 'cc') west of the capacity constraint. The market price relationship across the prairies would be 'acct,' with prices lower on the center of the prairies than at the points close to ports. Pooled prices on the prairies would not be significantly different than market determined prices, particularly if pooled prices were distributed to farmers based on the minimum rail rate. In such a situation, representation for a dual export market could diminish. As well, the benefits attributed to pooling in this paper would also diminish.

Conclusions and Policy Implications

A major conclusion of this paper is that CWB price pooling provides an important (and most likely unintended) function in western Canada, which is to redistribute returns from a scarce resource to all prairie grain producers. The manner in which this redistribution across the prairies occurs has equity and distributional implications.

The second conclusion is that, as the export restraint is removed, the need for price pooling as a mechanism to distribute the returns from a scarce resource will decrease.

Achievement of a natural spatial price equilibrium eliminates a benefit attributed to CWB price pooling in this paper. That is, there is no more need for pooling to be the means to distribute the returns of a scarce resource to all producers. Price pooling may still be preferred to spot pricing as a means to reduce producer price risk. As well, regional price pooling can then be seriously considered since the difference between a market related price and a pooled price in a region would be largely eliminated. That is, regional prices can reflect true market opportunity for a region. However, within a region pooling will likely be considered unfair by some in a region on the same basis as the current prairie wide pool.

A third conclusion is that nonboard grains like canola receive substantial benefits over other grains by having unlimited access to the west coast market. That is, unlike CWB exports, a portion of canola exports do not have to be allocated through the lower return Thunder Bay market.

Fourth, moving to a dual export system would prove to be inequitable to the CWB and producers delivering to the CWB unless non-CWB grain exports share in the export restraint.
The arguments in this paper suggest that a dual export market for barley should not be implemented until at least the capacity problem is resolved. When this occurs, objections to dual export markets for barley, for example, cannot be argued against on the grounds that it would create an advantage to one area or commodity. That is distance 'bk' in Figure 3 should approximate zero when the capacity constraint is removed. Objections to dual export markets could still exist if it is perceived that elimination of a single desk seller reduces returns from the export market to Canadian grain producers. Elimination of the constraint could reduce producer pressure for private grain company grain exports by grain producers.

Fifth, there are a few ways to reduce the capacity constraint and allow pooled returns to approximate market opportunities. They include additional capacity, improving Thunder Bay returns, and paying the Crown benefit to producers. A combination of the above would be most effective.

With a capacity constraint, market opportunities can be best reflected by redistributing returns from the market with the constraint. This is the mechanism proposed by the CWB.

The method of payment issue evolved from the need to reform the low statutory payments for moving grain to allow additional grain transportation capacity. This analysis indicates that the method of payment chosen can impact on the prairie grain capacity issue. In addition, the analysis does suggest that improvements should be made to west coast movements and not necessarily to east coast movements. Another implication is that after the rail capacity constraint is removed, handling capacity may be the next constraint to expanded physical capacity.

Sixth, in the current system Thunder Bay and west coast market signals are masked from grain producers and grain companies have little incentive to expand west coast capacity since regulated tariffs limit the amount of benefit that they can receive. Both of these limit additional investment in west coast capacity.

Seventh, marginal improvements in west coast capacity benefit the prairie grain economy, but disadvantage the western livestock economy relative to the current situation.

Increasing the benefits from west coast sales as increases in pooled returns should result in higher feed grain prices on the prairies. That is, the opportunity cost of domestic sales increases, so less should go into that system and more into the export system. This has consequences on the domestic feed grain market. First, the cost of feed to prairie and British Columbia livestock producers should increase. The British Columbia feed industry will probably source more grain from the northwestern United States feed market. The other consequence is that there will likely be a smaller amount of prairie feed grains moving off the prairies into the eastern market. Instead the east will probably use more Ontario feed grain, produce more local grain and import the remainder.
References


Subsidies for Grain Transport: Are They Justified?

E. W. Tychniewicz

Introduction

Transport subsidies are an historical fact in Canada. They include both direct subsidies, e.g., freight rate subsidies and infrastructure subsidies, and indirect subsidies, e.g., freight rate controls. They are also pervasive. In the case of grain transport, they include the "Crow Benefit" under the Western Grain Transportation Act, the light density branch line operating subsidy, the branch line rehabilitation program, the grain hopper car construction program, the feed freight assistance program, "At and East" rates, and minimum compensatory rates on canola products.

The purpose of this paper is to explore in a general way the perceived justification for grain transport subsidies. Major topics include: the conceptual basis for transport subsidies (from an economic and sociopolitical perspective), does grain transport merit special subsidy consideration, some alternative approaches to grain transport subsidies, and some issues requiring further research.

Conceptual Basis for Transport Subsidies

For purposes of this paper, a subsidy is generally defined as the difference between the actual cost of providing a good or service and the amount which can be collected for the good or service from the purchaser or user of the good or service. This difference can be covered by government payments to users or suppliers of the good or service, by the suppliers of the good or service, by users of related goods or services, or by some combination of the above. For the sake of simplicity, the cross-subsidization question is ignored in this paper, and the focus is on government subsidies.

Economists, political scientists, and others argue for and against subsidies on many different grounds. In this paper, a summary of the major arguments for transport subsidies is presented from an economic and sociopolitical perspective.1

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1 For an excellent and more thorough presentation, the interested reader is referred to John Heads, The Economic Basis for Transport Subsidies, Canadian Transport Commission, Economic and Social Analysis Branch, ESAB Report 75-4, 1975.
Economic Perspectives

The economic case against subsidies rests on the argument that competition can bring about an economically optimal allocation of resources at the lowest cost, and that subsidies cause costly distortions from the optimal situation. Where competition is imperfect, or does not exist at all, resource allocation is typically not optimal and costs are higher. Under these circumstances, subsidy interventions may be justified on economic grounds.

In the case of industries or firms with increasing returns to scale (i.e., declining average costs), it is often argued that subsidies will bring about an increase in output at a lower unit cost. Heads points out that the effectiveness of subsidies in doing this is dependent upon the degree of increasing returns to scale and the elasticity of demand for transport. If the degree of increasing returns to scale is small, the scope for benefit from subsidization is small. In the case of transport, there are unlikely to be many examples of significant increasing returns to scale, except possibly in pipelines and isolated cases in rail. Generally, the more elastic is the demand for transport, the greater is the potential payoff from a transport subsidy. Clearly, elasticities of demand and returns to scale are not identical for all transport modes and commodities, and consequently it is not valid to conclude that all modes and/or commodities should receive equal treatment with respect to transport subsidies.

The economic case for subsidies is also argued on the basis of countering monopoly power. In essence transport subsidies are used to persuade a firm with some degree of monopoly power to reduce rates and increase the level of output. This is usually accompanied by increased regulation to ensure that the firm complies with the conditions attached to the subsidy, since the firm could normally be worse off financially as a result of the transport subsidy. The effectiveness of such a subsidy is dependent upon the cost and efficiency of the regulatory process.

Sociopolitical Perspectives

A number of noneconomic reasons are typically given for the provision of transport subsidies. Although these sociopolitical arguments are often scorned by economic purists, there remains the argument that these have the most impact on the thinking of politicians and other policymakers. Five such arguments are mentioned here. No attempt is made to evaluate them.

Transport subsidies are, on occasion, justified on the grounds of promoting political unity and national defense. Clear examples of this are the land and cash grants to the Canadian Pacific Railway Company for the building of the railway across Western Canada, as well as a number of provisions of the Crow's Nest Pass Agreement of 1897.

Income redistribution, through taking income from the general taxpayer to subsidize users of specific goods or services, is a prevalent, but
often unstated, objective of a variety of Canadian subsidy programs. In the case of grain transport, income redistribution is an important component of the grain hopper car construction program as well as the "Crow Benefit" under the Western Grain Transportation Act.

Transport subsidies are also justified on the grounds of softening the impact of social and economic change. The light density branch line operating subsidy is clearly an example of this.

A frequent argument is made that transport subsidies can stimulate regional development by creating income and employment for otherwise underdeveloped or unemployed resources. This has been a "raison d'être" for a number of grain transport related programs, such as minimum compensatory rates on canola products, the branch line rehabilitation program, and the Feed Freight Assistance Program. Indeed, some of the most heated debates around the "method of payment" issue are rooted in different perceptions of the likely impact on prairie regional economic development.

A more nebulous justification for transport subsidies is the perception of an "historical right" to a particular benefit. The federal Government conceded this argument very early in the debate on entrenchment of the "Crow Benefit." This argument also surfaces when "temporary" transport subsidies outlive their intended mandate, such as in the case of the Feed Freight Assistance Program and the minimum compensatory rates on canola products.

Does Grain Transport Merit Special Subsidy Considerations?

A basic problem in Canadian agriculture, especially the grain production sector, is instability. This instability has two root causes. First, production instability is the result of climatic and biological factors that influence yields. Second, market instability arises from fluctuations in world demand and supply conditions for grain and policy changes (including subsidy programs!) in competing exporting countries as well as in importing countries. The importance of this market instability is underscored by the fact that upwards of 75 percent of Western Canadian grain is exported.

Put together, production and market instability generate rather severe cash flow instability in the Western Canadian grain sector. Cash flow instability in the short run, coupled with longer run downward pressures on world grain prices, undermines grain farmers' ability to pay "normal" or compensatory freight rates. In reality, transport subsidy programs such as the "Crow Benefit" and the light density branch line subsidy are disguised grain production subsidies. Regardless of

2 For a more thorough analysis of this argument, the interested reader is referred to two Ph.D. dissertations completed at the University of Manitoba (e.g., John Heads, Transport Subsidies and Regional Development, 1976; and Jack W. Craven, The Role of Transportation in Regional Development: Impacts on Industrial Location, 1980).
the method of payment of the "Crow Benefit" and the fact that the branch line subsidy is paid to the railways, these subsidies serve to redistribute income to the grain production sector and to cushion the impacts of economic change and instability. The question of whether there are more effective ways of dealing with the twin problems of cash flow instability and low income in the grain production sector is considered in the next section.

Some Alternative Approaches

The question raised in the previous section is complex and there are no simple answers. It is clearly recognized that firmly entrenched sociopolitical forces, coupled with a political reluctance to deal with root causes of problems, may well preclude any movement away from the current approach to dealing with problems in the Western Canadian grain production sector. The alternatives mentioned below clearly require elaboration and analysis of their implications.

One alternative is the Grain Transportation Agency's proposal for the Federal Government to "pay out" the Crow Benefit obligations to farmers. Details of the genesis of this proposal can be found in the paper by Miles and Wansbutter in this Proceedings. The approach is appealing in that it has the potential to remove most of the economic distortions and inequities associated with grain transport subsidies in Canada. Unfortunately, details such as the basis, method, and time frame for the "pay out" were not included in the proposal, and the Task Force recommended to deal with these issues is yet to be appointed.

A second alternative for dealing with grain transport subsidies would be to focus on programs already dealing with instability in the grain production sector. More specifically, the Western Grain Stabilization Program could be broadened to take account of grain transport costs. Grain freight rates could be allowed to rise to compensatory levels, the annual "Crow Benefit" of $650 million would be an additional contribution by the Federal Government into the Western Grain Stabilization Fund, and grain producers would receive a pay out when cash flow fell below some designated level. A desirable feature would be to continue with grain producers sharing in the funding of the program, but with the added dimension of being able to choose the level of stability of cash flow which a grain producer desired. The higher the level of stability desired by the grain producer, the higher would be his "premium" into the stabilization program; this is similar to a number of crop insurance programs. This approach to broadening the Western Grain Stabilization Program would require a number of modifications to the existing program, but these would be administrative in nature.

A third alternative which focuses more specifically on the level of income problem would be the concept of a guaranteed minimum annual income. Low incomes are not unique to grain producers in Western Canada or to the agricultural sector. Various social and economic programs (including grain transport subsidies) have been introduced to deal with low incomes and to provide some form of "safety net." These programs are proliferating, they are increasingly expensive to operate and moni-
tor, and they are often in conflict with one another. Clearly, there is
a need to "rationalize" the myriad of federal and provincial income re-
lated "safety net" programs. The concept of a guaranteed minimum annual
income program was explored in the 1970s in Manitoba and several areas
of the United States, but with limited success. Further exploration is
warranted. A desirable feature of such a program would be an incentive
scheme for job retraining and enhanced labor mobility. The current low
income problem in the grain sector will not go away with higher grain
prices and/or ad hoc subsidy programs. There is a need to tackle the
low income problem in a broader and more systematic way.

Some Research Needs

The discussion above has raised a number of questions that require
additional information and analysis.

In line with one of the objectives of this Workshop, namely to iden-
tify future research needs, some suggestions are presented below:

1. There is a need for ongoing research into agricultural supply re-
sponse. How are farmers likely to respond, in terms of produc-
tion decisions, to the changing economic and technological envi-
rionment? Much of the supply response information used by
policymakers now is rather dated and does not take account of re-
cent economic and technological changes.

2. Another ongoing need is market analysis for Prairie agricultural
products. How are domestic and international forces influencing
Canada's share of grain and livestock markets? What is Western
Canada's comparative advantage in producing grains and livestock,
and the follow-up processing activities, relative to Eastern Cana-
da and other countries?

3. The impact and appropriateness of grain transport subsidies re-
quire special attention. The differential impact of production
vs. marketing oriented subsidies needs to be evaluated. Also,
how appropriate are current grain transport subsidies in light of
the instability and low incomes facing the grain sector?

4. Grain producers' ability to pay increased grain freight rates
warrants further research. What are the factors that influence a
particular grain producer's ability to pay higher freight rates,
including attitude towards risk? Can these be generalized into a
broad policy or program? Should "safety nets" for grain produc-
ers be more broadly based than just the ability to pay higher
freight rates?

5. The mechanics and implications of the Grain Transport Agency's
proposal for the "pay out" the Crow Benefit needs further work.

6. The feasibility and implications of broadening the Western Grain
Stabilization Program to include transportation needs to be re-
searched.
7. The impact of low grain prices and market instability on the efficient operation of the grain handling and transportation system is another question that should be researched.
Discussant: H. Garth Coffin*

Introduction

My task is to discuss three papers on very diverse topics, all of which are important policy issues worthy of further study. I may also introduce additional ideas or information wherever it seems appropriate. In general, however, I may say that I have no major disagreements with any of the previous speakers.

Paying the Crow Benefits

The question of how best to deliver the compensation promised to grain producers for giving up their claim to the benefits realized under the statutory Crow's Nest Pass rates is undoubtedly the most controversial aspect of the Western Grain Transportation Act. This is certainly the focal point of any interest in this issue from other regions of Canada. However, it has also been a divisive issue within Western Canada as well.

A number of alternative methods of payment of the Crow Benefit have been considered and studied. It is probably fair to say, however, that the results of those studies have tended to either overstate or understatement the consequences of each method of payment, depending upon the vantage point from which the problem is viewed. On balance, there is still considerable doubt about the full impact of each method of payment, both within Western Canada and in terms of interregional competition.

My previous observations on this issue pertain to both the principle involved and the need for further research. The question of principle is that of the potential change in the nature of the Crow Benefit from a transportation subsidy (which it has always been, and would continue to be) under a "pay-the-railways" approach, to a general production subsidy, restricted to a particular region but not to any commodity under a "pay-the-producer" approach. While the objective may be to leave the western grain producer equally well off while allowing an adjustment in resource use to the benefit of livestock producers in Western Canada, the end result of such a change in the nature of the subsidy is likely to also have a negative welfare impact on other regions of the country. Most of the impact studies performed to date have tended to dismiss the problem of regional impact by assuming relatively high commodity prices on the one hand, and perfectly elastic export demand for red meats on

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1 These points are discussed more fully in: H. Garth Coffin, "Western Grain Transportation Initiatives and Agriculture in Eastern Canada." Canadian Journal of Agricultural Economics 32 (July 1984): 269-281.
the other. The current levels of commodity prices and recent countervail actions by the United States as well as other developments in the international market, reveal a certain fallacy in those assumptions.

What remains to be seen is how western producers will respond to various kinds of payment schemes. According to the comments of Andy Schmitz, the method of payment will not make much difference to livestock producers in the context of all the other uncertainties and problems facing the industry. While that may be true today, one is left to wonder how producers might react to different payment schemes under more buoyant market conditions. The Feed Grain Market Adjustment program of the Alberta Government which pays livestock producers in that province $21 for every tonne of grain fed may provide some answers if it remains in place long enough. In the meantime, it is an interesting case study of one subsidy having been put in place to offset another. For the moment, at least, it seems to have given Alberta producers the best of both worlds.

The paper by Miles and Wansbutter does not address these questions in an analytical sense. Rather, the authors have devoted most of their paper to a review of the background of the method of payment issue, involving the Gilson consultations, the Western Grain Transportation Act (WGT A) and its review, and the Hall Commission of Inquiry.

Their discussion of the Hall Commission of Inquiry, and its evaluation under the WGT A Review, provides a good deal of information on the rationale, development and eventual rejection of the Grain Transportation Refund (GTR) proposal as a once promising method of payment. The failure of the GTR proposal to win public support as a method of payment and, in fact, the "almost unanimous opposition" to it at producer meetings during the WGT A review, seems to remain a mystery to Miles and Wansbutter, as indeed it should, despite their thorough review of the arguments. The difficulty of finding an acceptable solution to this problem is amplified by their own observation that there have been three major reviews or inquiries in the past four years dealing at least partly with this problem.

While the information provided by Miles and Wansbutter is a very useful summary, it is unfortunate that so little time is devoted to exploring the real gist of their paper which is to introduce the notion of a one-shot payout of the Crow Benefit as through a bond program. The authors list a series of questions which must be answered through research including the basis, timing, size, form and impact of the payment as well as provisions for inflation. They also suggest that some of these could be answered through a limited test conducted in the form of an experiment in a province such as Alberta. While I am not convinced about the practicalities of such a test, I do agree that the notion of a single payout is worthy of consideration as an alternative to the plans already proposed, and that it does need considerable development and research. I would also urge that development of the concept pay particular attention to the question of impact, including implications for international trade in view of the growing interest in domestic farm
programs in the context of trade negotiations. There is no reason to expect a different international reaction to national subsidies than the national reaction one observes to regional subsidies. These conditions have to be thought through carefully.

Before leaving the Miles and Wansbutter paper, I want to comment on their reference to the changing regional share of hog production in Canada. The observation that Alberta's share of hog production has declined while that of Quebec has increased since 1973, reinforces the popular notion that subsidized production in Quebec has combined with the Crow rate to drive Alberta producers out of business. This inference is not accurate. In truth, the abnormally high Alberta hog production of the early 1970s, put there to digest part of the grain surplus of the time and provide cash flow to producers, was trimmed down in response to improved grain markets (and weak pork prices) before expansion took place in Quebec. It was only after we had become net importers of pork, and prices had improved to a profitable level, that production expanded in Quebec. Ironically, most of this expansion occurred after the reduction of feed freight assistance to that province (1976) and before emergence of the subsidized income stabilization programs of the Provincial Government (1979). A brief examination of the dynamics of this change reveals the overwhelming importance of market forces in this case. Even as recently as the period 1980-83, our analysis of support for red meat production indicates that the level of subsidization of hog production in Alberta was approximately twice that of Quebec. The myth of Alberta hog production being displaced by a more heavily subsidized industry in Quebec may make powerful ammunition for political cannons, but it does not square with reality, and policies based on perpetuation of that myth are likely to miss their mark by a wide margin.

CWP Pooling and West Coast Capacity

The paper by Groenewegen provides insight into an intriguing problem, part of which first came to my attention a few years ago when I was considering the probable impact of a new rate regime on grain movements for the domestic market. Another aspect of this problem, namely the implications for equity of price pooling among producers, was revealed through a paper by Brooks and Oleson at the AIC meetings in Saskatoon last July. Their proposal to use St. Lawrence positions instead of Thunder Bay as the price pooling point seemed to be a logical solution to the pricing problem given the geographic setting of Manitoba with respect to world markets.

However, there are other dimensions and implications. On the surface, the analysis by Groenewegen makes a compelling case for further expansion of West Coast handling facilities. Even with allowances for price adjustments likely to be associated with changed volumes but ignored by his analysis, the incentive for expansion could still be attractive. Given the potential benefits from such action one is left to wonder why there was apparently so much reluctance to expand capacity at Prince Rupert a few years ago or why there should still be any additional need for further incentive to expand on the West Coast.
It is also not clear from Groenewegen’s analysis how a pay-the-producer plan for the Crow Benefit would reduce the West Coast constraint unless such a plan would either reduce the volume shipped or redirect the flow of that grain. Neither is it clear why West Coast expansion would reduce the need for price pooling by the Canadian Wheat Board since it is my impression that price pooling by the Canadian Wheat Board has always had a great deal more to do with temporal equity than spatial equity among producers.

This whole issue raises a question about the real cost of rail transport: does it really cost as much to move grain across the Prairies to Thunder Bay as through the mountains to the West Coast? The current freight rate structure, in effect since a Royal Commission ruling in 1969, seems to suggest that to be the case. Prior to that ruling, however, westbound traffic was recognized as being 25 percent more costly per ton-mile than eastbound grain traffic.

A more recent freight rate structure again calls the equality of these costs, and perhaps the whole rate basis, into question. I am referring here to the temporary freight rates of $30 to $45 per tonne quoted this past summer for the movement of Ontario corn into the prairie provinces. As shown in Table 1, these rates represent a charge of about 2.0 to 2.5 cents per tonne-mile compared to the 3 to 4 cents per tonne-mile attributed to western grains. Is this differential purely due to back-haul?

Table 1: Rail Freight Rates for Ontario Corn and Western Grains 1986

<table>
<thead>
<tr>
<th>Origin</th>
<th>Destination</th>
<th>Approx. Distance</th>
<th>Freight Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHATHAM&lt;sup&gt;a&lt;/sup&gt; (corn)</td>
<td>Winnipeg</td>
<td>1,300</td>
<td>30.31</td>
</tr>
<tr>
<td></td>
<td>Saskatoon</td>
<td>1,800</td>
<td>36.38</td>
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<tr>
<td></td>
<td>Edmonton</td>
<td>2,140</td>
<td>45.19</td>
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<tr>
<td></td>
<td>Vancouver</td>
<td>2,830</td>
<td>60.63</td>
</tr>
<tr>
<td>EDMONTON (wheat, oats barley)</td>
<td>Vancouver</td>
<td>766</td>
<td>29.76&lt;sup&gt;b&lt;/sup&gt;</td>
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<tr>
<td></td>
<td>Thunder Bay</td>
<td>1,280</td>
<td>37.99&lt;sup&gt;c&lt;/sup&gt;</td>
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<tr>
<td></td>
<td>Bayports</td>
<td>2,000</td>
<td>76.32&lt;sup&gt;c&lt;/sup&gt;</td>
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<tr>
<td></td>
<td>Granby, Que.</td>
<td>2,350</td>
<td>79.83&lt;sup&gt;c&lt;/sup&gt;</td>
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</table>

<sup>a</sup> LFT No. 54392. Effective July 4 to September 1, 1986
<sup>b</sup> Domestic Feed Grain Shipments
<sup>c</sup> Includes Actual Freight ($7.33/tonne) plus Government contribution ($30.63) to Thunder Bay
Within the rate structure for western grain, the domestic rate for feed grain shipments from Edmonton to Vancouver is nearly a cent per tonne-mile higher than the calculated rate (effective rate plus subsidy) for shipments from Edmonton to Thunder Bay. Although distance is also a contributing factor, the rate differential represents about 30 percent more per tonne-mile for the west-bound traffic. If the way we are pricing our services is contributing to the allocation problem, perhaps we should be paying more attention to both cost and value differentials. Although this would not likely eliminate the problem discussed by Groenewegen, it might, at least, reduce the magnitude.

The Need for Grain Transportation Subsidies

The final paper in this section addresses a very important and challenging question, namely, are grain transportation subsidies justified? It is important for a variety of reasons, not the least of which is the sheer volume of public dollars involved. If we were to put a figure on the total cost of grain transportation subsidies in Canada we may find it approaching one billion dollars, the largest component of which is, of course, the Crow Benefit.

However, there are other reasons for the importance of this question. We must explore the original reasons for these programs and determine if they are still valid. For example, the original reason for the Crow rate structure had to do with national and regional development, but it did not become a major subsidy until the inflationary period of the 1970s. Even at that, the public contribution to the subsidy was modest and administered by somewhat indirect means until the passage of the Western Grain Transportation Act. The fact that the producer's entitlement to continuation of this benefit has been taken for granted with so little discussion may be indicative of the price we are willing to pay to achieve this change in freight rates. But it may also mean that we somehow got sidetracked from the real nature of the case, and have decided to use transportation subsidies as an instrument of income support or production subsidy.

To pursue this argument just a bit further, one wonders how the objectives of the Crow rate structure have changed and what this means for compensation. No one questions the right of producers to some form and amount of compensation, but I have always been surprised at the ready acceptance of an accounting estimate of railway losses, (the Crow Gap) as a measure of producer benefit. This approach, even if the cost estimates are correct, implies a degree of pricing efficiency not usually attributed to a marketing system that is something less than perfectly competitive. It also has implications for methods of payment other than those through the market system. For example, if direct payments of Crow Benefit to producers exceed those previously realized through the market system, producers might be better off even after a freight rate increase.

Tyrchniewicz provides us with a definition of a subsidy as the "difference between the actual cost of a service and the amount which can be collected for the service from the users of the service." Although the
focus here is on government subsidies, the definition applies equally to transfers from other sources as well. By this definition, for example, inasmuch as market returns are currently below costs of production, it may be said that Canadian farmers are subsidizing consumers around the world. There may be other definitions of subsidies that one could use. In fact, one of the problems with subsidies is that their purposes and effects are not always well understood and may be viewed in very different ways. As observed by Break²

"To most economists the subsidy is a useful fiscal instrument whose major purpose is to improve the private sector's allocation of resources among their alternative uses. To many laymen, on the other hand, subsidies are an elusive and worrisome phenomenon, frequently hidden from the general view and often suspected of being used more for private gain than for public good." (p. 1)

Obviously, it is not only the laymen who take a dim view of subsidies and sometimes that view is the proper one. In our own assessment, however, we may need to remind ourselves that subsidies are not necessarily all bad. The main point is that it is time to get on with a review and assessment of our subsidization programs.

To assist in getting on with the job, Tyrchniewicz provides us with a conceptual basis for transport subsidies, including some thoughts on economic and sociopolitical considerations. He also cites production, market, and (consequently) cash flow instability as a major problem faced by grain producers, affecting their ability to pay "normal" freight rates. We are then presented with some alternative approaches to solving this problem, namely, the GTA pay-out proposal, a broadened stabilization program, or a guaranteed minimum income program.

The inference is clear: to repeat the perspective suggested by Hayward yesterday, market instability represents a $50 per tonne problem for grain producers while method of payment of the Crow Benefit may be closer to a $5 per tonne problem. Bearing that in mind, it may well be worthwhile exploring new ways to apply the Crow Benefit than through either a transportation or production subsidy. Whatever those new ways may be, they will have to take account of the international sensitivity factor.

Tyrchniewicz concludes with a research agenda containing the following items, each of which is accompanied by my own comments:

1. **Supply Response** - This is a very important area of agricultural research at the moment because so little is known about the impact of risk and how producers react to programs such as stabilization.

2. **Market Demand** - Again an important area for research, especially with apparent shifts occurring in the demand for meats and other products of agriculture. It may not be the time to count too heavily on livestock as a growth market.

3. **Producer Ability to Pay** - I am not sure about the real value of work on this subject. Does it mean that freight rates may be based on the bank accounts of producers?

4. **The Impact and Appropriateness of Subsidies** - I would put this item higher on the agenda, probably in second position, hand in hand with work on supply response. As noted earlier, it is time to review the objectives and impacts of such programs, including their trade implications.

5. **GTA Proposal and Other Method of Payment** - Failure to find a satisfactory method to administer the Crow Benefit thus far means the one-shot payment deserves a closer look, especially for potential arrangements, impact on land values and implications for production and marketing decisions.

6. **Incorporation of Crow Benefit into Grain Stabilization** - This represents an imaginative new approach to the search for the most useful manner in which to administer the Crow Benefit by applying it to the number one problem - price and income instability. It deserves serious consideration along with other instruments to achieve stabilization.

Already a great deal of work has been shown as necessary in researching policy issues—not all of which fits neatly into the domain of transportation. There is one more item which I think should be added to the list in view of developments occurring in transportation costs, traffic flows and the aging of a capital intensive infrastructure. I am referring to the future of the St. Lawrence Seaway which has already experienced rising costs and declining revenues at a time when important investment decisions have to be made to maintain the system. The future of grain traffic through that system will have an important bearing on those decisions.

With these and other research issues already emerging from other parts of this program, there is plenty of important work to keep many people occupied for some time to come. The most difficult task may be, in the midst of so many priorities, to decide where to begin.
VI. PANEL ON IDENTIFYING FUTURE RESEARCH NEEDS*

J. Murray Cormack**

I have been asked to reflect on our panel discussion of yesterday morning, which dealt with "Research on Efficiency Measures." My remarks will not deal in any detail with the presentations that were made, but will try to reflect on their implications for grain handling and transportation research.

Following our panel yesterday morning, one or two of the subsequent speakers suggested that perhaps we do not need more research on grain transportation efficiency, but rather that we need to more effectively use information that is already known. The tenor of these remarks was that public persuasion may be a more important element in bringing about change than additional information. I would like to pursue this theme for a moment.

There is probably some truth to the suggestion that the answer is in more use of the information that is available, but there are also some limitations to this suggestion. Let's use the example from yesterday's discussion relating to branch line abandonment. As we all know, under the Western Grain Transportation Act the farmer now bears, in a very direct way, the rail cost of moving grain. During our panel, David Craig presented a ranking of the CP grain independent lines in order of their cost per tonne mile. These figures showed a dramatic difference in the cost of moving grain on the various lines. There is a view that if this information was made available and fully explained to producers that they would be anxious to see the abandonment of a large number of the high-cost branch lines. I don't believe we should come to that conclusion too quickly. There are two reasons for this: First, while producers generally would benefit from the removal of a particular high-cost branch line, there is a group of producers who have been serviced by that line who will not see its removal as a benefit because they will experience a higher cost of moving their grain to an alternative line should their line disappear. They will, therefore, tend to resist removal of that branch line even though they may recognize that it would be to the benefit of producers generally. Secondly, while farmers do not always agree on all matters, one thing they will not do is be anxious to press hardships on each other. We should not expect that the farmers who would benefit generally from abandonment of a branch line, who live in other parts of the prairies, are going to rush to a rail abandonment hearing in a particular area to urge its removal.

* Session chaired by E. W. Tyrchniwiecz, Director, UMTI.
** Chief Executive Officer, Manitoba Pool Elevators.
This leads to the subject of compensation and the issue of "gainers and losers," which was dealt with in David McQueen's presentation. There are no doubt many problems with implementing a policy of compensation for those who suffer as a result of rail line abandonment. It is my contention, however, that unless the "losers" can be assured that they will not be any worse off after rail line abandonment than before, they will tend to resist the removal of their line.

It is for these reasons that I conclude that while more information and public persuasion may be important to achieving greater efficiency, it is not the entire answer.

Art Wilson presented an interesting paper on the impact of regulation on efficiency in the grain handling and transportation sector. He offered some examples and some judgments as to how certain regulations would impact. I was interested in the question asked by Andy Schnitz as to whether or not any research had been done in Canada on this subject. Art indicated that there had not been any work done to his knowledge. This surprised me. I would have thought for example that before "Freedom to Move" legislation was introduced in Canada that there would have been research done to determine what impact it might have. We were warned yesterday by more than one speaker that we should not simply take what has been adopted in the United States, and automatically assume that it will work effectively in Canada.

The grain handling and transportation sector is a heavily regulated industry and I believe we may have identified an area where research work needs to be done.

Such research must be objective and must be specific if it is to be useful. It cannot be undertaken on the philosophical premise that regulation in itself is either "good" or "bad."

During the panel we had presentations from representatives of both the grain handlers and railways who documented the fact that a number of efficiencies have been achieved in those particular sectors. I mentioned to Ron Weik that his use of 1984/85 as the end point of a 10-year period may have understated the throughput efficiency that he displayed due to that being a drought year in two of the western provinces. Similarly, this affected his projected estimates of capacity turnover through to 1994/95. For example, I have not seen all of the industry figures for 1985/86, but in the case of MPE our country elevator system turned over its capacity in excess of 7 times. This compares with a projected turnover in 1994/95 of 5.8 as suggested in Ron's paper. I mentioned this simply to make the point that the potential for greater efficiencies does exist in the current handling system.

The railways also indicated that a number of efficiencies have been achieved and that there is an incentive to achieve further efficiencies in grain transportation.

Regulation may be an impediment to achieving some of these efficiencies and bears further examination. For example, I think of the diffi-
cult time that the railways had to get approval to even run a test of a cabooseless train, in spite of the fact that they were able to demonstrate that there would be considerable cost savings by so doing.

One of the railway speakers suggested that one of the reasons the railways have not been able to achieve full efficiency is because of the "limitations imposed by an out-of-date gathering system at the origin of the grain movement." There has never been any question in my mind that from the standpoint of railway efficiency, the most efficient system would be for a single railway track to run through the middle of the prairies with grain picked up only at units where 100-car trains could be loaded. This brings me to a fundamental point which I wish to make and that is that efficiency must be looked at on a total system basis and not only on the basis of the one individual sector. This also brings us back to the point that if certain changes are going to have overall gains which exceed the costs, that we must find some way for the "losers" to receive some of these benefits if we expect them to support such changes.

In summary, I believe we have identified three broad areas where further research may be required:

1. An examination of the impact of regulations on efficiency in the grain handling and transportation industry.

2. Each sector must do what is within its means to achieve greater efficiency—and this will require them to do research.

3. Someone must stand back and be able to look at the overall system efficiency and develop mechanisms to encourage joint action among the sectors that will result in improved systems.

The Transport Institute here at the University of Manitoba perhaps has such a role. The National Transportation Institute as proposed by Mr. Dube may provide a vehicle. The SGTC can no doubt be helpful in implementation of policies aimed at achieving greater efficiencies.
Research activities are often characterized as basic or applied. The body of knowledge constituting basic research only diminishes in value if a theory or commonly held scientific truth is shown to be inferior or less general than an alternative postulate. In most instances, basic research extends the body of scientific knowledge by uncovering phenomena previously unknown. Examples of such knowledge are theories in areas of thermal dynamics and relativity in physics; heredity in genetics. Basic research provides the principles for applied research.

Transportation research is the application of knowledge to the industry which moves people and products around the world. Applied research differs from basic research in one noticeable way, namely that the usefulness of the applied body of knowledge diminishes in value with time. The state of the world changes over time in three general areas. These include changes in technology, individual attitudes and institutional structures. New discoveries in science and innovative application to transportation change the technologies for modes of transport and products that users ship. Individual preferences with respect to travel and products also change. Local and national governments revise regulations affecting the transportation industry to reflect changing political and economic conditions. Therefore, the capital base of applied research on transportation depreciates daily. Without ongoing research, the transportation knowledge base dwindles in value. Identifying where the current stock of transportation research is obsolete is critical in planning future studies.

Many papers, and much of the discussion, directly or indirectly addressed the concept of efficiency and transportation. Government and industry when maligning these papers often overlooked the merits of an efficient transportation system. It follows then that decision makers either placed little faith in the merits of the efficiency arguments or simply considered efficiency to be less important than other goals. The papers called for more information and research to effectively explain the efficiency arguments better. Let me suggest that one possible shortcoming in the communication of research in transportation policy is that the efficiency arguments may be based on insufficient information even though the information actually used may be accurate.

Efficiency arguments are founded upon static theories which assume no change in technology, attitudes and public rules and regulations. However, greater efficiency in transportation and the economy in general has occurred because of technological change. This has happened with or without choosing the most efficiency system in the static sense. A theoretical framework which assumes no change in technology may, in fact, be a poor foundation upon which to make recommendations.

* Professor and Director of the Solomon Sinclair Farm Management Institute, University of Manitoba.
Let us briefly highlight some technological developments in agriculture. Biotechnology in terms of hybrid crops, disease resistant varieties and shorter stemmed cereal grains have provided farmers with more choices. Expanding the array of cropping choices in addition to the choices on how the crops are grown in terms of using fertilizers, pesticides and machinery have been extremely critical in determining the path of agricultural expansion as well as the rate. A comparative static framework which identified the most efficient farming system in the absence of technological change may in fact have been dead wrong after the technological change occurred. Decision makers can justifiably question "efficiency" recommendations because of the inability to account for change.

Technological changes in transportation are no less important. The most efficient grain handling and transportation system in 1966 is not the same as 1986. Transportation research in 1986 must recognize that the efficiency system today will change tomorrow. More applied research within the same static framework, or a more elegant discussion of the same work, will not convert the nonbelievers. The value of transportation research is depreciated before it starts if the analytical system cannot account for and accommodate change.

Reading between the lines in the Schmitz paper, one sees that the western Canadian red meat industry is at a crossroads because of changing consumption of red meat and trade policy. Feed grain prices and transportation policy may be less important in how the industry evolves than the noneconomic factors such as the changing demographic features of the consuming public, their perception of red meat in a health conscious diet and more and more meals consumed away from home. Understanding those forces is necessary before a comparative static efficiency analysis of livestock and transportation can be presented. Similarly, for the comparative static efficiency analysis, the forces and rationale behind the countervail charges on live hog exports to the United States are outside its analytical framework.

Political pressure, interpretation of unfair trade practices or simply illegal but disruptive nontrade barriers—all represent changes in public attitudes and new judgments on previous rules that are not part of a static framework. Clearly, recommending an industry expand along a path which must wind through a mine field suggests why the comparative static efficiency case is discredited by some. Transportation research should identify, not only the changes which are tied directly to the stimuli being analyzed, but also identify forces outside the sector which may render the study obsolete the day it is published.
During the past day and a half, we have discussed numerous researchable topics, the sum of which at least approaches a research agenda in grain transportation. In the three papers this morning, as well as in others, we are reminded of the public policy nature of much of the research "problem" in grain transportation. It remains accurate that the issues of public policy and regulation by government are at the top of the research agenda. But Art Wilson's analogy is also appropriate. As the glacier of regulation retreats, an applied research agenda must deal with the debris of issues left behind. The number of such issues may suggest not an agenda, but only ad hoc research topics. Nevertheless, dealing successfully with debris, ad hoc or other, may be necessary as a prelude to a more efficient system.

Major elements of that research agenda seems to include the following:

Regulatory Studies

One of the major advantages Canadians have in analyzing the costs and benefits of regulatory change is that we are close to the United States, which has already gone through major aspects of transport deregulation. A look at the United States experience has the potential to provide a new perspective on several grain issues, including grade standards, elevator tariffs, and effects of changing grain shipment modes. The major regulatory issue faced by the grains industry at the moment appears to be the cost of a legislated (and expensive) grain assembly system, the branch line network. Examining alternative networks and their costs will consume the talents of many for some time to come, but the retreat of this particular glacier of regulation will leave considerable debris of regional equity issues, local infrastructure concerns and the like. Without a reasonable judgment of the costs of the change, increased efficiency in the branch line network is likely to be delayed for some time.

Pricing Alternatives

Changing the regional price pattern is a classic of the debris of de- or re-regulation. The redistribution of output and incomes associated with regional changes to the current regulated pattern of grain prices is a major issue. Again, the United States example may be an instructive one, since the adjacent areas of the United States probably reflect port prices and shipping costs similar to those in the marketplace.

* Head, Department of Rural Economy, University of Alberta.
Freight Rates and Grain/Livestock Production

The extent and regional distribution of livestock production is affected by several grain-related issues. These include the method of paying the Crow Benefit, the size of that benefit, the basing point for pricing grains, and the levels of rail rates which are established. Some of the above have become so sanctified by time that change will also take time. In the meantime, the question of the impact of such practices on other industries, especially farm and ranch production of livestock, is important yet unresolved. Some have suggested that some meats, for example beef, may be an obsolete product, implying that the effect of grain policy issues on that industry is of little concern. The consequence of beef being obsolete is not, however, only on the demand for feedgrains. The consequences of greatly changed production and settlement patterns are massive, and extend to many areas of the Prairies. Nevertheless, changes in beef as a product and changes in production patterns for it have been long predicted. Those changes have yet to appear. The impact of, for example, shifts from concentrates to roughages for finishing cattle, could profoundly influence livestock and grain production and shipment patterns.

Trucking in Grain Transportation

The grain trucking issue is particularly sensitive to the resolution of the method of payment issue. A series of other issues arise, including trucking costs, trucking as an alternative to other transport modes, licensing strategies and costs of truck ownership and operation. Since so much of the cost of the present system is associated with assembly costs, current issues include the economic feasibility of storage on farms, satellite elevators, in-field loading and other options with respect to grain storage and movement. Being able to distribute the costs of highways among their users would greatly assist analyzing the cost of added grain shipment on roads and highways.

Effects of System Modernization

There are a variety of public issues associated with system change. At least some continue to be associated with concern about alternative methods of payment of the Crow Benefit. While few studies to date have shown major consequences on community structure or on public revenues, the issue is one which does not go away. Clearly, there are concerns which go beyond analysis, and may instead reflect only strong risk aversion.

Modernization Alternatives and Grain Assemblers

The elevator companies have long been identified as possible victims of change in the grain handling system. There are at least two ways in which elevator company balance sheets may be influenced by changes in the grain assembly system. One is through changes in method of payment and possible added incentives for consolidation of grain shipping points. The other is uncertainty about branch line locations, and the effect of uncertainty on investment plans. This kind of a climate may
affect not only the planning and construction of new facilities, but may also act as a brake on innovation in the industry.

Alternative Methods of Paying the Crow Benefit

Professor McQueen has raised again the issue of method of payment. He is not alone in being frustrated at the continuing failure to resolve what is in part a noneconomic issue: i.e., how can a large amount of money be given away to the widespread satisfaction of the affected group? One is tempted to believe that this should have been an easy task, but it has not proven so. The issues seem to be, first, is there an acceptable way of paying the Crow Benefit in whole or in part to others rather than the farmers involved, including perhaps communities, municipalities, etc. What would be the consequence if some or all of the Crow Benefit were used to provide:

- community facilities?
- roads?
- grain research?
- rural churches?
- or other rural or community facilities?

Second, is the Crow Benefit the "right" amount? While raising the issue may seem to be borrowing trouble, the question likely will arise. If the Crow Benefit represents compensation for the inefficiencies developed under a highly regulated system of grain handling and transportation, and those inefficiencies disappear, the amount of compensation also becomes an issue.

National and International Research Issues

There are issues of trade and international specialization encompassed by grain and grain transportation research. Many have implications 5-10 years away. For example, what would happen if major world grain producers really played on a "level playing field?" What patterns would emerge, what trade/transport consequences would result, and could those results be reasonably contemplated? The capacity exists to look at what those patterns of production and transport would be. Possibly we might not mind living in a world in which the playing field were more level, but there would be internal shifts in grain production and export as a result of such a development.

Farmers Also Need to Know

The changing grain transport scene creates uncertainty for many at the management level. Perhaps the lack of support for change has as much as any other factor to do with uncertainty concerning prices, offsetting benefits, needed livestock and other adjustments, and management strategies to deal with significant changes in the price of grain transport. Resolving some of these may also help resolve the political logjam in grains policy.
Summary

While the research agenda is a long one, it is probably fair to say that we have underestimated most issues of a social and political nature. While not underestimating the economic issues to be addressed in the industry, perhaps a focus on the economic consequences of equity issues in the industry will be as effective as any possible alternative in addressing the costs and benefits of industry change and development. We should not, however, underestimate the importance of transport research in the near future. A range of public issues, including possible adjustment to altered international trade arrangements, will focus attention on transport costs and adjustments. For these and many other reasons, the generation of new knowledge in this area is more, not less, important than it has been.
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