ROYAL COMMISSION ON FARM MACHINERY

LOCATIONAL ADVANTAGES IN THE FARM MACHINERY INDUSTRY

Neil B. MacDonald

Study No 6

CANADA

ROYAL COMMISSION ON FARM MACHINERY

LOCATIONAL ADVANTAGES IN THE FARM MACHINERY INDUSTRY

A COMPARATIVE ANALYSIS BETWEEN SELECTED LOCATIONS IN CANADA AND THE UNITED STATES

by

Neil B. MacDonald

While this study was prepared for the Royal Commission on Farm Machinery and is being published under its auspices, the views expressed therein are those of the author and not necessarily those of the Commissioner.

Dr. Clarence L. Barber – Commissioner
Neil B. MacDonald – Director of Research

Available by mail from the Queen's Printer, Ottawa,
and at the following Canadian Government bookshops:

HALIFAX
1735 Barrington Street

MONTREAL
Æterna-Vie Building, 1182 St. Catherine Street West

OTTAWA
Daly Building, Corner Mackenzie and Rideau

TORONTO
221 Yonge Street

WINNIPEG
Mall Center Building, 499 Portage Avenue

VANCOUVER
657 Granville Street

or through your bookseller

Price $2.25 Catalogue No. Z1-1966/4-6

Price subject to change without notice

Queen's Printer for Canada
Ottawa, 1970

CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

ACKNOWLEDGEMENTS

While the author alone remains responsible for the views and conclusions in this study, many people and organizations have contributed to it.

For its comparison of outbound freight costs, this paper relies heavily on the study *Differences in Outbound Transportation Costs to the North American Farm Machinery Market from Canadian and U.S. Manufacturing Locations*, prepared for the Commission by Kates, Peat, Marwick & Co., and is included as Appendix D to this paper. ASL Traffic Services Limited provided much of the supporting data for the analysis of inbound freight costs in Appendix B. The departments of industry in Ontario and Manitoba, the Industrial Commissioner for Brantford, the Union Gas Company, the state governments of Illinois and Iowa, as well as many other private and public organizations mentioned in the text, were most helpful in supplying information. Many farm machinery companies provided large amounts of data.

I acknowledge the research assistance of Mrs. Audrey Doerr, who obtained much of the historical material; Mr. Michael Lum, who was responsible for gathering the data on labour costs; and Mr. H. Gregory Rogers, who was able to gather the data on comparative tax rates and similar material. Mrs. Helga Maley and Mrs. Geraldine McDonald checked the manuscript, and Mrs. Eva Dawe prepared it for printing. Mr. Don Hanright edited the paper and suggested certain rearrangements of material. I most gratefully acknowledge the advice and assistance of my colleagues in the Commission, Mr. William F. Barnicke, Mr. Bernard Barry, Mr. Donald Martinusen, Dr. Christopher J. Maule, Dr. Harvey Schwartz, and Dr. David Schwartzman.

The maps included at pages 74 ff. were prepared under the direction of Professor Duncan M. Anderson and Professor D.R.F. Taylor of the Geography Department of Carleton University, Ottawa, from data also analysed under their direction.

Finally, I am most grateful to the Commissioner, Dr. Clarence L. Barber, for his encouragement and suggestions in the preparation of a paper to elaborate some of the many facets of comparative locational advantages.

1. INTRODUCTION

The terms of reference of the Royal Commission on Farm Machinery included a requirement to study

> the present and prospective competitive position of the Canadian agricultural machinery industry in Canadian and in export markets as compared with agricultural machinery industries in other countries, ...

While the reference is to all other countries, the Canadian farm machinery industry operates in practice as part of a broader North American industry (Canada plus the United States). With free trade in farm machinery between the two countries, manufacturers have rationalized their production, supplying the combined markets of the two countries from single, specialized plants. In most cases, production of certain types or sizes of machines is concentrated in single plants in one or the other country; in no case is the same model produced in two places.

Canada's competitive position as a manufacturer of agricultural machinery turns then on her ability to meet or surpass production cost advantages of alternative United States locations. The competitive position of North American manufacturing with regard to the rest of the world will affect manufacturing potential in both countries, as it has in the United States in the manufacture of smaller sized tractors. As long, however, as the North American market requires machines which are different physically from those produced in Europe, a North American manufacturing base will be required. Whether it will be in Canada or the United States depends on the location in the two countries which can produce and deliver at lowest costs.

This study examines the differences in costs at three important locations for farm machinery production in Canada and the United States. It uses the *ad hoc* location study which is a

standard management procedure in modern business. No large corporation makes any significant decision to build a new plant without such an analysis.[1/] Generally, such studies begin by identifying, in as much detail as possible, the cost of a particular product or product line, currently made in a specific location. From this breakdown, the analyst develops a comparable series of estimated costs for the product if the plant were located elsewhere. Cost changes not specifically related to location change -- such as those resulting from simplification of the product mix or the installation of new machines in a better laid-out building -- can be isolated and accounted for in the cost comparison; theoretically, at least, such cost changes can be obtained from the same improvements at the present location. The result should show the location which will minimize costs and thus maximize profits.[2/]

The competitive positions of Canadian industry in general as well as many individual Canadian industries have been examined in recent years both officially and privately to determine their advantages and disadvantages against those of other countries, particularly the United States. These analyses have usually tended to discuss the position of a given industry as a whole, or industry in general, i.e. they have not dissected the cost structure of a specific product or plant in detail and projected the changes, item by item, resulting from the alternative locations.

An example of the general approach, which, however, also identifies many detailed cost factors, is the Wonnacotts' study *Free Trade Between the United States and Canada*.[3/] The authors set out to identify the degree of cost difference for certain industries between Canada and the United States in order to assess the impact of free trade on particular industries.

1/ For a discussion of the question, see M.R. Colberg, D.R. Forbush and G.R. Whitaker, Jr., Business Economics: Principles and Cases, "Location of Plants" (Richard D. Irwin, Inc., Homewood, Ill., U.S.A. 1964), Chapter 10, p.448.

2/ cf. "In one way or another, therefore, each industrial site -- whether being considered by a manufacturer or already being used by him -- undergoes some sort of test for its effect on such costs as labor, transportation, space, and taxes", Edgar M. Hoover and Raymond Vernon, Anatomy of a Metropolis, Anchor Books Edition: 1962, p. 25.

3/ Ronald J. Wonnacott and Paul Wonnacott, Free Trade Between the United States and Canada, The Potential Economic Effects (Harvard University Press, Cambridge, Mass., 1967).

The study establishes relative weights for input factors used in manufacturing various products, which, combined, provide the total costs involved in manufacturing a particular product. By identifying how the various component factors of the costs of manufacturing particular products vary with location, each can be weighted by its relative importance to the particular industry under study, thus showing the effect of the specific cost differential on a particular product cost. This procedure is very close to the full analysis of the plant locational study.

A more recent publication, *Trade Liberalization and the Canadian Pulp and Paper Industry*[4/] compares production cost factors (rather than factor weights) for different types of paper mills at different locations in Canada and the United States. Outbound transportation costs from the chosen locations to selected markets are then added to determine the most competitive source to supply each market.

It is the intention of this paper to handle the question of locational advantage in the farm machinery industry as far as possible in terms of a plant location study. All cost factors will be covered as fully as available data permit. For example, general studies of locational advantage usually discuss labour costs only in terms of average wage rates taken from official publications. It is desirable, however, to consider labour costs as a combination of hourly wage rates (if possible taken from more direct sources than official measurements of "average hourly earnings"), work incentive payments and fringe benefits (the additional amounts paid by the employer for such items as all types of insurance, pensions, holidays, and vacations).

Similarly, material cost comparisons require the associated consideration of inbound transportation costs to the point of use of the material. Outbound transportation cost differences between locations offer competitive advantage to one firm over another in a particular market: the cost penalty must be absorbed by the disadvantaged plant if the product is priced on a delivered basis, or by the consumer if it is priced "f.o.b. plant". In either

---

4/ W.E. Haviland, N.S. Takacsy, E.M. Cape, "Trade Liberalization and the Canadian Pulp and Paper Industry", published for the Private Planning Association of Canada by University of Toronto Press, Toronto, 1968.

case, since they are part of what the consumer will have to pay, such costs can provide a marketing advantage to a plant in a particular location. Differences in corporate income tax rates and the basis used in calculating them among different jurisdictions allow the retention of more or less of the profit earned at each location.

This study, therefore, attempts to consider the farm machinery industry generally, as if it were a single firm for which a plant location study was being undertaken, in the manner typical of modern business analysis. It will be necessary, of course, to make the comparison in more general terms than if one were analysing data for a particular decision to be made by a specific company. Thus the results cannot be directly equated with those of any particular company. Nevertheless, a closely reasoned argument can be made in relation to specific cost factors to allow some appreciation of the position of the farm machinery industry in Canadian locations against locations in the United States. The estimated cost differences should also provide a basis for projecting what is likely to happen to the industry in the future.

Since much of the data used in developing this study was given by Canadian farm machinery companies to the Commission on a confidential basis, no particular company can be identified with specific costs and other inputs. Comparisons are therefore expressed as relative numbers, against a fixed level of average total manufacturing costs of 100 for a number of companies in one "base" location. The results show relative costs in directly comparable terms without revealing companies' actual costs.

Chapter 2 discusses the three locations, two in Canada and one in the United States, which were studied in detail and the reason for their selection. It outlines the methods to be used and describes the areas of cost difference to be analysed.

Chapter 3 brings together, quantitatively, the production cost factors. The cost factors are treated in accounting terms, with their relationships among the three geographical areas analysed in some depth. More detailed data are included in a number of appendices.

Chapter 4 analyses post-production cost differentials. These are considered as differences in the ability to retain

potential manufacturing profits. Competitive product pricing (which is assumed to absorb outbound transportation cost differentials) is covered, as is the corporation income tax levy of the federal and provincial or state authorities.

Chapter 5 summarizes the comparative advantage of the various locations, and attempts to project the future pattern of growth of the industry as it will be affected by economic factors only. Since economic factors are not always paramount, however, recognition is given to other factors affecting locational decisions.

2. ALTERNATIVE LOCATIONS AND FACTORS AFFECTING THEIR COMPARATIVE ADVANTAGE: SELECTION OF PRODUCT ANALYSED

Locations Selected

The kind of detailed plant location study used in industry requires consideration of specific plant locations where precise cost factors at a particular point of time are available for comparison. In this study, three such locations are used: Brantford, Ontario (the base, or "100" level), Winnipeg, Manitoba, and Moline, Illinois. All three locations are important in farm machinery manufacturing today and there is therefore the possibility of checking theoretical results against empirical evidence from the real world. The fact that all three locations produce the same kind of farm machine, the self-propelled combine, allows production cost levels and theoretical price levels to be compared with real selling price levels and outbound transportation costs for the same kind of machine produced in the three locations. Brantford is the location of both Massey-Ferguson Industries Limited and Cockshutt Farm Equipment of Canada Limited; Winnipeg is the home of Versatile Manufacturing Ltd. which produces combines among other products; and Deere & Company and International Harvester Company both produce combines at Moline.

The selection of the three locations, therefore, of Brantford, Winnipeg, and Moline gives the opportunity to compare theoretical results with actual data, and to discuss cost advantages in the production of combines which account for about 34 per cent of the value of production and about 47 per cent of the value of exports of Canadian farm machinery.[1/]

1/ DBS, Agricultural Implement Industry, 1967, Annual Census of Manufactures, Catalogue No. 42-202; DBS, Trade of Canada, Exports by Commodities, Dec. 1968, Catalogue No. 65-004; and analysis of confidential returns in "Census of Manufactures" (1967) made available to the Commission by DBS at the request of the companies concerned.

Factors Affecting Comparative Advantage of Alternative Locations

Among all the factors whose impacts on costs or profit may vary between locations, two main areas of variation exist -- those cost factors affecting production costs, and those cost and profit factors affecting distribution costs. In this study, they are treated separately as production costs and post-production costs. Each factor of costs or profit can have changes induced for other reasons than the change in location (such as the changes in mix, installation of new machinery, and construction of new buildings, referred to earlier). It is, therefore, necessary to identify those factors being kept constant between location in the analysis. These factors may be considered as appropriate for analysis elsewhere than in a locational study.

All three locations produce the same kind of farm machines (in this case, combines). For the purposes of this study, the following other assumptions are made. The same product produced at each of the three locations commands the same price in the market. All plants produce the same product volumes and the same models, so that the same product mix results, and use the same technology or state-of-the-art of manufacturing. Each uses the same production processes, and the same production machinery, and therefore requires the same quantity of inputs of materials and labour and overhead factors. Unless there is some measurable difference in the *kind* or *quality* of one of these input factors among the locations being considered, the same physical amount of each input factor is required. The only cost differences allowed are those related to the costs of the required input factors at different locations.

Table 2.1 lists items of "Production Costs" and "Post-Production Costs" under two columns -- those which are considered to be affected by changes between locations, and those which should not be affected by the locational decision.

Each of the cost items on Table 2.1 can be shown as a separate entry in a revenue-cost-profit statement relating to the "base" area plant and, by reflecting the cost differences among the locations being considered for each item, the cost advantage of the separate locations can be shown in numerical terms.

TABLE 2.1

ITEMS AFFECTING COSTS AND PROFITS

	Variable Between Locations	Constant Between Locations
1) Production Cost Differentials		
a) Cost of Acquiring Material Inputs		
- actual costs of purchased materials		
amount		x
price	x	
- inbound transportation costs		
amount to be carried		x
price	x	
(affected by rate structure, distance from sources, forms of transportation available and utilized and any inhibiting legislation)		
Note: There is a constant trade-off between costs of material purchased at various locations and inbound transportation costs. The lowest "delivered" cost is also subject to inventory costs which can increase with distance from source.		
b) Costs of Direct Labour Used in Manufacturing		
- these costs are a combination of:		
wage rates	x	
fringe benefits	x	
labour productivity	x	
supply availability	x	
c) Plant Overhead Costs		
- indirect labour and office workers relating to plant		
wage or salary rates	x	
fringe benefits	x	
labour productivity	x	
supply availability	x	
- amortised costs of buildings		
building specifications)		x
amounts of materials) *taken as*		x
differences in material	x	
costs	x	
sales tax on building materials		
federal	x	
provincial - state	x	
labour costs	x	
- municipal property taxation	x	

TABLE 2.1 *(Continued)*

	Variable Between Locations	Constant Between Locations
1) Production Cost Differentials *(Continued)*		
- consumed supplies		
amount		x
price	x	
taxation rate	x	
- machinery costs		
type of machinery		x
acquisition costs	x	
installation costs *taken as*		x
- utility costs - light, heat and power rates	x	
- amounts used (for three locations, climate is approximately the same)		x
- taxes - other than property taxes (provincial or state sales taxes)	x	
- differences in costs of capital	x	
negative local taxes, tax-free municipal bonds	x	
2) Post-Production Cost Differentials		
a) Costs of Distribution System (sales staff, branch offices, product warehouses, blockmen, etc.) other than physical transportation		x
b) Outbound Transportation Costs	x	
c) Corporation Income Taxes		
- federal, provincial or state		
basis on which "profits" are calculated	x	
rates of tax	x	
- federal and provincial or state incentives relating to income tax	x	

The final result will be close to what would happen to a company in the farm machinery industry if it located identical production facilities in each of the three locations.

Establishing a Common Basis for Comparison

To consider the competitive advantage of one location over another, it is necessary to link the two cost areas outlined in Table 2.1 -- i.e. those relating to production costs, and those relating to the ability to retain profits. This link, the common denominator, is the wholesale selling price received by the farm

machinery company from the dealer for the machine. The basis for this is indicated in Table 2.2 and Figure 2.1, which show prices, profits, and North American costs as a chain.

TABLE 2.2

PRICES, PROFITS, AND COSTS IN THE FARM MACHINERY INDUSTRY

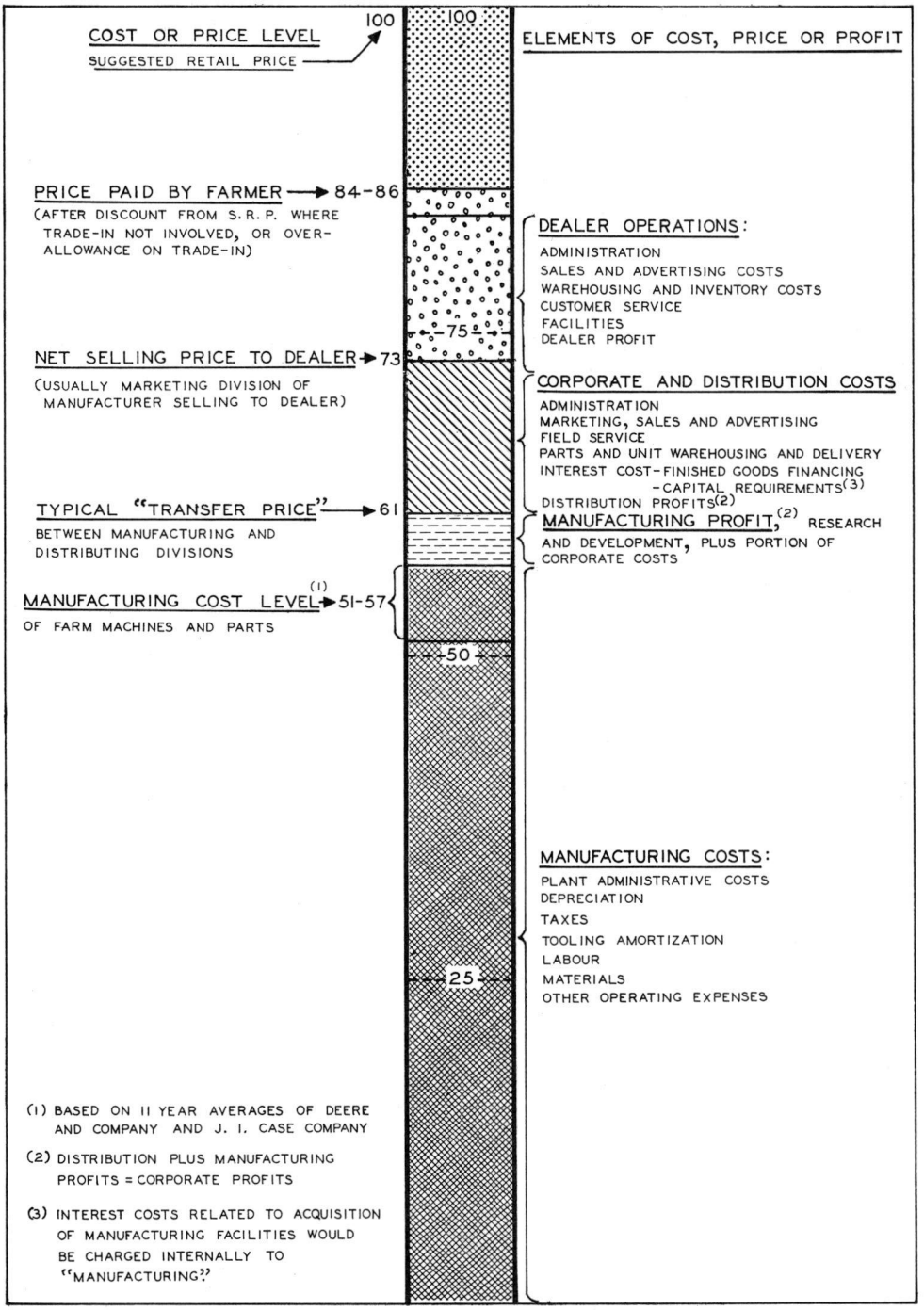
	Retail Level	Wholesale Level	Manufacturing Level
Suggested retail price (SRP)	100		
Price paid by farmer (often cash discount or over-allowance on used machine) (84-86 per cent of SRP)	85		
Company's net wholesale price (NWP) to dealer	(73)	73	
Dealer's gross margin	12		
Transfer price from manufacturing division to distribution division		(61)	61
Company margin for distribution cost and distribution profits		12	
Typical North American manufacturing costs			(54)
Company margin for other costs associated with manufacturing, e.g. R&D, and manufacturing profits			7
Less assumed corporate costs charged to manufacturing and R&D 1/			(3)
Net manufacturing profits			4

1/ Highest R&D cost level in industry is about 3 percentage points of SRP (Deere & Co.). (See Royal Commission on Farm Machinery, Farm Tractor Production Costs, Ottawa: Queen's Printer, 1969, Table 44, p. 146.)

Source: Constructed from details in Table 3.1, Royal Commission on Farm Machinery, Special Report on Prices of Tractors and Combines in Canada and Other Countries (Ottawa: Queen's Printer, December 1969).

FIGURE 2.1

PRICE AND COST LEVELS FOR NEW MACHINES IN THE NORTH AMERICAN FARM MACHINERY INDUSTRY



Reproduced from: Royal Commission on Farm Machinery, Farm Tractor Production Costs: A Study in Economies of Scale, Ottawa: Queen's Printer, 1969, p. 4.

Only those costs and profits below the "Transfer Price" level of 61, the price at which the manufacturing division sells to the distribution division, are further considered in this study. The revenues and profits above this level, concerned with the wholesale distribution of farm machinery, are not considered to be affected by plant location, because the respective distribution profits earned on sales in Canada and the United States are dependent on market shares and costs in the two jurisdictions. These profits should be considered as independent of the manufacturing plant location. Penalty costs related to outbound transportation might, however, reasonably be expected to be absorbed by manufacturing location since they were related to the decision that it should be located in a certain place.

3. PRODUCTION COST DIFFERENTIALS

In discussing manufacturing cost differentials, the first point to be established is the relative weight to be given to each component cost factor entering into production costs. At this point occurs the first major divergence between the data which this study can present and the "real world".

Chapter 1 noted that the basic reference point would be Brantford, where there are two combine plants. Both companies reported their manufacturing costs to the Commission. Obviously, the use in this study of those companies' average component costs could reveal competitive data to commercial rivals. The alternative is to use the manufacturing cost data of the four major farm machinery companies in Canada, all located in Ontario, to mask the amounts reported by any one in the group. While this larger group manufactures products other than combines, no consistent pattern of differences of weighting between companies producing combines and companies producing other products is apparent. Differences in cost seemed to be associated with volume of production, age of facilities, and management decisions (related in many cases to production facilities in associated companies).

Table 3.1 breaks down manufacturing costs in the farm machinery industry in Ontario. Massey-Ferguson Industries Limited, the Canadian farm manufacturing and distributing arm of the parent company, Massey-Ferguson Limited, alone accounts for almost half of all Canadian farm machinery manufacturing. The four major companies (Massey-Ferguson Industries Limited, International Harvester of Canada Limited, John Deere Limited, and Cockshutt Farm Equipment Company of Canada Limited) manufacture over 80 per cent of the farm machinery produced in Canada. Given their Ontario locations, this breakdown of costs can be considered broadly representative of how costs are distributed in Ontario farm machinery

manufacturing, and therefore geographically appropriate to be used at the base or reference point of Brantford.

TABLE 3.1

BREAKDOWN OF MANUFACTURING COSTS BETWEEN COST FACTORS, FARM MACHINERY INDUSTRY IN ONTARIO (BASED ON AVERAGE OF FOUR ONTARIO COMPANIES), 1966

Cost Factor	Percentage of Total Manufacturing Costs Represented by Cost Factor
Materials	
Purchased items	52.02
Inbound transportation	.98
Materials	53.00
Direct Labour	
Wage costs	12.11
Fringe benefits	3.92
Direct labour	16.03
Overheads	
Indirect labour (including fringes)	7.52
Salaries (including fringes)	6.88
Maintenance	3.11
Depreciation	2.28
Warehousing and freight	1.82
Production tooling	1.49
Obsolescence, warranty	1.49
Administration	1.36
Power, light, heat, etc.	1.09
Operating supplies	1.08
Property taxes	.84
Expense tools	.70
Defective work and scrap	.63
Insurance	.06
Other	.62
Overheads	30.97
Total manufacturing costs	100.00

Source: Table A.2.

The "average" data shown in Table 3.1 are to some extent "unreal", because of the different products produced and the different degree of manufacturing carried out among the four companies. For example, the only farm machine manufactured in Brantford by Cockshutt is the combine (although the same "establishment" also assembled White trucks in 1966). This combine manufacturing plant was largely a self-contained operation, i.e. stampings and machined parts were made and assembled into Cockshutt, Oliver, and Minneapolis-Moline combines. While other parts were purchased, no affiliated company or plant was involved. Massey-Ferguson costs reported to the Commission consolidated those of the combine plant at Brantford which assembled combines only, from parts made elsewhere, many in their Toronto plant (where complete swathers, balers, and other machines were also made). Castings made in the company's "M" Foundry at Brantford were machined in Toronto and other parts came from the company's Detroit operations and from Massey-Ferguson plants in England. International Harvester produced a variety of farm machines at Hamilton in a highly self-contained establishment, including a few small combines, a wide range of swathers and manure spreaders, and a small crawler tractor. Many of these products used parts imported from International Harvester in the United States, and all but the crawler tractor were produced in sequential batches throughout the year. Finally, John Deere at Welland produced a pull-type swather, a series of very large rotary mowers, and a variety of tillage equipment along with light industrial machinery.

Although other machinery besides combines is represented in Table 3.1, the costs are probably dominated by the costs of combines, both because of the large volume of production of these machines and their high unit costs. As noted earlier, combines accounted for about 34 per cent of all farm machinery production in Canada. Since only Versatile's production is excluded by being outside Ontario, the four companies' production output must be nearly half combines. Nevertheless, the average costs mask important differences in operations performed, in volume levels and economies of scale, and in make-buy situations. For example, Massey-Ferguson will probably make combine components which Cockshutt, with its lower volume, may buy. Massey-Ferguson also has more sources internal to the company from which to purchase items.

Appendix A sets out in detail the approach used to construct Table 3.1 and the means used to adjust or identify certain cost items, required separately for locational analysis. The reason for carrying each cost factor shown in Table 3.1 to two decimal places is to show the real cost levels of a number of small, identified cost factors that could be separately analysed. No claim for equivalent precision is thereby intended.

Costs for the hypothetical plant located at Brantford therefore break down under major headings as follows:

	Percentage of Total Costs	With Direct Labour as 100
Materials	53.00%	331% of direct labour
Direct labour	16.03%	100
Overheads	30.97%	193% of direct labour

The amount of manufacturing costs which is represented by purchased materials, parts and supplies directly entering the production process, 53 per cent, is striking. A farm machinery manufacturer appears therefore to have little direct cost control over more than half the costs entering into production. These costs are also relatively fixed at all volumes and he therefore finds limited cost advantages from increases in production volume. The overhead rate of roughly 200 per cent of direct labour costs is typical of the type of manufacturing and assembly processes found in this industry.

Costs of Acquiring Material Inputs

The Canadian farm machinery industry is able to import everything it requires as direct input materials or parts without duty.

While many materials are used in manufacturing farm machinery and in making the parts purchased as finished items by the farm machinery manufacturers, the basic item required is steel. Of the 8,500 to 12,000 lbs. of a finished combine, at least 75 per cent would be formed from this metal. Thus steel prices at different locations can provide important locational advantages.

Table 3.2 compares steel prices in Canada and the United States. Taking the difference in price for hot rolled sheet steel between the two locations of 4 cents a lb. (7.555 - 7.15), and assuming 6,000 lbs. of steel used, there would appear to be a small but significant advantage to the Canadian farm machinery manufacturer of about $25 a combine. With a production of 10,000 combines a year, the $25 advantage would amount to $250,000 additional profit.

TABLE 3.2

STEEL PRICES - CANADA AND THE UNITED STATES
(Canadian dollars)

	Canadian Price	U.S. Price	Canadian Price as Percentage of U.S. Price
Hot Rolled Mild Steel Sheet			
Annealed and pickled	$143/ton	$151/ton	94.7
Cold Rolled Mild Steel Sheet	$151/ton	$158/ton	95.6
Steel Bar			
Mild steel (AlSl C-1010)	$147/ton	$158.50/ton	92.7
Low-alloy steel (AlSl 4140)	$ 12.05/cwt.	$ 13.64/cwt.	88.3
Forging Bar Billets			
AlSl C-1010	$128/short ton	$135.50/short ton	94.5

Source: Department of Industry, Trade & Commerce, Materials Branch, letter, Royal Commission on Farm Machinery, Ottawa, June 17, 1969.

Unlike the Canadian farm machinery manufacturer, his counterpart in the United States would have to pay duty on the lower-cost Canadian steel.

The effective duty rate applying to lower-priced Canadian steel imported into the United States is shown in a tabulation entitled "U.S. Imports of Merchandise for Consumption". The tabulation for October 1967 of this material on items of steel used in manufacturing recorded effective duty rates of from 7 to 15 per cent.

The Department of Industry, Trade and Commerce, provided the following comment, with regard to duties applicable to farm tractors and parts for their production imported into the United States.

> Tractors suitable for agricultural use whether or not equipped with power take-offs, winches or pulleys and parts of such tractors, are duty free on entry into the United States under tariff item 692.30.
>
> However, in respect to parts, I should like to point out that under the general rules of interpretation of the U.S. tariff a provision for "parts" of an article covers a product solely or chiefly used as a part of such article, but does not prevail over a special provision for such part. In other words, a tractor part is only given duty free entry under

> item 692.30 when there is no other item in the U.S. tariff specifically applicable. You mentioned specifically the question of the U.S. tariff status of transmissions for tractors and parts of such transmissions. The transmissions would be duty free as parts of tractors as would parts for such transmissions provided the parts were not specifically named in a dutiable provision of the tariff. For example, ball or roller bearings even though they were specifically designed for use with the particular transmission would be classified under item 680.35 with duty presently at 2¢ per lb. plus 12% ad valorem. Nuts, bolts, washers, certain gaskets, similarly will be dutiable.
>
> Piston type engines for tractors are duty free under tariff item 660.40, but all parts of these engines are subject to duty under item 660.52 at 6½% ad valorem unless of course the part is specifically provided for in some other dutiable section, i.e. a fuel pump would be dutiable under item 660.94 at 8% ad valorem. 1/

Similar duty rates would apply to other component parts imported by a manufacturer in the United States although they might not apply to the component included in an end-product classified as a farm machine. Thus, the manufacturer in Canada can supply the United States market for the finished farm tractor or other farm machine on a duty-free basis, gaining the advantage of lower Canadian material (and labour) costs, along with any purchased parts which are cheaper in Canada. If, however, the parts are available more cheaply in the United States, they can be imported to Canada at no duty cost for incorporation into a finished machine.

The manufacturer in the Canadian location has the advantage of being able to buy materials and parts in the lowest-cost market in the world, manufacture and assemble them into a finished machine, and sell the machine in the United States without duty penalty. The manufacturer in the United States may be be forced to use higher cost sources in that country for materials and parts because even with these cost penalties, their cost to him will be lower than buying the parts in the lowest-cost source outside the United States and paying duty costs on importing them.

While steel is available in Canada at between 88 and 96 per cent of U.S. prices, at the same time certain hidden, indirect cost penalties are incurred by the Canadian industry. To the

---

1/ Department of Industry, Trade and Commerce, Office of Area Relations, United States Division, letter from C.J. Kelly, Assistant Director, Ottawa, June 24, 1969.

extent that the Canadian manufacturer may have to go to the United States to obtain certain kinds of components or materials, he will probably have to spend more money in the form of office overheads to secure an equal control over his product than a manufacturer buying the same items from a closer location in the United States. More administrative controls are required at a greater distance and across an international border. If the Canadian farm machinery manufacturer is in Winnipeg, he may face many of the same problems in dealing with Eastern Canadian parts manufacturers as manufacturers in Eastern Canada in dealing with suppliers in the United States. In both cases, the Canadian manufacturer is forced to seek the component or material in a distant area because he has no nearer alternative choice. The absence of a strong parts manufacturing industry in the West has probably held back the growth of farm machinery manufacturing in that area. The large number of suppliers of automotive parts located in Ontario are able to supply the many similar kinds of components required for the farm machinery industry. It is not possible to reflect these hidden penalties directly in terms of costs.

Finally, a small, hidden cost related to doing business across a border should not be ignored, even though the part or material itself is duty free. Each parts shipment received by a Canadian farm machinery manufacturer must have a customs entry form completed, even though the parts themselves are duty free. It has been estimated that the preparation of such a form costs not less that $5.[2/] A measurable administrative burden is added to overheads by the addition of a company customs department, if many cross-border shipments are involved. Neither the administrative costs of cross-border or long-distance purchasing or customs clearance could be shown in this study.

Although this analysis of material costs indicates that steel prices are lower in Canada than in the United States and other prices for materials and parts cannot be higher, the conservative position of purchase price equality is assumed in this study. Although this position may understate the competitive advantage of the Canadian manufacturer, it ensures that any advantages in his position are not exaggerated.

2/ This would be an "in-house" cost estimate; customs brokers' costs would probably be much higher.

Inbound Transportation Costs -- Inbound transportation costs are one of the more difficult cost factors to analyse in determining the comparative advantage of alternative plant locations. Business accounting procedures generally include them as part of the cost of material inputs to the plant.

Each purchase decision involves a combination of unit purchase order price and inbound transportation costs. The alternative points of origin for the shipment may involve not just differences in transportation costs in a linear relationship to the distance involved, but also possible differences in mode of shipment (highway transport vs. rail), in minimum shipping weights (possible combined shipments of several parts from the same vendor to achieve desired rates), in the possibility of "pooled" shipments from several vendors to achieve lower tranportation costs, and in the rate structures themselves (one shipping point may come under one rate tariff, a second under another which is entirely different in structure). Moreover, transportation economies involve such complex questions as basing points (a form of freight cost equalization), free delivery (where the vendor pays the freight or uses its own delivery trucks) and inventory control and its associated costs (as the distance from the vendor increases, the safety "float" increases to maintain production in the plant if a transportation crisis developed).

It is not, therefore, possible, in considering the general advantage of one location in the area of inbound transportation against another, to be as definitive as in other areas, such as labour costs discussed below. One has to examine specific, "real world" situations to determine just what transportation cost differences may be involved.

Massey-Ferguson Industries Limited presented an analysis[3/] of the difference in the costs of locating a tractor assembly plant (with its supporting transmission and axle plant) in Brantford as opposed to Detroit. The largest single cost penalty item (equal to the whole net disadvantage projected by the company for the Brantford location) was $1.7 million on inbound freight. At the request of the Commission, Massey-Ferguson provided confidential supporting data for this very large penalty cost. From these data,

---

3/ Massey-Ferguson Industries Limited, Brief to the Royal Commission on Farm Machinery, 1967, Chapter IV, p. 28.

without destroying their confidentiality, it is possible to provide some very general comparative data on inbound transportation costs in Canada and in the United States.

Appendix C examines the freight costs used in the Massey-Ferguson location study in detail and concludes that real Brantford inbound freight costs could not be more than 121 per cent greater than Detroit freight (if those freight costs paid by the vendor are included). The Brantford-Detroit relationship is used as the Brantford-Moline relationship. Since Moline appears to be less of an industrial transportation centre than Detroit, this relationship probably overstates the inbound transportation cost penalty of Brantford over Moline.

Comparative transportation costs for a Winnipeg plant were also given by Massey-Ferguson in its analysis of the alternative costs of operating a combine plant in Brantford and Winnipeg.[4/] When combined with the comparison just reviewed of Brantford costs vs. Detroit or Moline, it is possible to estimate the relative levels of freight costs for Brantford, Winnipeg, and Moline. The relative freight costs for the three locations are shown in Table 3.3. Moline-Detroit costs are about half as large as Brantford's, and about one quarter of Winnipeg's.

Costs of Hourly Paid and Salaried Personnel

The primary factor affecting manufacturing cost differentials between possible plant locations is usually considered to be the actual hourly wages and weekly or monthly salaries paid. Wage rates must include, of course, premium payments for piece-work. To wage costs and salary costs, fringe benefit costs also have to be added to develop total costs of employing a worker for a period of time at a particular location. Fringe benefit costs, which run as high as 35 per cent of the wage or salary costs, represent a differential factor which cannot be ignored.

Tables 3.4 and 3.5 show the average hourly wage and weekly salary rates for firms in the farm machinery industry during 1966 and 1968, taken directly from the Wage Survey Questionnaires of the Department of Labour, Canada, and from two published wage surveys of the U.S. Bureau of Labor Statistics. These are shown together with fringe benefits collected by the Commission from

4/ Ibid., Chapter IV, p. 24.

TABLE 3.3

INBOUND FREIGHT COSTS AT BRANTFORD, WINNIPEG, AND MOLINE, AS PERCENTAGE OF BRANTFORD MATERIAL COSTS
($000)

	Brantford	Winnipeg	Moline	In Relation to Material Percentage, Table 3.1
Brantford				
Inbound freight costs reported in Massey-Ferguson Brief (p. 37, Chapter VII) for all Canadian M-F plants - taken as typical of Brantford location. (Appendix A.3):				
Material costs	$70,333.6			52.02
Freight costs	1,323.3			.98
Total	$71.656.9			53.00
Winnipeg				
Inbound freight costs reported in Massey-Ferguson Brief (p. 24, Chapter IV) for Winnipeg as opposed to Brantford location:				
Material costs		$70,333.6		52.02
Freight costs at Brantford		1,323.3		
Additional freight costs for Winnipeg location of combine plant		1,600.0		
Freight costs		2,923.3		2.16
Total		$73,256.9		54.18
Detroit (used for Moline)				
Inbound freight costs - Detroit vs. Brantford location as analysed in Appendix B, Brantford as 2.21 times Detroit freight:				
Material costs			$70,333.6	52.02
Freight costs ($1,323.3 ÷ 2.21)			598.8	.44
Total			$70,932.4	52.46

firms concerned. More detail is provided in Appendix C on comparative labour costs and fringe benefits at the various locations selected.

These tables indicate the real labour cost advantage enjoyed in 1966 and 1968 by the Canadian farm machinery manufacturer and the extent to which this is greater in Manitoba than in Ontario. If the Brantford level is taken as 100, in 1966, average direct labour hourly wage rates fall to 69 per cent of the Brantford rate at Winnipeg and rise to 114 at Moline. Indirect labour hourly rates fall to 74 at Winnipeg and increase to 130 at Moline. With the further differentials of fringe benefits added to both categories of labour, however, Manitoba has a labour cost level only 57 per cent that of Ontario's for direct labour, while the Corn Belt costs are 13 per cent above Ontario's. For indirect labour, wage costs and fringe benefits combined are 62 per cent and 128 per cent respectively for Winnipeg and Moline.

The advantage in plant salaries (not including those of senior management, which were not considered in this study) is somewhat greater to Canadian farm machinery manufacturers in Ontario than in wage rates, as shown in the third section of Table 3.4. With Ontario costs as 100, Manitoba's combined salary and fringe benefit costs are only 67 per cent, while Moline's salary costs appear 36 per cent higher.

Table 3.5 updates Table 3.4 to 1968 levels. The ranking of the three locations remains the same, but Moline's penalty over Brantford's has dropped for both direct and indirect labour. Winnipeg's position appears slightly less advantageous (one percentage point in each of the three categories) than in 1966. These changes are the result of Brantford and Winnipeg wage rates showing a greater percentage increase than Moline wage rates, at least from the available data. Salary rates at Moline, however, increased more than salary rates at either Brantford or Winnipeg.

Data from the Commission's General and Financial Information (Table 3.1), showed that the cost of direct labour represents about 16.0 per cent of the factory cost of the farm machine. A manufacturer locating his plant in Winnipeg in 1966 would have had an advantage in total production costs of close to 9 per cent as the result of differences in direct labour costs alone over a manufacturer in Moline: 16.0% of (113%-56%) = 9.12%. The remaining

TABLE 3.4

COMPARISON OF AVERAGE WAGE AND SALARY RATES PAID (IN CANADIAN DOLLARS) IN THE FARM MACHINERY INDUSTRY AT BRANTFORD, WINNIPEG, AND MOLINE, 1966

	Brantford	Winnipeg	Moline
Direct Labour Wage Rates			
Average hourly wage rate	$2.81	$1.93	$3.21
Hourly fringe benefit cost	.91	.20	.98
Total direct labour cost	$3.72	$2.13	$4.19
Compared to Brantford as 100			
Average hourly wage rate	100	69	114
Hourly fringe benefit cost	100	22	108
Total direct labour cost	100	57	113
Indirect Labour Wage Rates			
Average hourly wage rate	$2.70	$2.01	$3.50
Hourly fringe benefit cost	.87	.21	1.07
Total indirect labour cost	$3.57	$2.22	$4.57
Compared to Brantford as 100			
Average hourly wage rate	100	74	130
Hourly fringe benefit cost	100	24	123
Total indirect labour cost	100	62	128
Salary Rates			
Average weekly salary rate	$81.06	$65.54	$111.97
Average salary fringe benefits	26.26	6.75	34.15
Total salaried employment costs	$107.32	$72.29	$146.12
Compared to Brantford as 100			
Average weekly salary rate	100	81	138
Average salary fringe benefits	100	26	130
Total salaried employment costs	100	67	136

Source: Table C.3A.

TABLE 3.5

COMPARISON OF AVERAGE WAGE AND SALARY RATES PAID (IN CANADIAN DOLLARS) IN THE FARM MACHINERY INDUSTRY AT BRANTFORD, WINNIPEG, AND MOLINE, 1968

(1968 Rates as Percentage of 1966 Rates Shown in Parentheses)

	Brantford		Winnipeg		Moline	
Direct Labour Wage Rates						
Average hourly wage rate	$3.19	(113.5)	$2.21	(114.5)	$3.44	(107.2)
Hourly fringe benefit cost	1.03	(113.2)	.23	(115.0)	1.05	(107.1)
Total direct labour cost	$4.22	(113.4)	$2.44	(114.6)	$4.49	(107.2)
Compared to Brantford as 100						
Average hourly wage rate	100		69		108	
Hourly fringe benefit cost	100		22		102	
Total direct labour cost	100		58		106	
Indirect Labour Wage Rates						
Average hourly wage rate	$3.11	(115.2)	$2.36	(117.4)	$3.78	(108.0)
Hourly fringe benefit cost	1.01	(116.1)	.24	(114.3)	1.15	(107.5)
Total indirect labour cost	$4.12	(115.4)	$2.60	(117.1)	$4.93	(107.9)
Compared to Brantford as 100						
Average hourly wage rate	100		76		122	
Hourly fringe benefit cost	100		24		114	
Total indirect labour cost	100		63		120	
Salary Rates						
Average weekly salary rate	$92.30	(113.9)	$75.30	(114.9)	$131.60	(117.5)
Average salary fringe benefits	29.90	(113.9)	7.80	(115.6)	40.10	(117.4)
Total salaried employment costs	$122.20	(113.9)	$83.10	(115.0)	$171.70	(117.5)
Compared to Brantford as 100						
Average weekly salary rate	100		82		143	
Average salary fringe benefits	100		26		134	
Total salaried employment costs	100		68		141	

Source: Table C.3B.

part of this manufacturing cost analysis will be to determine whether other, possible penalty costs offset the very large advantages conferred by lower wage rates and fringe benefit costs on Winnipeg and, to a lesser degree, Brantford.

Labour Productivity -- The comparative productivity of labour in the two countries could be considered a major factor to "deflate" the initial labour cost advantage to the Canadian manufacturer. Relative productivity between United States and Canadian plants was discussed before the Commission by Massey-Ferguson Industries Limited. The company representatives said that they were unable to measure any productivity difference between Canada and the United States.[5/]

The Commission has published a study comparing productivity in the farm machinery industry in Canada and the United States.[6/] This study demonstrated that productivity in the Canadian industry in recent years was much closer to the U.S. level than previous estimates had indicated. From it, the following comparative data relating to value added in constant dollars are drawn.[7/]

Productivity 1960-1966 measured in terms of:	1960-66 Average	1960-66 Range	Last Figure
Production workers	78.1	69.6 - 88.5	76.3 (1966)
Total employees	77.7	70.5 - 88.9	77.8 (1966)
Man-hours paid	79.7	70.7 - 89.4	76.3 (1965)

Given, however, the identical conditions projected for the plants in this study -- the same plants using the same technology to produce the same volume of the same products -- it could reasonably be assumed that productivity would be equal at all three locations. However, a more conservative estimate of the productivity level for plants in Ontario could be 93 per cent of the U.S. level and for Winnipeg perhaps 90 per cent of the U.S. level. With Brantford as 100, this would give productivity factors of 96 at Winnipeg and 108 at Moline.

5/ Royal Commission on Farm Machinery, Hearings, Vol. XXXVI, 1968, p. 4022.

6/ C. J. Maule, Productivity in the Farm Machinery Industry: A Comparative Analysis Between Canada and the United States, Royal Commission on Farm Machinery, Study No. 3 (Ottawa: Queen's Printer, 1969).

7/ Ibid., Table 7, p. 34.

Relative Quality of Labour -- Some evidence was given to the Commission by New Holland Division of Sperry Rand Corporation that in 1964 when their Grand Island, Nebraska, plant had been in the planning stage, they had considered Winnipeg as an alternative location.[8/] Among other factors that weighed against Winnipeg was a shortage of skilled tool room workers, a shortage which it was noted had since been alleviated by the Manitoba Government's training program. As far as semi-skilled workers were concerned, the company stated that it would prefer to train them itself to its own standards.

It is important to recognize, however, that the quality of labour available in the required quantity in a community provides a tangible incentive or disincentive to its locating there.

Overhead Costs

The first two items of overhead costs, "Indirect Labour" and "Salaried Personnel Costs", have already been covered in discussing the costs of labour generally. The significant advantages shown on Table 3.4 for Brantford and Winnipeg against Moline can therefore be carried directly to these two items.

The next largest item of Overheads is "Maintenance", shown at 3.11 per cent of total Brantford costs. If one were able to examine its costs in detail it must be made up of two major components, maintenance labour costs and material costs, which will vary between locations in different ways. Labour costs will probably change between locations like other indirect labour costs; the costs of material can be considered as costing the same at all three locations because of the operation of tariff item 4400-1, which allows duty-free entry to Canada of all items entering into the cost of production of farm machinery.[9/]

The study *Farm Tractor Production Costs*[10/] provides details of maintenance costs to allow the item to be divided between materials and labour. For the four functional plants in this study,

---

8/ New Holland Division of Sperry Rand Corporation, Brief to the Royal Commission on Farm Machinery, 1967, p. 2; and Royal Commission on Farm Machinery, Hearings, Vol. XXIX, 1967, pp. 3066-7.

9/ Since this section was written in 1968, the 1969 Ontario budget made the provincial sales tax applicable to maintenance and operating supplies.

10/ Royal Commission on Farm Machinery, Farm Tractor Production Costs: A Study in Economies of Scale, Study No. 2 (Ottawa: Queen's Printer, 1969).

these costs divide 66 per cent labour and 34 per cent material at the 60,000-unit volume. Applying this division to the total maintenance costs of 3.11 per cent, the following relationships for maintenance costs at the three locations emerge:

	Brantford	Winnipeg	Moline
Material	1.05	1.05	1.05
Labour	2.06	1.28[1/]	2.64[2/]
Total	3.11	2.33	3.69

1/ Taken as 62 per cent of Brantford cost (indirect labour relationship).

2/ Taken as 128 per cent of Brantford cost (indirect labour relationship).

Depreciation is the second largest item of "Overheads", amounting to 2.28 per cent of total costs for the four Ontario locations. It covers, of course, a multitude of individual items whose depreciation may be calculated differently by different companies for cost analysis. (There is a standard depreciation method for calculating income taxes.) As a consequence, widely different costs might develop in company records for two companies with essentially the same asset structure. One company reported the following straight-line annual depreciation rates for certain items:

Buildings - masonry	2 1/2 per cent
Building improvements	15 per cent
Machinery and equipment	10 per cent
Tooling	33 1/3 per cent

Making the reasonable assumption that the bulk of a company's capital expenditures on manufacturing facilities will be related to the two main items, buildings and machinery, two sources of data are open to suggest an appropriate division of the depreciation cost. (Depreciation of "Production Tooling" is shown as a separate item.) Both the records of the four major companies in the General and Financial Information Questionnaire and the data published by the Dominion Bureau of Statistics for the industry as a whole[11/]

11/ DBS, Industry and Merchandising Division, The Agricultural Implements Industry (Ottawa: Queen's Printer, 1959-62). After 1959 these capital expenditure data were not published by DBS, but they are readily available.

indicate that accumulated capital expenditures[12] are divided as follows: buildings 44 per cent, building improvements[13] 6 per cent, machinery and equipment 50 per cent. Using the above depreciation rates, it is possible to divide the 2.28 per cent depreciation cost as follows:

	Accumulated Capital Expenditures	Annual Depreciation Rate	Division of Depreciation Amount	Division of Depreciation Cost (Table 3.1)
Buildings	44.0%	2.5%	15.4%	0.35
Building improvements	6.0%	15.0%	12.7%	0.29
Machinery and equipment	50.0%	10.0%	71.9%	1.64
Total	100.0%		100.0%	2.28

During their appearance before the Commission, representatives of Ford Motor Company of Canada, Limited, presented certain data[14] on the penalty costs they had identified in building the new St. Thomas assembly plant over what it would have cost if built in the United States. Table 3.6 analyses the data given at that time to identify the causes of the penalty costs shown and to determine which of the penalties would carry over to an assembly plant in the farm machinery industry having the same cost structure. The penalty remaining in the farm machinery plant is basically the carrying over of the $2.2 million federal sales tax on construction materials, the impact of which would appear to be applicable to the building of a farm machinery plant. As a percentage of costs other than "Plant Tooling and Equipment", the whole $2.9 million would be 5.3 per cent. These penalty costs would, however, apply only to the factors of building and building improvement costs, machinery and equipment being available for exclusive use in farm machinery plants at U.S. cost levels under tariff item 44200-1.

12/ Accumulated capital expenditures represent the sum of actual capital expenditures (plus estimated expenditures prior to 1948 data) for 40 years on buildings, 7 years on building improvements, and 10 years on machinery and equipment.

13/ The annual construction expenditure was arbitrarily subdivided as follows: buildings 75 per cent, building improvements 25 per cent.

14/ Royal Commission on Farm Machinery, Hearings, Vol. XXXI, 1967, p. 3400.

TABLE 3.6

COMPARATIVE BUILDING AND EQUIPMENT COSTS IN FARM MACHINERY INDUSTRY IN CANADA AND THE UNITED STATES

(Derived from data presented by Ford Motor Company of Canada, Limited, relating to its St. Thomas assembly plant)

	Scheduled Cost of St. Thomas Assembly Plant	Penalty Canadian Cost (over U.S.)	Comparable Cost in U.S.	Comparable Cost of Farm Machinery Plant in Canada	Applicable Penalty Cost to Plant in Farm Machinery Industry in Canada
		(Can. $ millions)			
Construction materials	$22.2	*(2.2)*[2]	20.0[1]	22.2	*$2.2*
Plant tooling and equipment	6.1[3]	*(1.1)*[4]	5.0[3]	5.0	-[6]
Building costs	20.5	(.5))	20.0	20.5	.5[7]
Other	11.2	(1.2))[5] (1.7)	10.0	10.2	.2[7]
Total	*$60.0*	*(5.0)*	55.0	57.9	$2.9

1/ Value of construction materials calculated by assumption of 11 per cent sales tax, yielding known $2.2 million penalty.

2/ $2.2 million was identified as the sales tax penalty on construction materials.

3/ Value of plant tooling and equipment calculated by assumption of 22 per cent duty rate in effect at that time.

4/ $1.1 million is duty on plant tooling and equipment, duty-free for farm machinery plants, not manufacturing any other products.

5/ Residual amount attributed (by Commission) to items identified by Ford Motor Company of Canada, Limited, as "additional sales taxes on machinery, equipment and tooling, in addition to.... further penalties in some of the utility areas relative to.... the U.S".

6/ The Ontario Budget for 1968 established that these items would be subject to sales tax of 5 per cent.

7/ Assumed to be much lower penalty than for automobile plant because of freedom from duty and sales taxes of production tooling, etc., in farm machinery industry.

Source: Numbers in italics were taken from presentation by Ford Motor Company of Canada, Limited; other numbers were derived from analysis as set out in footnotes.

The Dow Building Cost Calculator[15/] gives rating factors to be used in calculating building costs applicable to various geographical locations in Canada and the United States. These multipliers are intended to be used to adjust base building costs to actual costs in various locations for insurance and property valuations, taxation assessments and the like. The following data are available for the areas concerned:

	Brantford	Winnipeg	Moline
Dow local cost modifier	1.213 (for Kitchener, Ont., closest point to Brantford)	1.184	1.336

The Dow Building Cost Calculator factors show costs at both Canadian locations below those of the United States. The data presented by Ford Motor Company of Canada, Limited, show building costs higher in Canada. If the high cost data expressed by Ford are used to avoid exaggerating any Canadian locational advantages, they should be modified by the ratio of 1.213 to 1.184 between Brantford and Winnipeg. The following relative costs are therefore used to adjust the depreciation costs at the three locations:

	Brantford	Winnipeg	Moline
Buildings	0.35	0.34	0.33
Building improvements	0.29	0.28	0.28
Machinery	1.64	1.64	1.64
Total	2.28	2.26	2.25

For the relative cost of "Warehousing and Freight" (1.82 per cent), the generally lower wage and salary costs of the Winnipeg area, coupled with its closeness to the Western farm machinery market, suggest costs somewhat lower than Ontario's. The factor of 90 per cent of Ontario's costs was arbitrarily selected. For Moline, higher wage and salary costs, but with a geographical location closer to the market in the Corn Belt, suggested an intermediate percentage, 95. Similarly, "Administration" (1.36 per cent) is reduced to 90 per cent of the Ontario level at Winnipeg and to 99 per cent at Moline.

15/ Dow Building Cost Calculator and Valuation Guide, publication of F.W. Dodge Company, a Division of McGraw-Hill Inc., New York, 1966.

In Canada, production tooling, and materials and supplies used in production may be imported duty free, and federal and provincial sales taxes would not apply at either Canadian location.[16/] In the United States, while production tooling and such materials and supplies do not attract federal sales taxes, they may be taxable at state levels. In Illinois, production tooling and expense tools would be subject to a 5 per cent tax, while operating supplies would be tax free. Next door in Iowa, however, all three categories appear taxable, tooling at the same 5 per cent rate and operating supplies at 3 per cent, except solvents and thinners for paints. Although Moline is in Illinois, it makes up part of the Quad City group. Davenport, Iowa is one of the four, and farm machinery plants are in both states. With Illinois as the comparison point, however, the following cost relationships can be developed:

	Brantford Cost Weight	Brantford	Winnipeg	Moline
Production tooling	1.49%	100	100	100
Operating supplies	1.08%	100	100	105
Expense tools	.70%	100	100	100

For a number of overhead cost items, there appears to be no reason why costs should differ significantly from one location to another. "Obsolescence and Warranty" (1.49 per cent), "Defective Work and Scrap" (.63 per cent), and the small catch-all item "Other" (.62 per cent) are therefore taken as equal at all three locations.

"Power, Light and Heat" accounts for slightly more than 1 per cent of average production costs in Ontario. From data contained in the Census of Manufactures returns for the year 1967 to the Dominion Bureau of Statistics, the relative weight for natural gas, electricity, fuel oil and coal (which make up the cost factor) were obtained. From rate books used by the utilities in the three locations, relative costs of appropriate amounts of natural gas and electricity were estimated for each location. The relative costs of fuel oil and coal were taken from the average of the census returns for the Ontario companies. Equivalent costs for the Winnipeg area were obtained from *Manitoba, Industrial Fact Book*[17/] and for

---

16/ See Note 9.

17/ Manitoba, Industrial Fact Book, published by the Department of Industry and Commerce, Province of Manitoba, Winnipeg, (no date).

Moline from data for the whole United States taken from the publication "Wholesale Prices and Price Indexes", issued by the Bureau of Labor Statistics.[18/] The following tabulation gives the results of the analysis:

Percentage Weights of Items		Brantford Item Cost	Brantford Weighted Cost	Winnipeg Item Cost	Winnipeg Weighted Cost	Moline Item Cost	Moline Weighted Cost
Gas	25.9	100.0	/25.9	91.23	/23.63	108.77	/28.17
Electricity	42.5	100.0	/42.5	59.31	/25.20	208.57	/88.64
Fuel oil	16.3	100.0	/16.3	89.24	/14.55	111.96	/18.24
Coal	15.3	100.0	/15.3	161.46	/24.70	92.78	/14.20
			/100.0		/88.08		/149.25
With Brantford weight as in Table 3.1			1.09		.96		1.63

For "Property Taxes", since it was not possible to obtain details to allow the application of the different assessment bases and tax rates for an identical plant in the different localities, the same costs have also been shown for the three locations. Since "Property Taxes" are shown as .84 per cent of manufacturing costs, any reasonable range of difference would appear to create little cost advantage related to location. The last, and smallest item, "Insurance" costs amounts to only .06 per cent of production costs in Ontario. It would probably be identical for identical buildings in all locations.[19/]

18/ U.S. Department of Labor, Bureau of Labor Statistics, Wholesale Prices and Price Indexes.

19/ Letter from Richard S. Winzer, President, James S. Kemper Agency, Inc., Chicago, April 16, 1969:
"It seems to me that if we are talking about a very modern plant, such as that which would be constructed of what would be considered a "superior" risk, or a highly protected risk which would include sprinkling and some form of watch service or alarm service, then I believe that the rates would be quite comparable in any one of the locations mentioned. My reasoning for this is because the rating is almost wholly dependent upon the physical aspects of the particular plant and very little credence is given to outside fire protection and location. Obviously, there would be some difference between a completely unprotected locale versus a high quality fire protection area such as the City of Chicago or some other major city with fully paid fire protection."

The result of these adjustments is set out in Table 3.7 which accumulates the comparative manufacturing cost advantages identified item by item in this chapter. Winnipeg costs are almost 12 per cent less than Brantford's, while Moline's are close to 6 per cent higher. The sources of the cost advantages and disadvantages of the three locations are analysed in Table 3.8.

The chief source of all cost differences is labour and related costs. All Brantford costs for "Direct and Indirect Labour", "Salaried Employment and Fringe Benefits" total 30.43 per cent of its total costs. Winnipeg's equivalent costs are shown as 18.87 percentage points only and Moline's as 35.69. The ratios of these costs at the three locations are then 0.62 to 1.00 to 1.21, respectively. The cost differences assumed in the area of overheads are, by contrast, negligible in their effect on total costs. Higher transportation costs for inbound materials appear to do little to reduce the effect of the locational advantage in production costs which results from lower labour and related costs.

Was 1966 a special circumstance, or are its costs representative of a continuing situation? Significant wage rate changes occurred between 1966 and 1968, particularly in Ontario. How did these affect over-all production costs?

A number of assumptions were made in the preparation of Table 3.9, which projects comparative manufacturing costs using 1968 wage and salary data. All costs except labour and related fringe benefits were assumed to have remained constant and the fringe benefit relationship for 1966 was used to calculate fringe benefit costs for 1968. In fact, many other costs as well as those of labour must have changed and the cost of fringe benefits as a percentage of wage costs may have also changed.

Nevertheless, while recognizing a lower level of precision in Table 3.9 than in 3.7, the extension of relatively the same positions for the three locations for 1968 as for 1966 indicates that the cost relationships were only slightly affected by the wage adjustments (taken in isolation) which were reported to have taken place. It would take a very much higher wage increase, of the order of 40 per cent, to erode completely the advantage enjoyed by Winnipeg compared with Brantford or Moline. Moline's costs over Brantford's changed by less than one percentage point.

TABLE 3.7

COMPARATIVE MANUFACTURING COST ADVANTAGE OF FARM MACHINERY MANUFACTURING PLANT IN BRANTFORD, WINNIPEG, AND MOLINE, 1966

Cost Factor	Brantford (Base) (Table 3.1)	Adjusting Factor Brantford/ Winnipeg	Winnipeg Relative Cost	Adjusting Factor Brantford/ Moline	Moline Relative Cost
Materials					
Purchased items	52.02		52.02		52.02
Inbound transportation	.98	(Table 3.3)	2.16	(Table 3.3)	.44
Materials	53.00		54.18		52.46
Direct Labour					
Wage costs	12.11	69	8.36	114	13.81
Fringe benefits	3.92	22	.86	108	4.23
Direct labour	16.03		9.22		18.04
÷ Productivity factor	1.00		.96		1.08
Adjusted direct labour	16.03		9.60		16.70
Overheads					
Indirect labour (incl. fringes)	7.52	62	4.66	128	9.63
Salaries (incl. fringes)	6.88	67	4.61	136	9.36
Maintenance	3.11	text	2.33	text	3.69
Depreciation	2.28	text	2.26	text	2.25
Warehousing and freight	1.82	90	1.64	95	1.73
Production tooling	1.49	100	1.49	100	1.49
Obsolescence and warranty	1.49	100	1.49	100	1.49
Administration	1.36	90	1.22	99	1.35
Power, light, heat, etc.	1.09	88	.96	149	1.63
Operating supplies	1.08	100	1.08	100	1.08
Property taxes	.84	100	.84	100	.84
Expense tools	.70	100	.70	100	.70
Defective work and scrap	.63	100	.63	100	.63
Insurance	.06	100	.06	100	.06
Other	.62	100	.62	100	.62
Overheads	30.97		24.59		36.55
Total manufacturing costs	100.00		88.37		105.71

TABLE 3.8

RECONCILIATION OF COST ADVANTAGES, FARM MACHINERY MANUFACTURING PLANT, BRANTFORD, WINNIPEG, AND MOLINE, 1966

Cost Factor	Brantford (Base)	Winnipeg Costs Lower/(Higher) than Brantford Costs	Winnipeg	Moline Costs Lower/(Higher) than Brantford Costs	Moline
Materials					
Purchased items	52.02		52.02		52.02
Inbound transportation	.98	(1.18)	2.16	.54	.44
Materials	53.00	(1.18)	54.18	.54	52.46
Direct Labour					
Wage costs	12.11	3.75	8.36	(1.70)	13.81
Fringe benefits	3.92	3.06	.86	(.31)	4.23
Direct labour	16.03	6.81	9.22	(2.01)	18.04
÷ Productivity factor	1.00	(.38)	.96	1.34	1.08
Adjusted direct labour	16.03*	6.43*	9.60*	(.67)*	16.70*
Overheads					
Salaries (incl. fringes)	6.88*	2.27*	4.61*	(2.48)*	9.36*
Indirect labour (incl. fringes)	7.52*	2.86*	4.66*	(2.11)*	9.63*
(Memo, total wages*, salaries* and fringes*)	/30.43*/	/11.56*/	/18.87*/	/(5.26)*/	/35.69*/
Other overheads	16.57	1.25	15.32	(.99)	17.56
Overheads	30.97	6.38	24.59	5.58	36.55
Total Manufacturing Costs	100.00	11.63	88.37	5.71	105.71

TABLE 3.9

COMPARATIVE MANUFACTURING COST ADVANTAGE OF FARM MACHINERY MANUFACTURING PLANT IN BRANTFORD, WINNIPEG, AND MOLINE, 1968

Cost Factor	Brantford (Base) "1966" Cost Data[1]		1966-68 Labour Cost Multipliers[2]	Brantford (Base) Unadjusted 1968 Costs	Brantford (Base) Costs Prorated to Total 100	Adjusting Factor Brantford/Winnipeg[3]	Winnipeg Relative Cost	Adjusting Factor Brantford/Moline[3]	Moline Relative Cost
Materials									
Purchased items	52.02			52.02	49.89		49.89		49.89
Inbound transportation	.98			.98	.94		2.07		.42
Materials	53.00			53.00	50.83		51.96		50.31
Direct Labour									
Wage costs	12.11	x	113.5	13.74	13.18	69	9.09	108	14.23
Fringe benefits	3.92	x	113.2	4.44	4.26	22	.94	102	4.35
Direct labour	16.03			18.18	17.44		10.03		18.58
÷ Productivity factor	1.00				1.00		.96		1.08
Adjusted direct labour	16.03				17.44		10.45		17.20
Overheads									
Salaries (incl. fringes)	6.88	x	113.9	7.84	7.52	68	5.11	141	10.60
Indirect labour (incl. fringes)	7.52	x	115.4	8.68	8.32	63	5.24	120	9.98
Operating supplies	1.08			1.08	1.04	100	1.04	100	1.04
Expense tools	.70			.70	.66	100	.66	100	.66
Power, light, heat, etc.	1.09			1.09	1.05	88	.92	149	1.58
Maintenance	3.11			3.11	2.98	75	2.23	119	3.54
Defective work and scrap	.63			.63	.60	100	.60	100	.60
Depreciation	2.28			2.28	2.19	99	2.17	99	2.18
Insurance	.06			.06	.06	100	.06	100	.06
Property taxes	.84			.84	.81	100	.81	100	.81
Production tooling	1.49			1.49	1.43	100	1.43	100	1.43
Obsolescence and warranty	1.49			1.49	1.43	100	1.43	100	1.43
Warehousing and freight	1.82			1.82	1.75	90	1.58	95	1.66
Administration	1.36			1.36	1.30	90	1.17	99	1.29
Other	.62			.62	.59	100	.59	100	.59
Overheads	30.97			33.09	31.73		25.04		37.45
Total manufacturing costs	100.00			104.27	100.00		87.45		104.96

1/ See Table 3.7.

2/ See Table 3.5.

3/ See Table 3.5 and text.

What advantages do these apparent differences in manufacturing costs finally confer in Brantford or Winnipeg, in relation to Moline? Are they sufficient to provide a real locational advantage? If the Brantford or Winnipeg manufacturer can retain the profit differential created by the lower costs, they will be. The retention of profits created by the cost differentials is discussed in the next chapter.

Reservations

Before proceeding to Chapter 4, however, there are two points which should be discussed here.

Availability of Capital -- This is an item affecting plant decisions that does not show up directly in accounting records of plant manufacturing costs. It is alleged that native Canadian manufacturers generally find it harder to raise funds than manufacturers in the United States. While the Commission has not done specific research on the subject in relation to the farm machinery industry, it would appear reasonable to assume that subsidiaries of U.S. companies can borrow through their parent company, with no real penalty cost to the parent organization, as between the Canadian and U.S. locations. Thus, the International Harvester Corporation's 1966 prospectus for a 5 per cent 20-year bond issue for the International Harvester Capital Corporation noted that the money raised would be used to finance the activities of the company throughout the world, indicating that their subsidiaries would not be paying more than the going U.S. rate for capital, or at least would not be reducing their parent's profits more than the U.S. rate for capital would indicate, whatever rates they were charged for the capital thus borrowed. The U.S. balance of payments guidelines would make it somewhat more difficult to borrow in the United States and invest in Canada, but European capital sources are now being used for this purpose.

The native Canadian manufacturer, however, would be unable to raise money as easily, or at as low a cost. It may be expected that he would be at a disadvantage as compared with the larger multinational company.

Restrictions Relating to Duty-free Importation of Production Machinery in the Farm Machinery Industry -- The special provisions which allow a Canadian farm machinery manufacturer to import production machinery duty free if it is used in manufacturing farm

machines can carry a consequential problem related to the most efficient use of the machinery by the manufacturer. This problem is undoubtedly less serious since the establishment of tariff item 42700-1 which both reduced the tariff on production and other machinery to 15 per cent (MFN) and arranged for the remission of this duty when the machinery was "not available from production in Canada". For the most part, machinery which would be dutiable under the new item had previously been dutiable at 22½ per cent (MFN). To the extent that the new tariff item eliminated the penalty on production machinery of a kind not made in Canada, the problem discussed below was eliminated; to the extent that kinds of machinery available from Canadian production are priced to take advantage of the 15 per cent duty protection, the problem would still continue to exist.

The problem is the efficient use in Canada of production machines imported to Canada under the provisions of tariff item 44200-1, and therefore duty free for use in farm machinery plants. These machines would be otherwise dutiable, and therefore presumably priced for Canadian users other than farm machinery companies at higher prices, either because of the direct imposition of the duty or its indirect application in prices of Canadian-manufactured machines. Because of the provisions of this tariff item, farm machinery companies may purchase their production machinery requirements wherever the price is best. While it is conceivable that there may be some penalty costs incurred in the installation of such machinery in Canadian plants because of the application of other duties and taxes on other associated materials, it is likely that it is too small to create any significant advantage for a location outside Canada against a Canadian location.

Prior to 1944, a special lower duty rate of 6 per cent was imposed on production machinery used in the farm machinery industry. When this duty was removed in 1944, a restriction was continued along with the duty on farm machines: the production machinery imported had to be used exclusively for the production of farm machinery. From the viewpoint of the Department of National Revenue, the point was obvious: it would be manifestly unfair to allow such duty-free machinery to be used to manufacture parts or machines for use outside the farm machinery industry. Competitive manufacturers in these other fields could be assumed to have higher overhead costs, related to their having had to pay either duty or higher Canadian prices for their production machinery.

The administrative complexities which would have followed any other ruling can be appreciated. It would be difficult to collect (or allowed for claiming back) partial duty based on the uses to which the machine would be put, for example.

The existence of this restriction could, however, affect corporate decisions to build new plants in this industry in Canada. If it is assumed that the production machinery exempted from duty might not be fully utilized in making parts for farm machines only, or could be so specialized that it could not be used at the same unit cost level unless it made parts for farm machines and for some other product as well, the Canadian manufacturing location could be at a disadvantage in its manufacturing costs, compared with another manufacturer (not necessarily in the farm machinery industry) located in the United States. The U.S. plant would be able to attain lower overhead costs than a Canadian plant limited to a lower volume of parts for farm machinery alone. The U.S. plant would have a larger volume of parts for farm machinery and other end products over which it could amortize its production machinery costs.

As a specific example, consider International Harvester Company of Canada, Limited, which manufactures farm machinery in Hamilton and trucks in Chatham, Ontario. Machinery in either plant could turn out similar parts for non-farm use, e.g. an axle shaft for a combine or a truck. To gain duty free exemption of otherwise dutiable production machinery, the company is forced, however, to segregate the two activities, farm machinery and trucks. It would be under pressure to compete with farm machinery producers in the United States who are able to purchase production machinery at the same time, it might not (unless the machinery were capable of being fully utilized in building parts for farm equipment only) use the machinery as efficiently as a plant in the United States. If a plant of the world-wide International Harvester organization in the United States can use its production machinery to produce parts for farm machinery and other purposes, it would have lower unit production costs than the Hamilton plant.

How very real this problem may be presumed to be is shown in the analysis of International Harvester plants in the United States and the products they produce in Table 3.10. Of the 22 plant locations in the United States, 10, with 43 per cent of the total factory space, appear to be producing both complete agricultural

equipment or parts along with other types of equipment or parts (motor trucks, aircraft parts, industrial equipment, heavy construction equipment, etc.). If these 10 "combination" facilities had been built by International Harvester in Canada, they would have been entitled to duty-free status for machinery and equipment only on machinery which was "not available from Canadian production" or on machinery which would be used exclusively for the production of farm machinery.

TABLE 3.10

PROPORTION OF INTERNATIONAL HARVESTER'S MANUFACTURING FACILITIES IN THE UNITED STATES, PRODUCING: FARM MACHINERY, OTHER PRODUCTS, AND A COMBINATION OF FARM MACHINERY AND OTHER PRODUCTS

Plants Producing	Number of Plants	Plant Area	
		Square Footage	Percentage of Total Area
Primary materials	1	2,121	7.6
Parts and components (assumed to be for agricultural and other use)	5 1/	3,236 1/	11.5 1/
End items (plus some component parts)			
Agricultural machinery only	4	3,983	14.2
Other products only	7	9,804	35.0
Agricultural machinery and other products	5 1/	8,876 1/	31.7 1/
	22	28,020	100.0

1/ Plants making agricultural machinery (or components) combined with other products. The five end item plants which make agricultural machinery and other equipment and the five component parts plants which presumably make parts for both kinds of equipment, accounting for 43 per cent of total square footage, could not be built in Canada because of the requirement that production machinery, to be allowed duty-free status, must not be used for purposes other than manufacturing farm machinery.

4. POST-PRODUCTION COST DIFFERENTIALS

After the products of a factory are manufactured, two additional cost areas can vary significantly between one location and another -- transportation costs from the plant to the markets where the products are sold, and federal and provincial or state corporation income taxes. To examine the complex question of corporation income taxes, it was assumed that the company's income was segregated between manufacturing and distribution operations. The distribution income, resulting from the sales the company makes in certain areas against cost of distribution of its products, was considered as independent of the manufacturing location.

In the farm machinery industry in North America, end products are most typically made in one plant location for the combined Canadian and U.S. markets, with the output of the manufacturing plant being sold to the distribution division (in Canada or the United States) at approximately 61 per cent of the suggested retail price of the end product. Thus the income that will be affected by plant-location decisions is the income related to the sale by the manufacturing division to the selling division. This income is assumed for this study to absorb any outbound transportation cost penalties for a particular location and to be affected by differences in income tax rates of the country and state concerned.

Outbound Transportation Costs

To appreciate the effect of differences in outbound transportation costs on the profitability of alternative locations, it is necessary to relate them to the relative production cost advantages. How do they add to or reduce the advantages of one area over another? Since outbound transportation costs are charged out at a different

point in the production-distribution cycle (in that they are typically charged on top of an f.o.b. factory wholesale price to the dealer), they cannot be added directly to a table of production costs. Instead, they form an addition, varying in amount, which becomes part of the nominal retail delivered price from which bargaining between farmer and dealer commences.[1/] If it can be assumed that the products of each of the three plants are identical (this is supported by the assumption of identical plant cost structures), the products must be assumed to have the same market value or price at all points at which they are sold. In turn, it can be concluded that one of two things will happen:

- The manufacturer having high transportation costs will adjust his wholesale price to absorb freight differences between his product at various locations and rival products, or
- the dealer himself will reduce his margin to absorb the freight differences.

It can be demonstrated easily that it is not practicable for the dealer to reduce his margin substantially beyond the average and stay in business. The manufacturer is then left in the position of having to adjust his wholesale price to the dealer so that the sum of the wholesale price and the transportation charges, together making the "delivered price" of the final product to the dealer, does not rise above the level at which a rival manufacturer can sell the same materials on a delivered basis. For the whole market for North America, each of the farm machinery manufacturing plants at the three locations selected for this study, producing the same products, would have a relative advantage or disadvantage (the sum of the advantages and disadvantages at each market point).

One of the areas studied for the Commission in detail was the difference in outbound transportation costs. The detailed study, *Differences in Outbound Transportation Costs to the North American Farm Machinery Market*, bound with this study as Appendix D,[2/] analysed outbound transportation costs for farm machinery plants

---

1/ See p. 10 for a discussion of suggested retail prices, wholesale prices, and prices actually paid by farmers. Transportation costs are an addition to the factors outlined in Table 2.2.

2/ Prepared by Kates, Peat, Marwick and Co., Toronto, Ontario.

manufacturing different products and located alternatively in Brantford, Winnipeg, and Moline. Briefly, the method used in the study was to divide North America into certain geographical areas, to determine the number of units of various kinds of farm machinery sold in each region, and then to cost the shipping of this volume of each type of machine from each manufacturing location to a mid-point selected in each province or region. While the results of such a study necessarily oversimplify costs related to machine varieties and destinations, they indicate how outbound shipping costs compare for the three manufacturing locations considered. The following Table 4.1 is taken from data included in Appendix D.

TABLE 4.1

COMPARATIVE OUTBOUND FREIGHT COSTS FOR SPECIFIED PRODUCTS, BRANTFORD, WINNIPEG, AND MOLINE

	Weighted Average Shipping Costs to Supply North American Market from:					
	Brantford		Winnipeg		Moline	
Farm Machine Type	Can. $	Relative	Can. $	Relative	Can. $	Relative
Wheeled tractor	100	100	116	116	69	69
Self-propelled combine	179	100	156[1/]	87[1/]	110	62
Automatic baler	44	100	41	93	29	66
Tandem wheel-type disk harrow	36	100	40	111	26	72

1/ More correctly $158 and 88 (see text).

Source: Appendix D, page 134.

In preparing the data presented in Appendix D, Kates, Peat, Marwick & Co. selected the Prairie capitals as the "mid-points" to which the volumes of each product studied would be shipped in these Canadian provinces. In one case, however, a provincial capital (Winnipeg) is also an origin point in the study, i.e. a location at which farm machinery is manufactured. The result is that the volumes of two of the four implements studied (combines and disk harrows) bear no charges for delivery in the Manitoba area, being shown as "manufactured" and "consumed" in the same location, Winnipeg.

The transportation costs for a plant located in Winnipeg are therefore understated for combines and disk harrows. In the terms of the K.P.M. & Co. study, the other two products, tractors and balers, just fail to have enough of the North American population in Manitoba to have the province shown as one of the "major retail market areas". The effect of the omission of Manitoba is here relatively neutral, since no manufacturing location is shown as shipping these products into Manitoba in the K.P.M. & Co. study. Thus for tractors and balers every destination location studied bears a shipping cost from each of the three origin points.

Table D.38 of the K.P.M. & Co. study records shipping rates from Winnipeg to Brandon, Manitoba, which might more properly be considered as the centre of the consumption area for farm machinery in the region. Applying the truck rate of 53 cents a hundredweight to the weights of the combine and disk harrow markets shown in Manitoba supplies the omitted data. The effect of the correction, however, is so small that only the two figures relating to combine shipping costs from Winnipeg on Table 4.1 would be affected. They would show $158 average shipping costs instead of $156, giving a relationship of 88 per cent to Brantford's shipping costs instead of 87 per cent.

The K.P.M. & Co. study analysed the shipping costs of the four types of machines from the three locations in terms of the impact of shipping costs and shipping cost penalties on average wholesale prices. The following Table 4.2, Representative Net Wholesale Prices and Transportation Costs, indicates that transportation costs increase steeply as the "price per pound" of the product decreases. Prices of tractors and combines are much higher per pound than the price of the disk harrow selected as representing cultivating equipment, while the price of balers occupies an intermediate position. For tractors, because of the market distribution, Winnipeg has a higher penalty cost over Moline than Brantford, while for the same reason, it has a lower penalty transportation cost than Brantford's. In no case, however, does the transportation cost for tractors exceed 2.5 per cent of a representative net wholesale price, with the highest penalty for either Canadian location at 1 per cent or less of net wholesale price. This same relationship as regards penalty outbound transport costs holds true for balers, but for the disk harrow,

TABLE 4.2

REPRESENTATIVE NET WHOLESALE PRICES AND TRANSPORTATION COSTS

	Representative Net Wholesale Prices (Can. $)	Weight (cwt.)	Price per Lb. (Can. $)	Weighted Average Transportation Costs to Market: Brantford (Can. $)	Winnipeg (Can. $)	Moline (Can. $)
Wheeled Tractor	4,616	61	0.76	100	116	69
Transportation						
- as % of NWP				2.2	2.5	1.5
- penalty[1] as % of NWP				0.7	1.0	0
Combine	7,314	98	0.75	179	158[2]	110
Transportation						
- as % of NWP				2.4	2.2	1.5
- penalty[1] as % of NWP				0.9	0.7	0
Baler	1,436	24	0.60	44	41	29
Transportation						
- as % of NWP				3.0	2.8	2.0
- penalty[1] as % of NWP				1.0	0.8	0
Disk Harrow	718	21	0.34[3]	36	40	26
Transportation						
- as % of NWP				5.0	5.5	3.6
- penalty[1] as % of NWP				1.4	1.9	0

1/ Over lowest cost, Moline.

2/ Adjusted figure used (see text).

3/ Corrected figure.

Source: Appendix D, (K.P.M. & Co. Study), Findings, p. 134 and Table D.2.

the penalty for the Canadian locations runs up to 2 per cent over the U.S. location. For both these machines, however, lowest outbound transportation costs (from Moline), however, rise from the 1.5 per cent relationship, identified for tractors and combines, to 2 per cent and 3.6 per cent of the representative net wholesale prices.

The advantage of a location closer to the centre of the whole North American market for farm machinery (in or near the U.S. Corn Belt) is clearly indicated. Moline enjoys outbound transportation costs for the four types of farm machines analysed that were 28 to 38 per cent below Brantford's, depending on the type of machine. In the case of Winnipeg, the lower penalty cost over Moline than the Brantford location as a source to supply the North American combine market is also shown (because of the weight of the Western Canadian and United States' markets for farm machinery).

If the wheat-growing areas for self-propelled combines (the Canadian West and the Western United States) are isolated, as set out in Table 4.3, the relative advantage of servicing them from Winnipeg is strikingly evident. Much of the impact of Versatile Manufacturing Limited on the farm machinery industry can probably be attributed to its very favourable location with regard to outbound transportation costs to its self-selected market for specialized machinery related to the wheat-growing area (swathers, combines and, more recently, large tractors).

As shown on Table 4.3, Winnipeg clearly enjoys competitive outbound transportation costs for combines to a large part of the wheat-growing areas of North America. Its costs to these markets are directly comparable to those of Moline, the centre of combine production for North America, and are about 40 per cent below those of Brantford.

Table 2.2 provides the data to relate comparative advantages in outbound transportation costs to those in manufacturing costs. If the data from the table are assumed to be equivalent to the "base" position, Table 4.4 can be constructed. Because combines are actually made in all three locations, transportation costs are adjusted by the relative transportation costs of combines in Table 4.1. (Different results would, of course, occur if the plant were assumed to be producing other products.)

TABLE 4.3

COMPARATIVE "LOWEST QUOTED" OUTBOUND FREIGHT COSTS FOR SELF-PROPELLED COMBINES TO WESTERN CANADIAN AND U.S. MARKETS FROM BRANTFORD, WINNIPEG, AND MOLINE

Canadian Province or U.S. Geographical Area and (Analysed) Destination Points (in Parentheses)	Share of North American Market[1] in Province or Area	Relative Cost if Shipped From: Brantford Rail Rate	Brantford Rate x Mkt. Share	Winnipeg Rail Rate	Winnipeg Rate x Mkt. Share	Moline Rail Rate	Moline Rate x Mkt. Share
Manitoba (Winnipeg)	2.8	2.49	6.97	0.53[1]	1.48	1.58	4.42
Saskatchewan (Regina)	8.0	3.14	25.12	0.57	4.56	2.17	17.36
Alberta (Edmonton)	5.0	3.90	19.50	1.14	5.70	3.07	15.35
U.S. Plains States (Omaha, Nebraska)	28.2	1.69	47.66	1.62	45.68	0.84	23.69
	44.0		99.25		57.42		60.82
Relative to Brantford as 100			100		58		61

1/ Ibid., highway transport rate for self-propelled combines to Brandon, Manitoba, taken from Table D.38.

Source: Table D.25 of study Differences in Outbound Transportation Costs, included herein as Appendix D.

Table 4.4 compares profitability before taxes of the three locations. It assumes that the combines produced in all plants are sold at the same suggested price (100), but that the manufacturing division's transfer price to the wholesale division, the "61" level shown in Table 2.2, is adjusted to absorb the difference between the lowest weighted average transportation costs to serve the North American market (from Moline) and the alternative higher costs from Brantford or Winnipeg. Thus the transfer price from a manufacturing plant in Brantford to a North American distribution division is shown as reduced to 60.33, and from a manufacturing location in Winnipeg to 60.56 from 61.0, to absorb freight penalties to the whole North American market for combines. The relative manufacturing costs, shown on Table 3.6 for each location, are used to adjust the "5 base figure which is taken to represent Brantford manufacturing co. s. By adjusting the "transfer price" to absorb the outbound transportation penalties and the production costs to reflect the differences in manufacturing costs related to the various locations, the manufacturing "profits" at each of the three locations result.

Table 4.4 indicates that the "profit" level of plants at the three locations, relating to a common suggested retail price, would be: Brantford, 3.33; Winnipeg, 9.83; and Moline .91. These are very large differences in manufacturing profits, much larger than one would expect to find while manufacturing continued in the three locations. On a percentage basis, Moline's manufacturing profits are about one quarter of Brantford's, while Winnipeg's are almost three times as great. If all other factors were equal, it would be almost impossible for combine manufacturing to continue at Moline, and even at Brantford, in the face of the much lower total costs attainable in Winnipeg.

In fact, of course, Moline continues as the major combine manufacturing location in North America. Brantford is next in importance, while Winnipeg has a relatively small share of the market. The factors assumed to be *ceteris paribus* for this study (volume, mix, technology) are not equal in real life. A further major factor is examined in the next section of this chapter, the much higher prices received for combines manufactured in Moline than in Brantford and the even lower prices for combines made in Winnipeg.

TABLE 4.4

COMPARATIVE COSTS, INCLUDING OUTBOUND TRANSPORTATION COSTS, AND PROFITABILITY BEFORE TAXES FOR COMBINE PLANT LOCATED IN BRANTFORD, WINNIPEG, AND MOLINE

	Base Price Costs and Profit Data (Table 2.2)	Adjustments to Actual Locations		
		Brantford	Winnipeg	Moline
Suggested retail price	100.0	100.00	100.00	100.00
Actual price paid by farmers	85.0	85.00	85.00	85.00
Add lowest weighted average transportation cost 1/ (from Moline)	-	1.08	1.08	1.08
Price paid by farmer, delivered	-	86.08	86.08	86.08
Actual transportation cost 2/ to company	-	(1.75)	(1.53)	(1.08)
Transportation cost penalty	-	(0.67)	(0.45)	-
Transfer price received by manufacturing division from distribution division	61.0	60.33 3/	60.55 3/	61.00 3/
Corporate costs charged to manufacturing, including R&D	(3.0)	(3.00)	(3.00)	(3.00)
Manufacturing costs	(54.0)	(54.00) 4/	(47.72) 5/	(57.09) 6/
Manufacturing profit before taxes	4.0	3.33	9.83	0.91
Profit ratio, before taxes		100.0	295.2	27.3

1/ Shown in Appendix D, p. 134 as $110 weighted average transportation costs from Moline to total North American market on wholesale price of $7,314 or a factor cost of 1.08 in relation to suggested retail price of 100 ($10,158).

2/ Moline has lowest weighted average transportation costs. Brantford and Winnipeg costs are developed from ratios of Table 4.1: Brantford 100, Winnipeg 88, and Moline 62.

3/ 61.00 level transfer price minus outbound transportation penalty.

4/ Taken as "base".

5/ Adjusted to 88.37 per cent of base (Table 3.7).

6/ Adjusted to 105.71 per cent of base (Table 3.7).

A major question that must be considered in relation to the Winnipeg location is whether it would be possible for a large farm machinery company to pay the lower wage and salary rates and fringe benefit costs currently accepted there. As noted in Appendix C, international unions, such as the United Automobile, Aerospace and Agricultural Workers Union, would be unlikely to accept a major company's establishing an important manufacturing plant in Winnipeg unless its wage scales paralleled those of Ontario plants. The result would be to wipe out much of the advantage shown for the Winnipeg location, although the new work force with, presumably, a lower average age, would create somewhat lower fringe benefit costs for pensions and vacations based on time with the company.

Companies' Real Selling Prices

In order to compare the products manufactured at the three locations, the study assumed that they would command the same price net of average transportation cost differences to North American markets. Do company prices for closely similar combines reflect these close price relationships?

The Commission has published a report on farm machinery prices[3/] which contains a detailed comparison of combine prices grouped under four size classifications according to industry sales literature groupings. These prices, f.o.b. factory, are examined along with associated delivery charged to a selected group of six locations in Canada and the United States in Appendix E *Real Comparative Selling Prices, Delivered Basis*. The locations were selected so that no one was a manufacturing location (every "delivered price" would therefore contain a delivery charge) and the actual charges were obtained from the companies themselves for the various models listed.

In Table 4.5, net wholesale prices of comparable self-propelled combines are shown, both f.o.b. factory and delivered, relative to equivalent John Deere factory and delivered prices. For each group, at the factory and at each location, the Deere

---

3/ Royal Commission on Farm Machinery, Special Report on Prices of Tractors and Combines in Canada and Other Countries, (Ottawa: Queen's Printer, December 1969), Table 5.7.

price is shown as 100 and the prices of the other equivalent machines are shown in relation to this manufacturer's prices. The relative f.o.b. factory prices establish the base price relationship; the relative delivered prices show the effect of the transportation costs on the price relationships between the different companies. The second column under each delivery location shows the change in inter-company price relationships between the factory price and the delivered price for that location.

While a relatively consistent pattern of differences in price relationships shows for all combine groups at all locations, only Group 3 includes Versatile's combines and, therefore, the Winnipeg area as a manufacturing location. In this group, the price, f.o.b. factory, of International Harvester's 403 combine is 96.1 per cent of John Deere's 95 model (f.o.b. the same location, Moline). The Massey-Ferguson 410 and Cockshutt 542 are priced at Brantford at 92.3 and 81.4 per cent respectively of Deere's price at Moline. The price of the Versatile 420 combine, f.o.b. Winnipeg, is 72.0 per cent of the Deere 95 factory price. For these combines of relatively competitive specifications (at least as closely as it is possible to relate them), the comparative net wholesale delivered cost at each location is then shown related to the delivered cost of the John Deere model 95 combine, location by location, underlined on the table.

The delivered net wholesale price of International Harvester's model 403 combine is consistently about 6 per cent below that of John Deere's model 95. Massey-Ferguson's net wholesale prices for its MF 410 are from 6 to 7 per cent below John Deere's and prices of the combine manufactured by Cockshutt-Oliver at Brantford run between 17 and 18 per cent below John Deere's prices. Versatile's delivered prices are between 26 and 29 per cent below John Deere's.

If one examines the change in the relative competitive positions of the companies, expressed as the difference between f.o.b. factory and delivered price relatives at the various locations, the comparative unimportance of outbound freight is clear. The differences in f.o.b. factory prices create the basic price differences between the companies which the addition of the actual delivery charges from the different locations do little to change. Thus the Cockshutt-Oliver delivered net wholesale prices are

TABLE 4.5

NET WHOLESALE PRICES OF COMPARABLE SELF-PROPELLED COMBINES, F.O.B. FACTORY AND DELIVERED AT SELECTED DESTINATIONS, EXPRESSED RELATIVE TO EQUIVALENT JOHN DEERE PRICES AS 100

(Factory and delivered prices relatively lower/(higher) than Deere prices at factory and delivered)

Company Group and Model	F.O.B. Factory	Des Moines (Iowa)		Bismarck (N.D.)		Brandon (Man.)		Regina (Sask.)		Saskatoon (Sask.)		Edmonton (Alta.)	
	Prices Compared to John Deere as:	Prices Compared to John Deere as:	Percentage Point Change Lower/(Higher) Between Factory and Delivered Price Relationships	Prices Compared to John Deere as:	Percentage Point Change Lower/(Higher) Between Factory and Delivered Price Relationships	Prices Compared to John Deere as:	Percentage Point Change Lower/(Higher) Between Factory and Delivered Price Relationships	Prices Compared to John Deere as:	Percentage Point Change Lower/(Higher) Between Factory and Delivered Price Relationships	Prices Compared to John Deere as:	Percentage Point Change Lower/(Higher) Between Factory and Delivered Price Relationships	Prices Compared to John Deere as:	Percentage Point Change Lower/(Higher) Between Factory and Delivered Price Relationships
John Deere (base)	(Moline)												
All groups 1/	100	100		100		100		100		100		100	
Cockshutt	(Brantford)												
(1) Model 525	100.5	102.8	(2.3)	102.3	(1.8)	101.1	(0.6)	101.6	(1.1)	101.4	(0.9)	101.4	(0.9)
(2) Model 535	96.5	98.4	(1.9)	97.9	(1.4)	96.9	(0.4)	97.2	(0.7)	97.1	(0.6)	97.0	(0.5)
(3) Model 542	80.5	82.6	(2.1)	82.1	(1.6)	81.5	(1.0)	81.8	(1.3)	81.7	(1.2)	81.8	(1.3)
(4) Model 545	83.1	84.5	(1.4)	84.2	(1.1)	83.4	(0.3)	83.5	(0.4)	83.4	(0.3)	83.3	(0.2)
International Harvester	(Moline)												
(1) Model 105						(Not included, built in Hamilton, Ontario)							
(2) Model 315	94.7	94.7	0.0	94.4	0.3	94.4	0.3	94.3	0.4	94.3	0.4	94.2	0.5
(3) Model 403	93.8	94.0	(0.2)	93.8	0.0	93.7	0.1	93.6	0.2	93.6	0.2	93.5	0.3
(4) Model 503	99.0	98.9	0.1	98.7	0.3	98.5	0.5	98.2	0.8	98.2	0.8	98.0	1.0
Massey-Ferguson	(Brantford)												
(1) Model 205	97.2	98.8	(1.6)	98.9	(1.7)	97.9	(0.7)	98.5	(1.2)	98.3	(1.1)	98.3	(1.1)
(2) Model 300	87.8	89.2	(1.4)	89.2	(1.4)	88.4	(0.6)	88.8	(1.0)	88.7	(0.9)	88.7	(0.9)
(3) Model 410	92.3	93.8	(1.5)	93.6	(1.3)	93.1	(0.8)	93.4	(1.1)	93.3	(1.0)	93.3	(1.0)
(4) Model 510	94.2	95.4	(1.2)	95.3	(1.1)	94.8	(0.6)	95.0	(0.8)	94.9	(0.7)	94.8	(0.6)
Versatile	(Winnipeg)												
(1) No model	-	-		-		-		-		-		-	
(2) No model	-	-		-		-		-		-		-	
(3) Model 420	72.0	74.3	(2.3)	72.2	(0.2)	71.4	0.6	71.0	1.0	71.2	0.8	71.4	0.6
(4) No model	-	-		-		-		-		-		-	

1/ Group 1, Model 45; Group 2, Model 55; Group 3, Model 95; Group 4, Model 105.

Source: Tables E.1, E.2, E.3, and E.4.

between .9 and 2.0 percentage points higher (at Brandon, Manitoba, and Des Moines, Iowa, relative to John Deere's) than its base, f.o.b. factory price relationship. The other Brantford manufacturer, Massey-Ferguson, again shows its highest transportation penalty at Des Moines, Iowa, of 1.6 percentage points (lower than the Cockshutt-Oliver 2.0 percentage points). In Brandon, Massey-Ferguson also has its lowest penalty, .8 percentage points against Cockshutt's .9. Thus, outbound transportation costs make a comparatively small difference to the basic f.o.b. factory competitive price relationship established by both companies manufacturing at Brantford. Massey-Ferguson appears to have a slightly lower outbound transportation penalty in this size of combines (Group 3) than Cockshutt-Oliver. The difference between the two companies' positions is created because transportation charges from Brantford to the destinations noted are a lower percentage of the higher Massey-Ferguson price than of the lower Cockshutt-Oliver price. As shown in Table E.3, even though quoted Massey-Ferguson delivery charges are lower to the two United States' points and higher to the four Canadian points than Cockshutt Oliver's, all Cockshutt-Oliver's delivery charges are higher than Massey-Ferguson's as a percentage of the two companies' factory prices.

For its shipments from Winnipeg, Versatile has a slightly less competitive position to the two U.S. points shown (albeit a negligible .2 per cent to Bismarck, North Dakota), but enjoys sufficiently lower freight costs to the Canadian points shown to increase its advantage by 1.0 percentage points at Regina over its basic f.o.b. factory relative price.

International Harvester's major combine plant, like John Deere's, is situated at Moline. In Group 3 combines, both companies have close to the same relationship for delivered prices at each point as in their f.o.b. factory prices. International Harvester appears to have a small advantage of between .5 and 1.0 percentage points at Western Canadian locations, which may be related to the very heavy weight of the John Deere 95 combine (12,800 lbs.)[4/] relative to the International Harvester 403 model (9,871 lbs.).[4/] The carriage of the heavier weight as the

---

4/ Ibid., Table C.5.

distances grew longer would tend to make the delivered price of the Deere machine increase more quickly.

The data in Table 4.5 show that it is not possible to find two makes of combines actually being sold for the same prices, and that costs of outbound transportation account for only a small part of the difference in delivered price. Presumably, therefore, other factors than outbound transportation account for differences in suggested retail prices and net wholesale prices.

The real differences in prices for combines from the three locations completely alter the relative profitability for the plants at the three locations. While the matter of price differences does not properly enter into advantages conferred by one location or another, they explain why combine manufacturing plants can successfully continue in the highest cost area, Moline. The price differences more than compensate for manufacturing cost differences.

Table 4.6 developes average relative net wholesale prices for the combines in the third size group, related to the location where they are manufactured. Group 3 combines were compared because Versatile, manufacturing at Winnipeg, appears in this group only. With the Brantford average price shown as 100, Winnipeg's is 83.33 and Moline's 112.15.

TABLE 4.6

RELATIVE NET WHOLESALE PRICES OF COMBINES MANUFACTURED AT BRANTFORD, WINNIPEG, AND MOLINE

(Group 3 combines only)

	Brantford	Winnipeg	Moline
Deere			100.0
Cockshutt	80.5		
International Harvester			93.8
Massey-Ferguson	92.3		
Versatile		72.0	
Average	86.4	72.0	96.9
With Brantford as base	100.00	83.33	112.15

Source: Table 4.5

Table 4.7 largely reproduces the structure of Table 4.4 to develop estimated manufacturing profits before taxes, but using the relative prices for the three locations shown in Table 4.6. With the addition of the average outbound transportation costs to the whole North American market, the average Winnipeg-made combine (from Group 3) has a suggested average delivered price almost 17 per cent less than the average Brantford Group 3 machine, while the average Group 3 combine, produced in Moline, has a delivered price about 11 per cent higher than Brantford's.

Net manufacturing profit in Table 4.7 is shown as follows for the three locations: 4.00 per cent of suggested retail price for Brantford, 2.11 per cent of that same Brantford price for Winnipeg and 8.32 per cent for Moline. Winnipeg's manufacturing profits are shown as about half Brantford's, while Moline's are about twice as high as the Ontario locations. Winnipeg's manufacturing "profit" would have been only .61 per cent if the level of corporate costs and research and development costs charged to manufacturing had been shown as 3 per cent of the suggested retail price for combines originating at the location (2.50 of the Winnipeg SRP of 83.33). Knowing that Versatile's corporate administrative expenses and research and development costs are much lower than the industry average, these were arbitrarily estimated at 1 per cent.

The result of these changes to price levels approximating those attained by the companies actually manufacturing at the three locations, and to probable corporate and R&D cost levels at Winnipeg, may be taken as reasonable approximations of the real world situation. Although manufacturing costs are high at Moline, the two companies manufacturing there can charge more for their combines than the two companies manufacturing at Brantford. Winnipeg's lower manufacturing and outbound transportation costs are reflected in the prices charged to the farmers, with the newest combine manufacturer using lower prices to enter the market.

One further aspect of price-cost relationships among the three locations is shown in Table 4.7. If it is assumed that Versatile Manufacturing Company operates on the same "transfer price" basis as is typical of the industry, selling from a manufacturing to a distribution division at 61 per cent of suggested retail price, its manufacturing "transfer price" is shown as 50.83 per cent

TABLE 4.7

COMPARATIVE PRICES, COSTS, AND PROFITABILITY BEFORE TAXES OF COMBINE PLANT LOCATED IN BRANTFORD, WINNIPEG, AND MOLINE

	Brantford[2]	Winnipeg	Moline
Actual suggested retail price[1]	100.00	83.33	112.15
Plus outbound transportation costs [2]	1.75	1.53	1.08
Delivered price	101.75	84.86	113.23
Actual SRP ratio, including delivery costs	100.0	83.40	111.28
Transfer price received by manufacturing division from distribution division (61 per cent of SRP)	61.00	50.83	68.41
Corporate costs charged to manufacturing and R&D (3 per cent of SRP except for Winnipeg)	(3.00)	(1.00)[3]	(3.36)
Manufacturing costs[2]	(54.00)	(47.72)	(57.09)
Manufacturing profit, before taxes	4.00	2.11	8.32
Profit ratio, before taxes	100.0	52.8	208.0

1/ Calculated from averages of Table 4.6, with Brantford as 100 or base level.

2/ Data repeated from Table 4.4.

3/ Winnipeg (Versatile) is known to have much lower corporate overhead costs and development costs than the other companies; the level of 1.00 per cent was arbitrarily selected.

of Brantford's suggested retail price. This "price", including a manufacturing "profit", is below the manufacturing costs shown for the firms producing combines at either Brantford or Moline. In fact, the Versatile "transfer price" could be raised from the 50.83 level to 52.72, to provide as large an "absolute profit" as is shown for the Brantford location and still be well below the costs shown for Brantford, 54.00 per cent, and Moline, 57.09 per cent of Brantford's suggested retail price.

Corporation Income Tax Costs

The effect of corporation income taxes on the comparative advantage of one location against another is so complex that any analysis must oversimplify the situation to the point of distorting reality. In the present study it is assumed that:

- The manufacturing profits earned by the combine plant would be taxed separately from other distribution profits of the company. (This would not be true of any farm machinery company studied.)
- The company is an independent company (not part of a multi-national corporation) whose place of business coincides with the plant's address. (Only Versatile would meet this criterion.)
- Depreciation allowances for the two tax jurisdictions would be the same.
- Profits to be taxed were for the calendar year 1968, using tax rates applicable to that period.
- There is no tax loss credit to be carried forward, no area development credit, and no credit resulting from an approved research program by which taxes would be reduced.

With these assumptions, it will be possible to develop a comparison of taxes to be paid as the result of federal, and provincial or state income taxes.

Corporation income tax rates in Canada and in the United States were each increased by a special surcharge effective in 1968. Making the reasonable assumption that the company's total profit in either country would be well over $1 million, the following rates would apply to the manufacturing profit component of total profit:

	Canada	United States
Federal taxes -	18% on first $35,000 of income, + 47% on excess over $35,000 + 3% old age security tax (equal to 21% and 50% respectively). For 1968 and 1969 an additional surtax of 3% of computed taxes was to be added:	22% on first $25,000 of income + Additional 26% on excess over $25,000 + 10% surcharge effective January 1, 1968.
	Calculation (on $1 million profit)	Calculation (on $1 million profit)

21% x $ 35,000 =	$ 7,350	22% x $ 25,000 =	$ 5,500
50% x $965,000 =	$482,500	48% x $975,000 =	$468,000
Total	$489,850	Total	$473,500
+ 3% surcharge	$ 14,696	+10% surcharge	$ 47,350
Total tax	$504,546	Total tax	$520,850
Effective rate	50.4%	Effective rate	52.1%

These rates understate the tax paid by the U.S. corporation in Canadian equivalent terms and, therefore, the difference in taxes paid by corporations between Canada and the United States. The U.S. corporation also pays other payroll taxes separately to support social security costs, equivalent in effect to the three percentage points allocated in corporate income tax to "old age security" in Canada. These "payroll taxes", however, were included in fringe benefit costs of hourly paid and salaried personnel under production costs, as were costs of similar items (e.g. workman's compensation costs) for the Canadian locations. The rates, however, may also overstate the U.S. tax paid and, therefore, the difference in taxes between the two countries by ignoring the U.S. investment tax credit (7 per cent). In view of the relatively small income shown for the U.S. location, this would probably have had negligible effect.

In the field of provincial or state taxes, however, the difference widens. The Canadian government allows a 10 per cent reduction on the taxes related to the income allocated to any province where the company does business. In practice, this means (for a company doing business in all provinces) that its tax liability is reduced by 10 per cent, and then increased by the provincial rate. Any state income tax in the United States is additional to the federal tax.

Since this study is concerned only with manufacturing, it is appropriate to assume that the manufacturing profits would be subject to the tax rates in effect in the province or state where the plant is located. For the three locations, the following rates apply:

	Brantford	Winnipeg	Moline
Provincial or state corporate income tax rate	12%	11%	Nil

Thus the 50.4 per cent tax rate in Canada is reduced by 10 per cent

to 45.4 per cent, to which the provincial income tax is added back, to give total effective rates of 50.9 per cent for Manitoba and 51.4 for Ontario.

It is now possible to determine the relative profitability of the three plant locations, on an after-tax basis.

TABLE 4.8

FEDERAL AND PROVINCIAL OR STATE INCOME TAXES AND RETAINED PROFITS AT BRANTFORD, WINNIPEG, AND MOLINE

	Brantford	Winnipeg	Moline
Manufacturing profits before taxes	3.33	9.83	.91
Tax rate	51.4%	50.9%	52.1%
Tax	(1.71)	(5.00)	(.47)
Retained manufacturing profits	1.62	4.83	.44
Retained manufacturing profit ratio	100.0	298.1	27.2

Source: Table 4.4 and text.

As shown by the relatively small change in relative profit ratios between Tables 4.4 and 4.8, corporation income taxes appear to have very little effect on locational advantages. Winnipeg's profits are still about 3.6 times those of Brantford's and Brantford's about nine times those of Moline's.

5. CONCLUSIONS: FUTURE PATTERN OF FARM MACHINERY MANUFACTURING IN NORTH AMERICA

How widely can the profit differences indicated for identical plants at the three locations be applied? How would the study's general conclusions be changed by modifications to match actual conditions? The very wide differences among the three locations shown indicate that, given identical conditions, there are significant cost differences at the three locations. A small difference might be considered the result of accident or "noise" in the data and methods used. Such wide differences, supported by reference to objectively recorded cost details, indicate that manufacturing costs are significantly higher or lower at the different locations, and that a company could exploit at least some of the advantage. While the use of "averages", "typical situations" and the like cannot represent the actual costs of any one producer, the study presents the fundamental locational cost differences facing a company manufacturing in the three places.

Application of Conclusions to Other Products

Because all of the plant locations chosen for comparison manufacture combines, product costs and outbound transportation costs were initially compared for this product. But the profit differences indicated by the analysis have more general application. The inclusion in Table 3.1 of the costs of manufacturing other farm machinery besides combines will suggest a wider application of the results. Outbound transportation costs, which affected locational decisions for a combine plant by less than .75 per cent of the suggested retail price level (Table 4.4), showed the heaviest differential in favour of Moline (62 per cent of Brantford costs) for combines (Table 4.1). For serving the North American tractor market, Moline's outbound transportation

costs were 69 per cent of Brantford's costs. Brantford's lower manufacturing costs would therefore not be as much offset by the outbound transportation cost penalty if tractors were manufactured instead of combines. (Winnipeg's very much higher transportation cost penalty for tractors is related to the total North American tractor market and would not apply to the special market for large four-wheel-drive tractors in Western Canada and the Western United States.)

Tractors -- A study on economies of scale in tractor manufacturing[1/] provides a percentage breakdown of manufacturing costs under cost headings similar to those used in this study.

The costs compare as follows:

	Costs Used in this Study (from Table 3.1)	Tractor Manufacturing Costs 2/
Materials	53.00	65.21
Labour	16.03	11.28
Overheads	30.97	23.51
	100.00	100.00

In tractor manufacturing, both labour and overhead costs have a lower impact on total product costs than in combine production.

Most of the difference, however, is caused not by a difference in overhead rates as a percentage of labour costs (the average overhead rate in the tractor manufacturing cost study is 208 per cent as opposed to 193 per cent in the data used in this study), but by the larger impact of purchased parts used in tractor manufacturing. Since materials and parts are available duty free to a Canadian farm machinery manufacturer, there would be no penalty to a Canadian farm tractor manufacturing location (apart from inbound transportation costs which were considered separately in Chapter 3). As noted in Chapter 3, there could actually be a saving because of lower costs of many basic materials such as steel used in manufacturing tractors. In Table 5.1, inbound transportation penalties of the same relative weight as were established in Table 3.3 are shown for the two Canadian locations.

1/ Royal Commission on Farm Machinery, Farm Tractor Production Costs, Study No. 2 (Ottawa: Queen's Printer, 1969).

2/ Ibid., taken from Appendix Table A49-1, 60,000-unit volume.

The same sorts of relationship among the three locations could be projected to exist for labour and overheads in manufacturing tractors as in combines, taken as the end product of the plants in this study. Thus direct labour costs (adjusted for assumed productivity) at Winnipeg would be 59.9 per cent of labour costs at Brantford, or 6.76 percentage points, and Moline's direct labour costs would be 104.2 per cent of Brantford's, or 11.75 percentage points. Overhead costs were also calculated from the differences shown in Table 3.7. Table 5.1 indicates the range of cost differences for tractor manufacturing, based on these differences.

TABLE 5.1

ESTIMATED MANUFACTURING COST DIFFERENCES FOR TRACTOR PLANTS LOCATED AT BRANTFORD, WINNIPEG, AND MOLINE

	Brantford	Winnipeg	Moline
Materials			
Purchased items	64.00	64.00	64.00
Inbound transportation	1.21	2.67	.54
Materials	65.21	66.67	64.54
Direct Labour	11.28	6.75	11.75
Overheads	23.51	18.67	27.75
Total manufacturing costs	100.00	92.09	104.04

Similar manufacturing cost relationships emerge for tractor manufacturing costs, although to a slightly lesser degree, in spite of the different weights given to the three major areas of costs. Winnipeg still enjoys the lowest total manufacturing costs, about 8 per cent below Brantford's, while Moline's are about 4 per cent above those of the Brantford area.

In connection with tractor manufacturing, however, there is a constraint in the U.S. tariff against locating a production facility in Canada. Industrial tractors derived from farm tractor designs now account for about 16 per cent of all tractors sold in the United States. These tractors provide the back-hoes and front-end loaders used on construction sites and elsewhere and are

normally produced in conjunction with farm tractor production. However, Canada and the United States accord different treatment for duty purposes to industrial tractors, thus creating an important restriction on tractor manufacturing in Canada. All tractors (other than highway tractor-trucks) coming into Canada are allowed duty-free entry; only those whose chief use is agricultural can enter the United States duty free. Others pay a duty of 11.5 per cent, which will drop to 5.5 per cent on January 1, 1972, as the result of Kennedy Round negotiations under the G.A.T.T.

Massey-Ferguson Industries Limited, in representing the comparative cost to the Commission of relocating its Detroit tractor plants in Canada, identified a penalty of $400,000[3/] a year in the absorption of duty on shipments of industrial tractors to its markets in the United States. This loss of profits was considered by the company as a serious inhibition to locating tractor manufacturing facilities in Canada.

In fact, however, the Massey-Ferguson figure of $400,000 penalty should be compared to the total cost level which could be achieved in a tractor plant located in Brantford. Assuming that the $400,000 penalty is calculated from the then existing U.S. duty rate of 11.5 per cent, it must represent industrial tractor sales from the hypothetical Canadian plant location of $3.5 million. The tractor cost study already referred to[4/] suggests that the appropriate price for the sale of the average tractor from a manufacturing to a selling division would be about $4,000 (U.S.) or $4,324 (Can.). This value is high because of the inclusion of large tractors of more than 100 HP; without them the value would be $4,060 (Can.).

Massey-Ferguson Incorporated (the U.S. subsidiary of Massey-Ferguson Limited) produced 38,800 tractors in its Detroit plant in 1966.[5/] The lower unit value for tractors shown in the previous

---

3/ Massey-Ferguson Industries Limited, Brief to the Royal Commission on Farm Machinery, Chapter IV, p. 28.

4/ Royal Commission on Farm Machinery, Farm Tractor Production Costs, Study No. 2 (Ottawa: Queen's Printer, 1969), Table 44.

5/ Royal Commission on Farm Machinery, Special Report on Prices of Tractors and Combines in Canada and Other Countries (Ottawa: Queen's Printer, December 1969), Table 2.1; Massey-Ferguson data taken from E.P. Neufeld, A Global Corporation, pp. 283-5.

paragraph would indicate that the company felt that less than 900 tractors would have been affected by duty going into the United States. If the 4 per cent manufacturing differential shown in Table 5.1 between a Brantford and Moline location is accepted, a potential cost saving of $5.5 million at the Ontario location could be achieved.[6/] Thus the duty penalty appears to be only 7.3 per cent of the potential manufacturing cost savings related to the Brantford location.

In fact, this analysis of the possible duty cost penalty on industrial tractors appears low. The output of any Canadian tractor plant would probably contain close to the North American market share of industrial tractors, about 15 per cent. If so, the duty penalty at present duty rates would be about $2.7 million, falling to $1.3 million in 1972 when the lower duty becomes effective. Thus, between half (today) and one quarter (1972) of the cost advantage of the Canadian location could be lost by the cost of the U.S. duty on non-farm tractors.

Other Products -- The application of the results of this study's analysis to products other than combines and tractors depends on two factors: the importance of labour costs in comparison to overhead costs and the effective outbound transportation penalty related to the value of the product produced. The greater the fraction of manufacturing costs taken up by labour costs, the more important management will consider low labour costs to hold down total costs. As outbound transportation costs become higher percentages of the value of a machine, the opportunity for manufacturing within a region becomes greater.

Limited available evidence indicates that certain products in the farm machinery field are less capital intensive in their production than others and that, therefore, labour costs are a more important component to them of total costs. If one ranks the products of farm machinery plants in order of sophistication

---

6/ Calculated as follows:

$$\frac{4\%}{104\%} \times \$3,688 \times 38,800 \text{ units} = \$5,502 \text{ million}$$

The $3,688 (Can.) is the estimated production cost for the average tractor produced (including the high, more than 100 HP units) at the 60,000-unit volume level, as shown in Table 6.3, Special Report on Prices, op. cit.

of manufacturing technology, the tractor stands at the head of the list and simple cultivating equipment, such as a chisel plow, at the bottom. Combines require less sophisticated technologies to manufacture than tractors (providing, as is the case with all combine plants in the world, the engine is not built in the combine plant, but bought outside or obtained from a sister plant); and some of these technologies are relatively less able to be made automatically repetitive. Swathers might be considered one further step down in capital intensity. More of the swather consists of simple welding and assembly than either the tractor or the combine. Finally, except for the chisel plow "teeth" themselves, or the disks of a disker, the technologies used to produce a chisel plow or a disker are fundamentally not dissimilar from those of any small, custom metal-working shop. A power hacksaw is needed to cut the frame from square tubing; some set of jigs is required to hold the frame together while it is being welded; and the assembling to it of components, largely purchased rather than made, completes one of these simpler products.

The effect of outbound transportation costs on these other types of products must be deduced from somewhat limited information. The study on outbound transportation costs by Kates, Peat, Marwick & Company[7/] analysed the transportation costs of two other products as well as tractors and combines: hay-balers and tandem wheel-type disk harrows. Its conclusions were that, for the whole North American market, both Brantford and Winnipeg were at a relatively greater disadvantage in relation to Moline than they were for combines or tractors (Table 4.2). Transportation penalties over Moline shipping costs as a percentage of average net wholesale prices of the four machine types are shown below:

	Brantford	Winnipeg
Wheeled tractor	0.7	1.0
Combine	0.9	0.7
Baler	1.0	0.8
Disk harrow	1.4	1.9

For hay-balers, the only area into which Brantford could ship most cheaply of the three locations was Ontario and Quebec. It accounted for less than 8 per cent of the North American market,

---

7/ Included as Appendix D to this study.

while Winnipeg was at an advantage only in the Prairie Provinces, representing about 10.5 per cent of the total market. These figures may, however, understate an advantage in areas immediately south of the U.S. border which can be reached by truck.

In conclusion, therefore, it can be suggested that both Canadian locations would have some advantage in manufacturing the less sophisticated, more labour-intensive implements for local use, Winnipeg, however, much more than Brantford because of its much lower labour rates. Outbound transportation penalties for these types of implements would be more serious than for combines, because outbound transportation costs represent a higher proportion of wholesale price, and the penalties would tend to make the machines non-competitive or force a lower factory price over the whole potential market. Brantford would be more seriously hurt than Winnipeg, because its labour costs on which any advantage would be based are so much higher.

How Specific Data Might Modify Conclusions

The conclusions reached in the previous chapter on the relative profitability of three North American locations for the manufacture of farm machinery are intended to be valid, of course, only under the particular, and artificial conditions imposed by this study.

As noted earlier, the three locations were considered to have identical plants, producing the same product (combines), using the same technologies, and producing the same mix of models at the same volumes. Thus only the input costs were allowed to vary for the same array of input factors. If the same mix of the same products was being built, it was initially assumed that the selling prices of the product would be the same, although this assumption was modified in Chapter 4 to show how companies manufacturing at the three locations offered substantially similar products at different price levels.

How would real world data modify the conclusions reached?

Volume -- Economies of Scale -- The five companies manufacturing combines at the three locations noted do so at very different volumes as shown on the following table:

TABLE 5.2

COMPARATIVE 1965 COMBINE MANUFACTURING VOLUMES

	Brantford	Winnipeg	Moline
Cockshutt	4,000		
Deere			13,500
Massey-Ferguson	9,600		
International Harvester	500[1/]		9,500
Versatile		500	

1/ Hamilton.

Source: Royal Commission on Farm Machinery, Special Report on Prices of Tractors and Combines in Canada and Other Countries. (Ottawa: Queen's Printer, December 1969), Table 2.7.

Combines are therefore being produced at four different volume ranges -- 500, 4,000, 9,500-9,600, and 13,500, roughly in the ratios of 1 to 10 to 20 to 30. Given this range of production volumes, one must expect a very large difference in costs to result, probably more than enough to override any cost difference resulting from location alone.

More Complex Product Mix -- Few of the plants produce just combines. The two Moline plants are specialized, and both Brantford plants have only combines as their outputs. As noted in Chapter 2, however, the cost data used from Massey-Ferguson Industries, Limited, covered not only its Brantford combine plant, but also its other works in Ontario. Moreover, the "Ontario" costs used to represent the Brantford location were a composite of the two companies manufacturing combines at Brantford, plus the costs of the Welland works of John Deere Limited and the Hamilton works of International Harvester of Canada Limited. Thus the basic cost data represent more a mixture of products than combines, and their application to other areas such as Winnipeg, where Versatile makes a product mix of sprayers, swathers, combines, and more recently large tractors, must over-simplify the real situation.

Manufacturing Technologies are Different -- Given the different ages of the various plants, different production volumes, and different product mixes, the technologies used to produce the combines will surely be different at the different locations. Thus another major variable will exist which this study ignores in order to concentrate on the differences which are purely the result of location.

Existing Markets and Plant Locations

The Commission had a series of maps of North America prepared, showing the regional distribution of three farm machines -- the tractor, the combine, and the baler -- in Canada and the United States.[8/] On these density maps, plotted by counties and census districts, major company locations responsible for manufacturing the particular products are superimposed. It is thus possible to see the location and size of the market for a type of machine against its manufacturing locations.

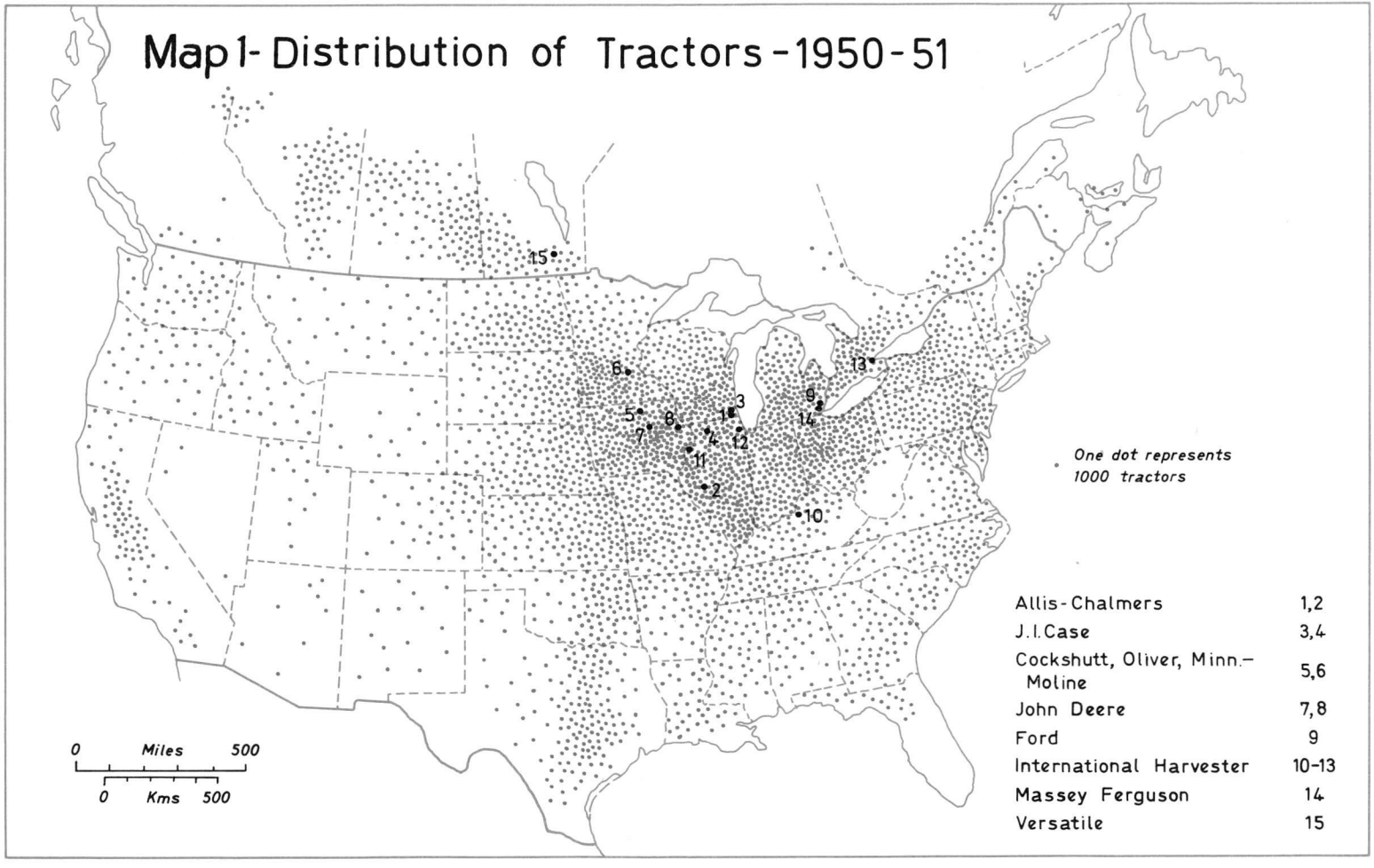
Tractors are shown for two time periods, on pages 74 and 75, the early fifties and mid-sixties.

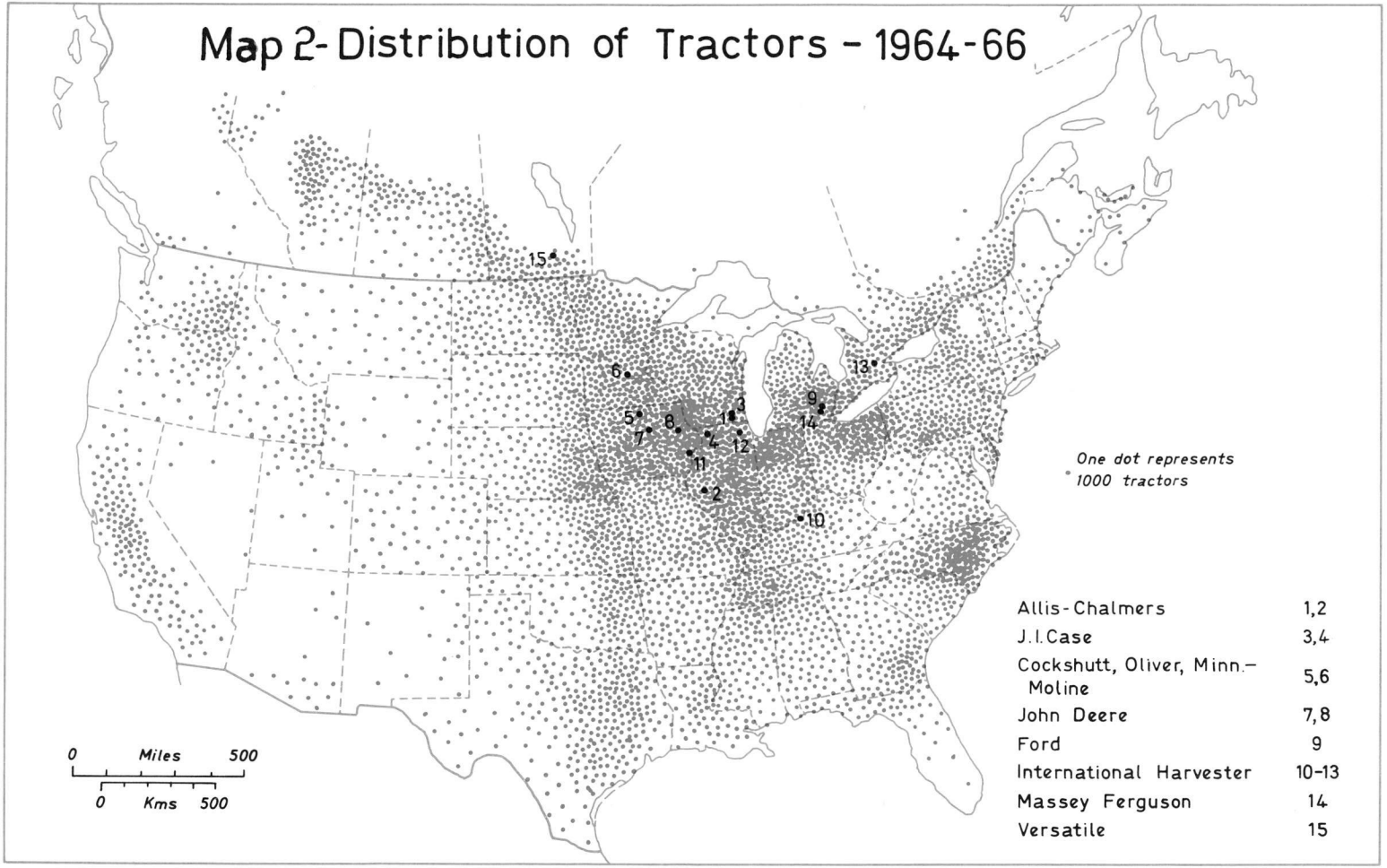
The same scale is used for the two maps, each dot representing 1,000 tractors. The heavy increase in number of tractors in both countries in the 15 years is first of all apparent. It is apparent also that the heaviest band of use runs east and west through the Corn Belt states south of the Great Lakes and north and south along the Mississippi. Heaviest areas of growth are in the areas that had a relatively heavy tractor population in the earlier period.

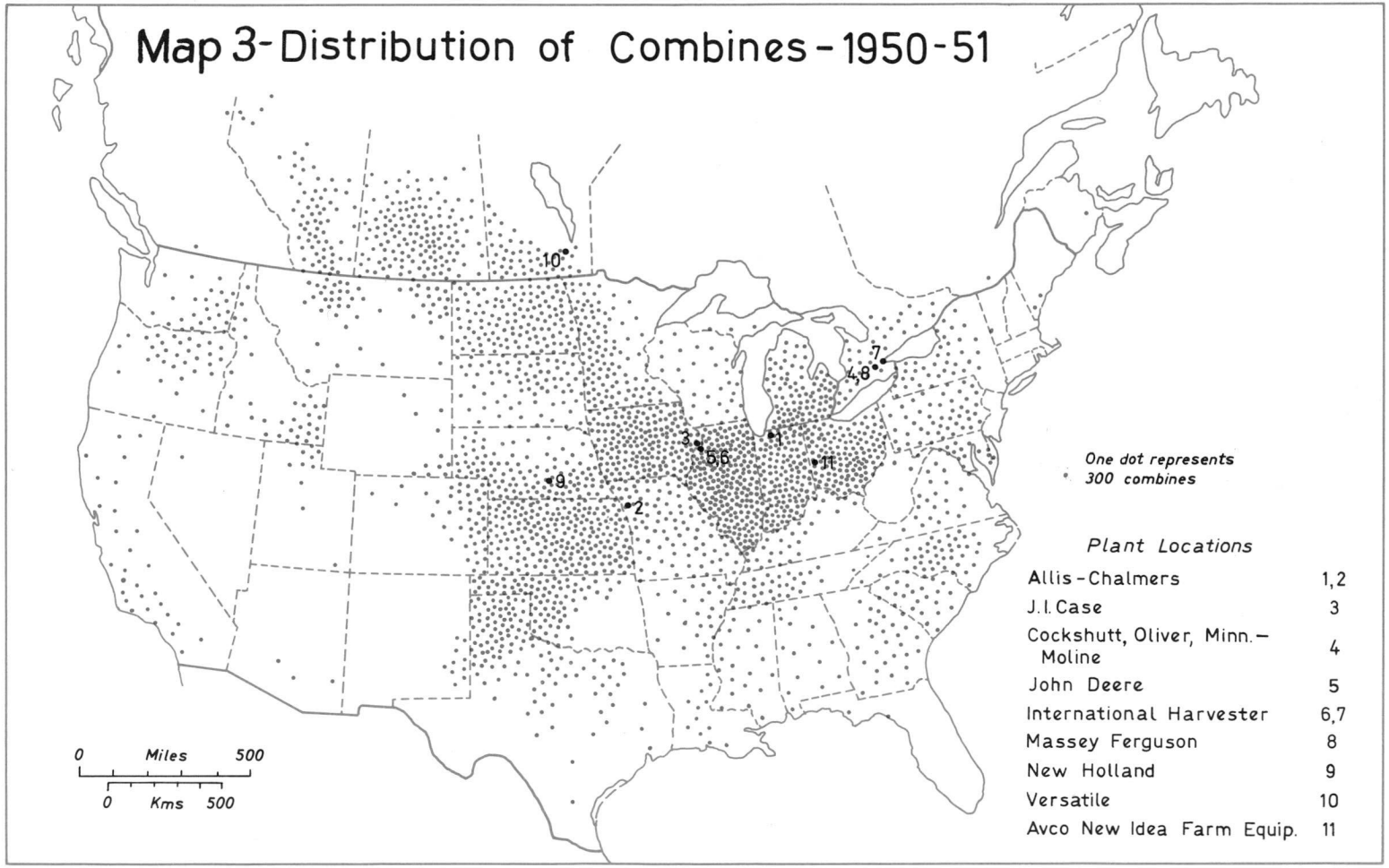
Canadian tractor density is greatest in southwestern Ontario, but it is about as dense in the Prairie Provinces as in adjacent areas of the U.S. western states. Canada's low percentage of the total number of tractors in North America is clearly evident.

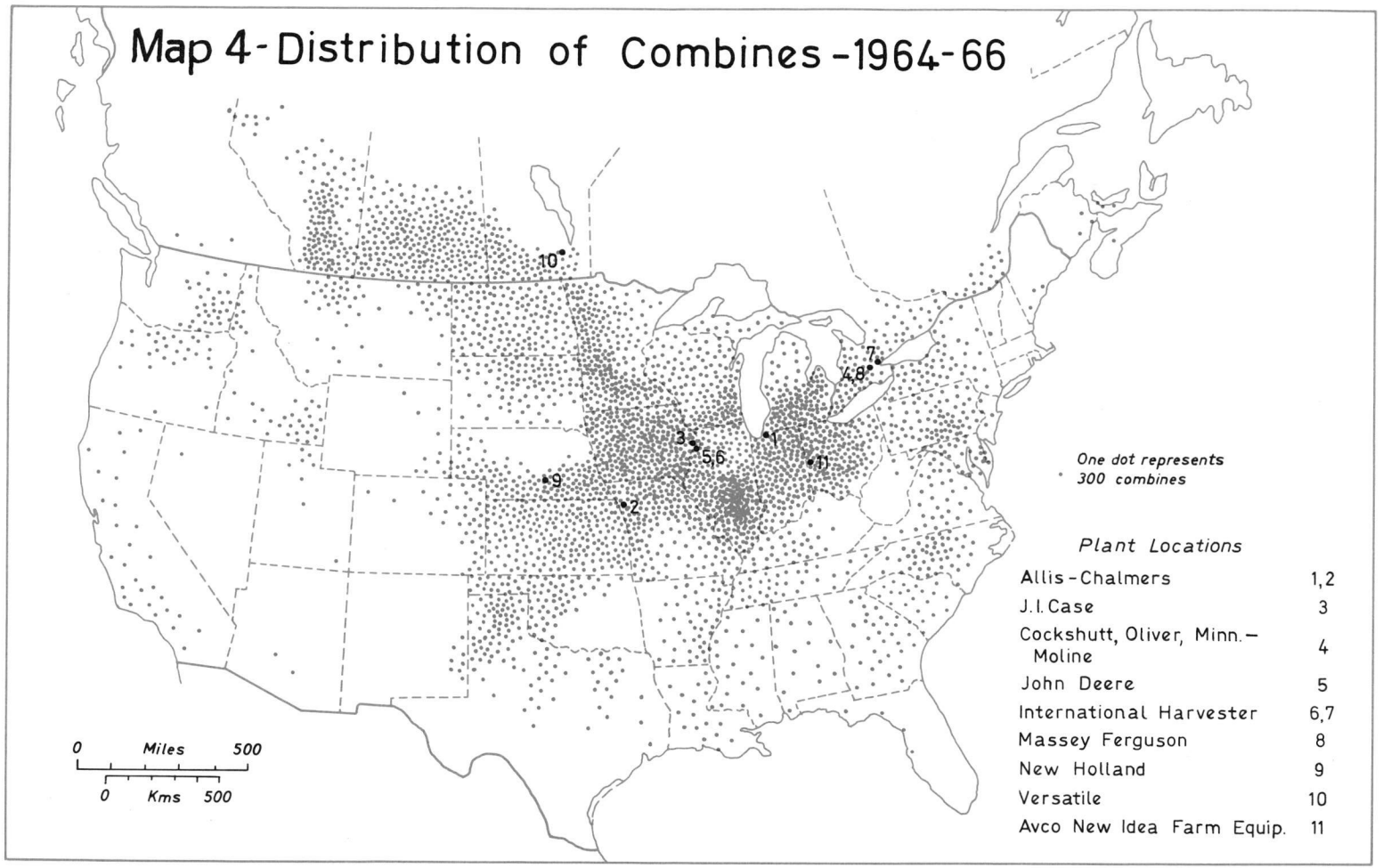
All the tractor manufacturing plants are in or adjacent to areas of high density. International Harvester's plants in Louisville, Kentucky, and Hamilton (where a small crawler tractor is produced) are the only ones belonging to a major producer which are not in the high density area. Versatile's plant in Winnipeg is the only new tractor plant established since 1950, and it is, of course, producing a specialized high-horsepower, four-wheel-drive tractor, particularly adapted for western conditions on both sides of the border.

8/ Prepared for the Royal Commission on Farm Machinery by Professor Duncan M. Anderson and Professor D.R.F. Taylor of the Geography Department of Carleton University, Ottawa. Data taken from analysis of Census of Canada, Agriculture, 1951 and 1966 and United States Census of Agriculture, 1949 and 1964.


Map 1- Distribution of Tractors - 1950-51
One dot represents 1000 tractors
0 Miles 500
0 Kms 500
Allis-Chalmers 1,2
J.I.Case 3,4
Cockshutt, Oliver, Minn.–Moline 5,6
John Deere 7,8
Ford 9
International Harvester 10-13
Massey Ferguson 14
Versatile 15


Map 2- Distribution of Tractors - 1964-66
One dot represents 1000 tractors
Allis-Chalmers 1,2
J.I.Case 3,4
Cockshutt, Oliver, Minn.–Moline 5,6
John Deere 7,8
Ford 9
International Harvester 10–13
Massey Ferguson 14
Versatile 15
0 Miles 500
0 Kms 500


Map 3- Distribution of Combines - 1950-51
10
7
4,8
3
5,6
1
11
9
2
One dot represents
300 combines
Plant Locations
Allis-Chalmers 1,2
J.I. Case 3
Cockshutt, Oliver, Minn.–Moline 4
John Deere 5
International Harvester 6,7
Massey Ferguson 8
New Holland 9
Versatile 10
Avco New Idea Farm Equip. 11
0 Miles 500
0 Kms 500


Map 4 - Distribution of Combines - 1964-66
10
7
4,8
3
5,6
1
11
9
2
One dot represents
300 combines
Plant Locations
Allis-Chalmers 1,2
J.I. Case 3
Cockshutt, Oliver, Minn.–Moline 4
John Deere 5
International Harvester 6,7
Massey Ferguson 8
New Holland 9
Versatile 10
Avco New Idea Farm Equip. 11
0 Miles 500
0 Kms 500

Most tractor manufacturing locations appear to be close to areas of the United States specializing in metalworking technology. The availability of these resources may therefore be as important as the markets for the machines in deciding plant location.

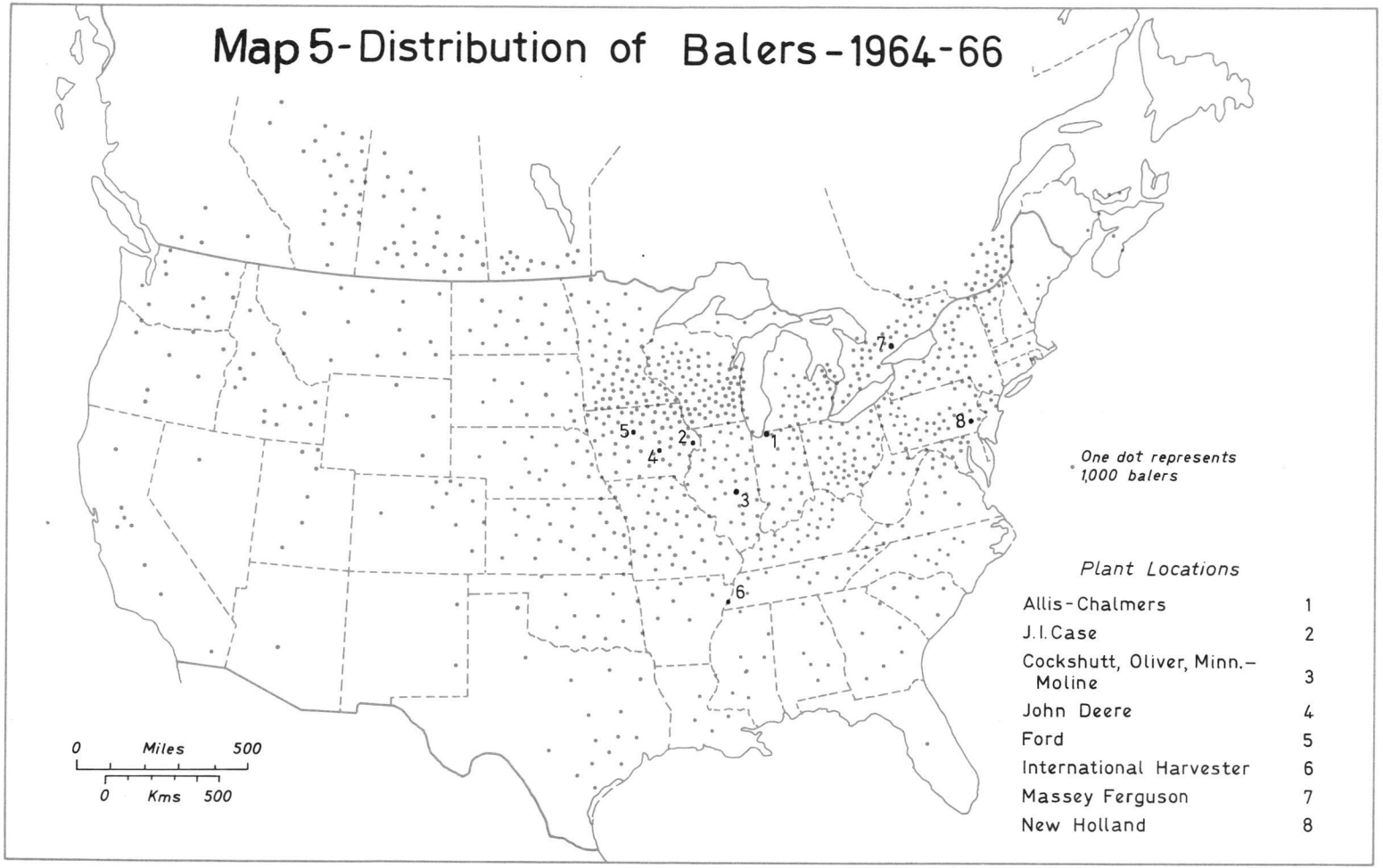
The two combine maps, on pages 76 and 77, show a similar pattern of growth. The importance of the Corn Belt is again evident, but the Canadian West appears relatively more important than in the tractor maps.

Combine manufacturing shows up as relatively much more dispersed in relation to the concentration of the markets than tractor manufacturing. Two new plant locations may be identified: Versatile at Winnipeg, New Holland at Grand Island, Nebraska. Massey-Ferguson's combine plant shifted in the period between the maps from Toronto to Brantford and International Harvester began to manufacture combines at Hamilton, Ontario. Grand Island, Nebraska, is as far from the Corn Belt as Brantford in Western Ontario. Winnipeg is close to the wheat-producing areas of both countries.

The final map shows the distribution of balers -- the most widely dispersed, both in terms of market and plants, of the three products analysed. (Only one year is shown because data for the earlier period were not available.) The eight plant locations range from Pennsylvania in the East, Ontario in the North, Tennessee in the South, and Iowa in the West. Widely dispersed plants are serving very large market areas.

To sum up the description of the five maps, it is evident that while many farm machinery companies are located close to the markets for their machines, some are not, and have survived. Some have not survived, or have been in difficulty, in spite of locational advantages. For tractors, particularly, the presence of other technologies such as casting, forging, machining and stamping, may be more important than location close to the market.

It is clear, however, that the concentration of farm machinery manufacturing in the U.S. mid-west states can be related visually to the density of the market for farm machinery in this area. The geographical advantage of Winnipeg as a farm machinery manufacturing location servicing the western wheat-growing areas of the continent is also indicated.


Map 5- Distribution of Balers - 1964-66
One dot represents 1,000 balers
Plant Locations
Allis-Chalmers 1
J.I. Case 2
Cockshutt, Oliver, Minn.– Moline 3
John Deere 4
Ford 5
International Harvester 6
Massey Ferguson 7
New Holland 8
0 Miles 500
0 Kms 500

Killbery Industries Ltd. is an interesting example of how the large farm machinery companies take advantage of low manufacturing costs at Winnipeg to have Killbery manufacture products which they sell. Killbery makes several competitive brands of swathers, for example. The large companies whose names they bear must enjoy some of the economies of scale of the longer production runs created by their pooled production as well as the lower costs of Winnipeg. Agristeel at Minnedosa, Manitoba, makes cultivating equipment on a custom basis, giving the brand names its products bear the advantage of Manitoba cost levels.

Similarly, locations in the other Prairie Provinces appear to offer short-line manufacturers the opportunity at once to capitalize on the unique product needs of the area while using the lower cost labour available there. Morris Rod Weeder of Yorkton, Saskatchewan, McCoy-Renn Limited and Robin Nodwell Limited, both of Calgary, Alberta, and Golden Arrow Manufacturing of Calgary, Alberta, are all successful specialty manufacturers.

In Quebec, Dion Frères Inc. has specialized in forage harvesting and handling equipment while in New Brunswick, Thomas Equipment Ltd., has pioneered a special type of potato harvester with the ability to discriminate between stones and potatoes. Given the New Brunswick type of soil, such a development was essential to allow the use of harvesters for potatoes.

Effect of Possible Wage Parity on Ontario Costs

The most recent wage negotiations in the Canadian farm machinery industries (1967) involved claims by unions for wage parity between Canadian and United States plants.[9/] What would wage parity for Ontario plants have done to the relative positions of the three locations studied?

9/ Defined, by company and union, as the same Canadian dollar wage rate as in the United States plants of the company (ignoring the effect of currency exchange); described as "domestic currency parity" in Haviland study, W.E. Haviland, N.S. Takacsy, E.M. Cape, "Trade Liberalization and the Canadian Pulp and Paper Industry", published for the Private Planning Association of Canada, Toronto: University of Toronto Press, 1968, p. 67.

The following Table 5.3 adjusts the "Brantford" wage and salary rates shown on Table 3.4 to provide for parity as defined above between Brantford and Moline. Salaried and indirect labour is included as well because it may be expected to receive the benefits of a settlement either directly from collective bargaining, or indirectly. The adjustments are based on the Canadian dollar continuing at .925 in relation to the U.S. dollar and represent the U.S. wage and salary amounts multiplied by this factor.

Wage and salary parity would increase earlier "Brantford" costs (used to represent an Ontario position) by about 4 per cent. These costs would, however, still be below the costs of manufacturing at Moline. If Moline costs were 5 per cent above Ontario costs without parity in 1966, they would still be more than 1 per cent above with parity, as defined by the company and the union. If it were assumed that a move to parity wages would be accompanied by a move to increase productivity in Ontario plants to Moline levels (initially taken in this study as lower than Moline levels), Moline's costs would be close to 2 per cent above Ontario's.

While the data used in developing and adjusting costs for this study are basically estimates only, their results appear firm enough to state that Ontario manufacturing costs would not rise above the industry level, even if wage parity were in effect.

In this case, the price of the end product would not necessarily have been affected, the Ontario-based companies simply accepting a lower profit level. Table 5.4 shows that, after wage parity, costs in an Ontario location would have increased from the 54.00 level shown on Table 4.3 to 56.34, on the assumption that a productivity differential would continue. While this cost level is still below that shown for Moline, 56.93, it is enough to reduce the Ontario plant's profit to .99 (in terms of the original suggested retail price as 100). The absorption of the outbound freight penalty of .67 for an Ontario location now practically wipes out its remaining cost advantages.

Table 5.4 assumes that a productivity differential will continue and that combines built at different locations have the same selling price. Winnipeg's profits are now nine times those of the Ontario location and Moline's almost equal to them.

TABLE 5.3

COMPARABLE PRODUCTION COSTS OF ONTARIO FARM MACHINERY PLANT
"BEFORE" AND "AFTER" WAGE "PARITY" WITH MOLINE PLANT

	Ontario Plant		Moline Plant	Differential Ontario Costs Better/(Worse) than Moline	
	"Before" Cost (Table 3.4)	"After" Parity Cost Adjustments	(No Change from Table 3.6)	Before "Parity"	After "Parity"
Materials	53.00	53.00	52.46	(.54)	(.54)
Direct Labour					
Wage costs	12.11	12.77[1/]	13.81	1.70	1.04
Fringe benefits	3.92	4.14[2/]	4.23	.31	.09
Total labour	16.03	16.91	18.04	2.01	1.13
+ Productivity factor	1.00	1.00[3/]	1.08	(1.34)[5/]	(1.32)[5/]
Adjusted total	16.03	16.91	16.70	.67	(.21)
Overheads					
Salaries (incl. fringes)	6.88	8.81[4/]	9.36	2.48	.55
Indirect labour (incl. fringes)	7.52	9.02[4/]	9.63	2.11	.61
Other	16.57	16.57	17.56	.99	.99
Total overheads	30.97	34.40	36.55	5.58	2.15
Total production costs	100.00	104.31	105.71	5.71	1.40
Taking Ontario costs after "parity" as 100		100.00	101.34		1.34

TABLE 5.3 (*Continued*)

1/ At .925 of U.S. rate, equalling MF definition of parity.

2/ Fringe benefit costs increased proportionally to wage rate increase.

3/ Assumed lower productivity than in the United States was retained. If the move to parity had been accompanied by parity in productivity, Canadian direct labour cost would actually have gone down to 15.65 (16.91 ÷ 1.08). Total costs after parity would then show as 103.05, leaving Moline's costs as 102.30 of Ontario's as 100.00.

4/ Table C.3A data adjusted to

	Ontario		Moline
	1966	(Parity)	
Indirect labour wage rate	$ 2.70	$ 3.24 ($3.50 x .925)	$ 3.50
Fringe benefit (increased proportionally with wage increase)	.87	1.05	1.07
Total	$ 3.57	$ 4.29	$ 4.57
	100.00	120.16 (120)	128.01 (128)
Salaried employees salary	$ 81.06	$103.57 ($111.97 x .925)	$111.97
Fringe benefit (increased proportionally with salary increase)	26.26	33.56	34.15
Total	$107.32	$137.13	$146.12
	100.00	127.78 (128)	136.15 (136)

5/ Derived number, difference between Differential for "total labour" and "adjusted total".

TABLE 5.4

RELATIVE COSTS AND PROFITS, BRANTFORD, WINNIPEG, AND MOLINE, ASSUMING WAGE PARITY FOR ONTARIO PLANTS, 1966 LEVELS FOR OTHER WAGES AND COSTS

	Brantford	Winnipeg	Moline
Suggested retail price	100.00	100.00	100.00
Transfer price received, net of transportation penalty, by manufacturing division from distribution division	60.33 [1]	60.55 [1]	61.00 [1]
Corporate costs charged to manufacturing, and R&D	(3.00)	(3.00)	(3.00)
Manufacturing costs	(56.34) [2]	(47.72) [3]	(57.09) [3]
Manufacturing profit/ (loss) before taxes	.99	9.83	.91
Profit ratio, before taxes	100.00	992.9	91.9

1/ Taken from Table 4.4.

2/ $\frac{100.00 \text{ (Table 5.1)}}{101.34 \text{ (Table 5.1)}} \times 57.09.$

3/ Taken from Table 4.4.

If the new Ontario costs are related, however, to the real average combine prices shown on Table 4.6, the situation changes to that shown in Table 5.5. An Ontario location would still be earning a manufacturing profit, but only one fifth of what could be earned by a Moline location. These "profit" differences, related to the price levels attainable by the companies concerned, are not, however, related to locational advantages but to some form of differential price advantage among the companies.

TABLE 5.5

COMPARATIVE PRICES, COSTS AND PROFITABILITY BEFORE TAXES OF ONTARIO COMBINE PLANT AND PLANT IN MOLINE, ASSUMING WAGE PARITY (1966 LEVEL) BETWEEN TWO LOCATIONS

	Brantford	Moline
Actual suggested retail price[1/]	100.00	112.15
Transfer price received by manufacturing division from distribution division (61% of SRP)[1/]	61.00	68.41
Corporate costs charged to manufacturing and R&D (3% of SRP)[1/]	(3.00)	(3.00)
Manufacturing costs[2/]	(56.34)	(57.09)
Manufacturing profit, before taxes	1.66	8.32
Profit ratio, before taxes	100.00	501.2

1/ Taken from Table 4.7.

2/ Taken from Table 5.4.

If wage parity were accepted, could the costs have been passed on in the form of higher prices to the customer? Would this have destroyed the Ontario companies' competitive positions? The data shown on tables 4.5 and 4.6 indicated that the 1968 prices of combines manufactured in Ontario were significantly below those of combines manufactured in Moline in the United States. Were they enough lower that they could have been raised by the relatively small amount needed to recover the cost of such a wage settlement? Would the physical performances of the different makes shown be sufficiently similar to allow such a price increase on the part of the Ontario combine manufacturers? Other competitive factors besides performance must, of course, also affect pricing decisions. The question therefore cannot be answered, because objective performance data and knowledge of company pricing policies are lacking.

Any move to wage parity in Ontario farm machinery plants, however, would further enhance the position of Winnipeg manufacturers. As long as Winnipeg's labour costs remain so much lower than those of other North American farm machinery manufacturing centres, any increase in the costs of Ontario plants would further widen their cost disadvantage.

Future Pattern of Manufacturing in North America

Manufacturing location decisions are never taken in a vacuum governed by purely abstract economic factors relating to the advantages of one location over another. Along with these factors, the existing situation has always to be considered. A company has certain production facilities already set up in certain locations and the lowest-cost, highest-profit decision for each company must be based on an analysis of abstract economic factors in the light of what facilities already are in place. It may make more sense to continue production in a less desirable location than one would choose if one were starting from scratch, because it uses existing land, buildings, machinery, and personnel. The community pressures on a company not to pull up its production facilities and move elsewhere cannot be ignored. Finally, the sheer resistance to change of a large corporation, pressing it to continue on the same course in the same place, are significant.

Particular situations are the result of unique circumstances, of historical accidents in many cases. As an example of the difference between the way decisions can be arrived at in the real world and in a hypothetical situation, consider the location of Deere & Company's headquarters and main manufacturing operations in the United States. Moline is supposed to have been selected in the 19th Century by the company's founder, a blacksmith turned plowmaker, because it had the water supply needed for his expanding business. That this location turned out to be ideally located for the large market currently represented by the Corn Belt was a form of serendipity which he could not have anticipated. Much of the success of Deere & Company probably came from being in a location ideally related to the largest market for farm machinery in North America. If the company had started operations elsewhere - say North Carolina - it might have had to move to end up near Moline (somewhere in the Corn Belt) or disappear.

Major new location decisions, such as the location of Versatile at Winnipeg, tend to be rare and the result of a new entrant to an

industry, rather than an action by an existing producer. In this light, the inclusion by Massey-Ferguson Industries Limited, of an item for plant relocation costs in its presentations to the Commission of comparative costs for tractor and combine manufacturing at different potential locations may be realistic (because these costs would be faced by any existing member of the industry which decided to move), although they are not properly part of any abstract analysis of the comparative advantage today of locating a new plant for a new company in one place rather than another.

In conclusion, then, Ontario is a lower-cost manufacturing location than the Moline area. It has the advantages of good labour supply and supporting manufacturing companies. Nothing revealed in this study would indicate that it should not continue to be an important source of farm machinery, at least from existing plants. Its manufacturing costs appear to be enough lower than those in the United States to give it a small but significant cost advantage.

Even if existing labour rates in the Winnipeg area were not attainable by any of the large manufacturing companies, it appears ideally situated as a centre to provide farm machinery to the wheat-growing areas of both Canada and the United States. Its low manufacturing costs, based on low labour costs, and the fact that it suffers from no outbound transportation penalty to the wheat-growing areas of North America make it highly competitive. The existence there of a number of other plants besides Versatile's -- Killbery Industries Ltd., Malmgren Manufacturing (1962) Ltd., and Canadian Co-operative Implements Limited -- reinforce this hypothesis.

Summary of Locational Advantages and Disadvantages

The following tabulation of items summarizes the relative advantages and disadvantages of the Canadian locations over the plants in Moline, Ill.

ADVANTAGES

Lower labour costs exist in Brantford and much lower labour costs at Winnipeg, but Winnipeg costs are probably not attainable by companies already having large, unionized plants elsewhere in either country. Winnipeg, however, is the natural site for new companies, and for companies manufacturing specialty items marketed by name-brand farm machinery companies.

Overhead Costs are shown as slightly lower in Canada, largely because of their content of labour, but also because of lower costs of items such as electricity.

DISADVANTAGES

Production machinery imported from abroad of a dutiable nature must be used exclusively for the production of farm machinery and farm machinery parts to be duty free.

Inbound transportation costs are higher for both Canadian locations, and much higher for Winnipeg; penalties, however, are small percentages of total cost.

Outbound transportation costs are higher from both Canadian locations, although the wheat-belt area of North America can be better served from Winnipeg than from Moline, Brantford being the most expensive location to serve this particular segment of the farm machinery market. As farm machinery becomes more expensive per pound, the impact of outbound freight on a company's competitive position becomes less serious.

Duty on non-farm tractors and certain farm machinery parts entering the United States adds to costs of Canadian tractor manufacturer (estimated at $400,000 by Massey-Ferguson Industries Limited) and could make rationalization of production between two plants of same company more difficult.

NEUTRAL ITEMS

Material costs will be as low as, and, in the case of steel, will be lower than, costs in the United States. If related products were being produced in the same plant, however, in Canada, which were not entitled to the exemption from duty, over-all material costs could be higher.

Capital for large companies is North American in orientation; for smaller Canadian companies it could be a problem.

Other things being equal (such as volume of production, design of product, mix of models produced, technology used, age of plant, and the like) a Brantford farm machinery plant manufacturing combines has significantly lower costs than one in Moline, but both have much higher costs than a plant in Winnipeg. These lower costs at Winnipeg are almost entirely the result of lower labour costs in this location. While these labour cost differences in favour of Winnipeg do exist today, it is unlikely that they would be attainable by any one of the large farm machinery manufacturers -- the Big Three (Massey-Ferguson, Deere, or International Harvester) -- if they were to locate a plant there. Their unions in other locations might be expected to resist the erosion of their positions by lower cost labour in Winnipeg if this were being undertaken to any significant degree.

APPENDIX A

BREAKDOWN OF MANUFACTURING COSTS IN FARM MACHINERY INDUSTRY IN ONTARIO

The breakdown of manufacturing costs used in this study was obtained from the analysis of the data received in response to a detailed financial questionnaire[1/] sent to all major and some smaller companies making or selling farm machinery in Canada. Table A.1 summarizes the percentage breakdown between the three main cost factors of materials, direct labour and overheads from 1962 to 1966 inclusive for the four companies manufacturing in Ontario, Massey-Ferguson Industries Limited, International Harvester Company of Canada, Limited, John Deere Limited, and Cockshutt Farm Equipment of Canada Limited.

Table A.1 shows both the average levels of cost for the factors of materials, direct labour and overheads and the range of these factors among the four Ontario companies. The comparatively wide cost range exhibited within each factor is significant, direct labour costs amount, for example, to 86 per cent more for the company showing this cost factor at the highest level among the four than for the company with this factor at the lowest level. If one looks at total labour costs, direct and indirect, however, an increase in direct labour is accompanied by a decrease in indirect labour (shown as part of overheads). In other words, some degree of accounting trade-off appears to exist between the two. Where such differences in factor relative

---

1/ The General and Financial Information Questionnaire is reproduced as Appendix A and the data received discussed more fully in the study by D. Martinusen and B. Barry, Revenues, Costs and Profits in the Farm Machinery Industry, Royal Commission on Farm Machinery, to be published, (Ottawa: Queen's Printer, 1970).

TABLE A.1

PERCENTAGE OF MANUFACTURING COSTS, REPRESENTED BY MATERIALS, DIRECT LABOUR, AND OVERHEADS, 1962-66

Four Ontario Farm Machinery Companies

	1962	1963	1964	1965	1966 As Reported	1966 As Adjusted[1/]	Four-Year[2/] Average (as reported) (1963-66)
Materials							
Highest %[3/]	56.7	61.5	68.0	70.9	63.8	63.8	
Lowest %[3/]	19.2[5/]	48.7	48.4	50.4	49.8	49.6	
Average	48.4	51.7	52.4	53.7	53.0	53.0	52.7
Direct Labour							
Highest %[4/]	12.1	12.4	12.4	11.9	15.1	15.1	
Lowest %[4/]	6.9	7.0	6.9	5.9	6.2	6.2	
Average	11.6	11.3	11.1	10.6	11.7	12.1	11.2
Overheads							
Highest %[3/]	71.5[5/]	38.9	39.2	37.9	38.9	38.3	
Lowest %[3/]	36.4	30.8	24.0	21.1	26.6	26.6	
Average	40.0	37.0	36.5	36.7	35.3	34.9	36.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

1/ 1966 data are adjusted to move Cost of Living Bonus figures for one company (shown in its system of accounts as part of "fringe benefits") to direct (and indirect) labour.
2/ Five-year average would be distorted by untypical 1962 data; hence four-year averages used.
3/ The same companies are not consistently in the same relative position.
4/ The same company is consistently in the same relative position.
5/ "Out-of-pattern" percentages represent unusual position of particular companies.

Source: Data received by Royal Commission on Farm Machinery from company answers to "General and Financial Information Questionnaire" (see text). "Highest" and "lowest" percentages shown cannot be totalled in any combination to reveal data on any particular company.

weights are real, however, they would create a major difference in the impact of a factor cost change, such as a wage increase, or change in labour productivity.

For the purposes of this study, the average position of the four companies for 1966 is used, adjusted as noted in Footnote 1 to Table A.1, to place the fourth company on the same accounting basis as the other three. The unadjusted 1966 breakdown is very close to the unadjusted four-year average for each factor, slightly above for materials and direct labour and slightly below for overheads. After the adjustment noted, of course, the differences became somewhat greater.

Table A.2 carries the breakdown of 1966 manufacturing costs one step further, in that it uses the detailed data on manufacturing overheads from the financial questionnaires of these four Ontario companies to establish a reasonable weight distribution basis for many of the detail cost factors gathered by conventional accounting methods in this cost area. These detailed cost factors, each small in itself, account altogether for close to one third of total manufacturing costs in the four manufacturing companies. In order to appreciate what would happen to manufacturing costs in different locations as the result of differences in overhead costs it is essential to establish the relative weights of these detail cost factors. The use of two decimal places in this table is not intended to indicate a specious level of precision, but to make visible individual cost factors for analysis. If lumped together into larger groupings, then different costs at different locations could not be shown.

The fourth column of Table A.2 divides the cost of materials between the cost of inbound freight and the purchase order price paid for the parts and materials used by the four Ontario-based manufacturing companies. The brief of the largest of the four companies, Massey-Ferguson Industries Limited, to the Commission gave the inbound transportation costs associated with the costs of materials and parts used in its four Ontario plants.[2/] These costs are repeated in Table A.3, following Table A.2, the conclusions of which are used to divide the amount shown in column (1) of

---

2/ Massey-Ferguson Industries Limited, Brief to the Royal Commission on Farm Machinery, Chapter VII, p. 37.

TABLE A.2

1966 MANUFACTURING COSTS INCURRED BY MAJOR FACTORS

Four Ontario Farm Machinery Companies

Cost Factor	Unadjusted Data from Financial Questionnaire			Adjusted to Show "Inbound Freight" and "Fringe Benefits on Direct Labour"
	Average (1)	Range High (2)	Range Low (3)	(4)
Materials				
Purchased items)				52.02
)	combined	combined	combined	
Inbound transportation)				.98
Materials	53.00	63.77	49.75	53.00
Direct Labour				
Wage costs	12.11	17.74	6.15	12.11
Fringe benefits	in over-heads	in over-heads	in over-heads	3.92
Direct labour	---	---	---	16.03
Overheads				
Salaries	5.20	7.23	4.02	6.88
Indirect labour	5.68	10.72	3.68	7.52
Fringe benefits	7.44	8.81	5.31	-
Operating supplies	1.08	1.25	.66	1.08
Expense tools	.70	.78	.36	.70
Power, light, heat, etc.	1.09	1.35	.64	1.09
Maintenance	3.11	3.64	.67	3.11
Defective work and scrap	.63	.75	.23	.63
Depreciation	2.28	2.61	1.42	2.28
Insurance	.06	.09	.02	.06
Property taxes	.84	1.08	.50	.84
Production tooling	1.49	2.38	1.61	1.49
Obsolescence, warranty	1.49	2.38	.36	1.49
Warehousing and freight	1.82	3.06	.85	1.82
Administration	1.36	2.14	.33	1.36
Other	.62	3.16	.12	.62
Overheads	34.89	38.91	26.59	30.97
Total	100.00			100.00

	Total %	Direct Labour %	Indirect Labour %	Salaried Employment %
Memo:				
Fringe benefits	7.44	3.92	1.84	1.68
Wages and salaries	22.99	12.11	5.68	5.20
	30.43	16.03	7.52	6.88

TABLE A.3

MASSEY-FERGUSON INDUSTRIES LIMITED INBOUND TRANSPORTATION COSTS RELATED TO PURCHASE ORDER COSTS

Fiscal year 1964 (November 1, 1963 - October 31, 1964)

	Ontario Factory				
	Toronto Works (Toronto)	North American Combine Plant (Brantford)	Verity Works (Woodstock)	"M" Foundry (Brantford)	Total/ Average
			($000)		
Purchased parts and materials	$28,667.8	$25,135.1	$14,609.9	$1,920.8	$70,333.6
Inbound transportation	573.2	487.3	251.3	11.5	1,323.3
Total materials costs	$29,241.0	$25,622.4	$14,861.2	$1,932.3	$71,656.9
Inbound transportation - as % of purchased parts and materials	1.999	1.939	1.720	.599	1.881
- as % of total materials costs					1.847

Source: Massey-Ferguson Industries Limited, Brief to the Royal Commission on Farm Machinery, 1967, Chapter VII, p. 37.

Table A.2 between direct purchase order costs of materials and parts and the costs of inbound transportation to the using plant. Table A.3 shows that, except for the materials entering the "M" Foundry at Brantford (and foundry and other bulk materials tend to attract low shipping costs relative to their value), the costs of inbound freight fall between 1.999 per cent and 1.720 per cent of the cost of materials and parts. The average, 1.881 per cent, is used to divide the cost factor "Materials" (53.0 per cent of total manufacturing costs) between "Purchased Items" costs and "Inbound Transportation" costs, assigning weights of 52.02 per cent and .98 per cent respectively to the two detailed cost factors.

The other change required to identify major detailed cost factors is to reallocate the fringe benefit costs (shown in the unadjusted data from the financial questionnaire under overheads as a single item only) among the three types of labour inputs shown, direct labour, indirect labour, and salaried personnel. This step is necessary to make detailed comparisons of direct labour costs between geographical regions. "Fringe Benefits" averaged 32.4 per cent of wage and salary costs shown in the General and Financial Information Questionnaire. This percentage was then used to reallocate fringe benefit costs to direct and indirect labour costs and to salary costs as shown in Table A.2, column (4).

APPENDIX B

INBOUND FREIGHT COSTS, CANADIAN PLANT (BRANTFORD) VS. UNITED STATES PLANT (DETROIT), USING DATA FROM CONFIDENTIAL STUDY PREPARED FOR MASSEY-FERGUSON INDUSTRIES LIMITED ON RELOCATION OF TRACTOR PLANT FROM DETROIT TO BRANTFORD

As noted in Chapter 3, page 22, Massey-Ferguson Industries Limited provided the Commission with a confidential estimate of the cost of relocating its existing Detroit tractor plant and transmission and axle plant to Brantford. Appendix B uses the data from this study to develop an appreciation of the outer limits of transportation cost difference between these two locations and to apply these limits to the transportation component shown in the manufacturing cost analysis of the hypothetical plant, if moved from Brantford to Moline, Ill.

As noted, the Massey-Ferguson Industries Limited study identified an inbound transportation penalty of $1.7 million for a tractor plant (organized identically to its existing Detroit plant) at a location in Brantford compared with its existing location in Detroit. This $1.7 million penalty cost was made up of the following component factors:

	Change in Inbound Transportation Costs Brantford Lower/(Higher) than Detroit ($000)
Outside Purchases	
Identified items	(797)
Projected on balance by ratio	(960)
Total	(1,757)
"Made" Items	
Interplant shipments	14
Net Total	(1,743)

A short description of the method used by Massey-Ferguson Industries Limited's consultants in preparing their analysis will clarify the above amounts. Shipping weights of the annual requirements of the Detroit tractor plant and transmission and axle plant were calculated for a portion of direct material purchases, categorized by type of commodity classifications used in transportation rate descriptions. Items that could be sourced interchangeably between Brantford and Detroit vendors, or items normally delivered for all industries by the vendor, such as tires, were excluded. The transportation costs of the annual requirements of this remaining portion of all required items were then calculated for delivery to the Detroit plants and for delivery to the plants if they were removed to Brantford. The resulting relationship between existing Detroit freight costs and anticipated Brantford freight costs for the sample portion of the material requirements analysed was then used to project the total annual freight bill for the Brantford plant. This was done by applying the ratio of the total Brantford freight costs to the Detroit freight costs developed during the analysis of the sample portion of the inbound freight costs to the total Detroit freight bill for an actual year.

The validity of the approach used hangs, therefore, on a number of specific points:

- Were the items selected for analysis representative of the total number of items which could have been analysed? (For example, was the proportion of transportation costs relating to items locally purchased in Detroit the same in the analysed sample as in the total annual plant requirements? Too high a proportion of local delivered items would make the apparent cost increase to relocate in Brantford higher than it should have been.)
- Was the ratio of inbound freight costs appropriately calculated for the sample between the two locations?
- Were prices the same for the commodities or parts at the two locations, or would there be an advantage or disadvantage which would offset the transportation cost differential?

It is not possible to determine from the confidential study made available to the Commission whether the sample was in fact representative of the whole, but it is possible to question certain

aspects of the methods used to calculate the ratio of Detroit inbound freight costs to Brantford costs. While legitimate differences of opinion as to methods and possible costs can exist, the following reservations may be appropriate.

The calculation of the inbound freight cost charges (shown in Table B.1) hangs on whether it is appropriate to assume that material purchased locally and delivered "free" does not, in fact, contain a hidden transportation cost. Such a viewpoint is of doubtful validity, although it assumes major significance in developing the heavy inbound transportation cost penalty shown in the study prepared for Massey-Ferguson Industries Limited, as indicated in Table B.1. Almost 80 per cent of the total cost penalty shown for the Brantford location is the result of applying full Brantford transportation costs to outside purchased parts and materials bought from Detroit vendors. No offsetting inbound freight was shown for these items shipped to the existing Detroit plant locations, although costs were incurred by the vendors in delivering them to the Massey-Ferguson Detroit locations. If it can be accepted that appropriate inbound freight costs should be charged on these parts and materials, the ratio between inbound transportation costs at the two locations (Detroit and Brantford) will inevitably be lowered for the analysed parts. As a result of the lower ratio for the analysed parts, the estimation of inbound transportation costs for the total material requirements of the plant will result in a lower total penalty for the Canadian location.

It is normal industrial purchasing practice in analysing plant location alternatives, to examine the structure of prices shown on the purchase order price for a commodity or classification of parts at the old location to determine how best to handle the procurement of the same item at the proposed site. If the vendor has been delivering the item to the old plant as part of the purchase order terms, two alternative approaches are available, depending on whether or not the same vendor is to continue to supply the item at the alternative location. If the shipments from the same supplier to the new location are to be by public carrier, there is every justification to ask the vendor to reduce the purchase order price by an amount equal to the local delivery charges which he has been up to then absorbing, either directly by payment of carrier charges or indirectly by transporting the parts or materials in his own truck. If a different supplier is to supply

TABLE B.1

INBOUND TRANSPORTATION COST CHARGES BETWEEN DETROIT AND BRANTFORD ON ANALYSED PORTION OF MATERIAL REQUIREMENTS, AS PROJECTED IN STUDY PREPARED FOR MASSEY-FERGUSON INDUSTRIES LIMITED

		Brantford Costs Lower/(Higher) than Detroit Costs		
		Brantford Lower/(Higher) than Detroit ($000) 1/	%	% of Total Charge Accounted for by Item
Outside Purchased Items				
Purchased in Detroit area (showing no freight cost in current part of equation)	Tractor assembly	(571.2)	(71.7)	
	Transmission and axle	(63.6)	(8.0)	
		(634.8)	(79.7)	
Purchased outside Detroit area (showing freight costs in current part of equation)	Tractor assembly	(192.3)	(24.1)	
	Transmission and axle	30.6	3.8	
		(161.7)	(20.3)	
			(100.0)	
Total	Tractor assembly	(763.5)		(95.9)
	Transmission and axle	(33.0)		(4.1)
		(796.5)		(100.0)

1/ Massey-Ferguson Industries Limited data.

the new, proposed plant location, the purchasing department would be expected to set itself a target -- using the old price, net of delivery charges calculated to have been included -- to negotiate a new price with the new vendor. The effect of both approaches is to separate the local transportation costs included in the delivered price to the existing plant location from actual vendor factory selling price, so that one does not pay for transportation twice, both to the old location and to the proposed new location, in developing comparative costs for the new plant.

While the theory enunciated above can be accepted as abstractly valid, a purchaser's ability to negotiate out the hidden transportation costs may be less than perfect in a purchase order whose terms read "f.o.b. our plant" (i.e., delivery charges paid, one way or another, by the vendor). Negotiation power in purchasing depends to a large degree on the size of the company doing the purchasing vs. that of the vendor company. If the vendor's output is large and the purchaser's requirements small relative to it, the ability to obtain the price reduction may simply not exist. If the vendor is delivering to a number of other purchasers with his own trucks, his incremental savings in ceasing to deliver to only one may actually be insignificant. On the other hand, if the order is important to the vendor, he may concede the full transportation cost difference at published rates, even though it has been costing him less than this to effect the delivery in his own trucks. It all comes down to the final question, does the vendor need to make the concession?

Whether the approach to obtain net purchase prices would be valid or not for the materials and parts used in the tractor assembly and transmission plants of Massey-Ferguson Inc. must therefore remain somewhat conjectural. The fact is, however, that these approaches did not receive visible consideration in the study prepared for Massey-Ferguson Industries Limited, on which its presentation to the Commission was made. As a result, the presentation showed $634,800 penalty cost on the analysed sample of materials and parts for the Brantford location with no cost of freight for these materials and parts at the Detroit location. In any case, the point at issue is not Massey-Ferguson Industries Limited's tractor study, but a method by which the data it contains can be used to develop fully realistic costs of inbound transportation between a Detroit location and Brantford.

TABLE B.2

CALCULATION OF DETROIT INTRA-CITY FREIGHT COSTS PRESUMED TO BE INCLUDED IN MASSEY-FERGUSON PURCHASE ORDER COSTS

Category of Materials or Parts	Annual Weight in Cwt. of Plant Requirements of Material or Part Category (1)	Assumed Number of Shipments Needed to Supply Needs for Year 1/ (2)	Average Weight of Shipment (lbs.) 2/ (3)	Rate Appropriate to Category and Weight 3/ (4)	Cost of Shipment (5)	Minimum Annual Intra-Detroit Freight Costs Included in Purchase Order Costs (6)
I TRACTOR PLANT						
Steel	16	12 4/	133	Min. $6.21	$6.21 as $6.25	$ 75
Machined parts	205,048	800 5/	25,631	List 15, Col. 18 $.27	69.20 as 69.00	55,200
Bearings	588	50 6/	1,176	$.80 plus $8.68	18.09 as 18.00	900
Engine accessories	3,266	150 7/	2,177	$.90 plus $8.68	28.27 as 28.00	4,200
Fasteners	67,642	300 8/	22,547	List 40, Col. 3 $.25	56.37 as 56.00	16,800
Screens and flights	336	12 4/	2,800	$.90 plus $8.68	33.88 as 34.00	408
Stampings	343,480	1,000 9/	34,348	List 15, Col. 19 $.23	79.00 as 79.00	79,000
						$156,583
II TRANSMISSION AND AXLE PLANT						
Steel	22,586	50 6/	45,172	$.15	67.76 as 68.00	3,400
Machined parts	49,958	150 7/	33,305	$.23	76.60 as 77.00	11,550
Bearings	944	50 6/	1,888	$.80 plus $8.68	23.78 as 24.00	1,200
Fasteners	12,138	100 10/	12,138	as 15,000 lbs. at $.36	54.00 as 54.00	5,400
Stampings	34	24 11/	142	Min. $6.21	6.21 as 6.25	150
						$ 21,700
Total						$178,283

Table B.2 (Continued)

1/ Number of shipments needed to supply needs of plants determined by consideration of a likely number of vendors and frequency of shipments (both held to minimum levels), as detailed in notes 4-11.
2/ Average Weight of Shipments (Col. 3) is calculated by dividing total weight required (Col. 1) by assumed number of shipments (Col. 2).
3/ Rate appropriate to category and weight determined from Detroit Commercial Zone Tariff Bureau Publications; for details, see Table B.3.
4/ Assuming one vendor and shipping once a month.
5/ Assuming eight vendors and shipping twice a week for 50 weeks.
6/ Assuming two vendors and shipping every second week.
7/ Assuming three vendors and shipping every week.
8/ Assuming three vendors and shipping twice a week.
9/ Assuming four vendors and shipping daily.
10/ Assuming two vendors and shipping once a week.
11/ Assuming two vendors and shipping once a month.

The following assumptions have been included:

1. All local delivery would be by truck.
2. No provision is made for penalty cost shipments or emergency cost shipments.
3. Auto parts rates are used wherever classifications of tractor parts show under List 15.
4. The study can give an opportunity for lower freight costs than are suggested by Massey-Ferguon for the Brantford location because it must be assumed that vendors are now making, two shipments of similar commodities to the two Detroit plants, whereas one shipment would go to a consolidated new plant in Brantford, i.e. there is no reason why the "ideal" plant should be divided into two separate entities.

Tables B.2 and B.3 rectify this deficiency in the Detroit-Brantford locational study. Table B.3 outlines the "Detroit Commercial Zone Local Transportation Rates" which would be applicable to local Detroit shipments of the kinds of material and parts shown in the study prepared for Massey-Ferguson Industries Limited. Not knowing Massey-Ferguson's actual vendor locations in relation to the Massey-Ferguson plants, the rates related to movements between Detroit Zone 1 and Detroit Zone 4 were used for Rate Base C, a mid-point rate for the area.

Table B.2 recalculates transportation costs within Detroit for those commodities on which no freight costs were shown for local delivery from Detroit area vendors in the study prepared for Massey-Ferguson Industries Limited. As in the study, the weight of the annual requirements of each category of materials or parts is shown. The number of shipments required to supply the plants is then shown in the third column, based on the assumptions indicated in the notes to the table of the number of vendors likely to be involved in the supply of the category of materials or parts and the frequency of shipments to the using plant. These frequencies are listed in footnotes 3 to 10 of Table B.2.

The next column on the table indicates the average weight of the shipment to support the shipping frequency determined. In turn, this shipment weight of a particular commodity leads to the choice of the appropriate rate classification and rate base from Table B.3, and the calculation of the cost of each shipment. The shipment cost is then multiplied by number of shipments required annually to calculate total inbound transportation costs for each category of materials and parts.

Table B.4, "Adjusted Inbound Transportation Cost Charges between Detroit and Brantford" uses the results of Table B.2 to reduce the penalty inbound transportation costs shown on Table B.1. This table provides a more accurate presentation of the range of the inbound transportation cost differential between Detroit and Brantford for the products and volumes reviewed. The penalty cost associated with inbound freight at the Brantford location drops by $178,400 or 22.4 per cent.

TABLE B.3

DETROIT COMMERCIAL ZONE LOCAL TRANSPORTATION RATES

(Taken from Detroit Commercial Zone Tariff Publications, M.P.S.C. C.Z, No. 1, with Supplement No. 2, and M.P.S.C. C.Z, No. 2, with Supplement No. 3)

Between Detroit Zone 1 and Zones	Steel	Machined Parts	Bearings	Engine Parts	Fasteners	Screens and Flights	Stampings
	$	$	$	$	$	$	$
TRACTOR PLANT	LTL[1] 133 lbs. Shipt.	T/L[2] 25,631 lbs. Shipt. List 15 Col. 18	LTL 1,176 lbs. Shipt.	LTL 2,177 lbs. Shipt.	T/L 22,547 lbs. Shipt. List 40 Col. 3	LTL 2,800 lbs. Shipt.	T/L 34,348 lbs. Shipt. List 15 Col. 19
No. 1 Rate Base A	Min. 5.42	.24	.70 + 8.68	.80 + 8.68	.23	.80 + 8.68	.21
No. 2 Rate Base B	Min. 5.44	.25	.73 + 8.68	.84 + 8.68	.24	.84 + 8.68	.23
No. 3 Rate Base B	Min. 5.44	.25	.73 + 8.68	.84 + 8.68	.24	.84 + 8.68	.23
No. 4*Rate Base C	Min. 6.21	.27	.80 + 8.68	.90 + 8.68	.25	.90 + 8.68	.23
No. 5 Rate Base B	Min. 6.30	.31	.88 + 8.68	.98 + 8.68	.24	.98 + 8.68	.29
No. 6 Rate Base G	Min. 6.25	.29	.84 + 8.68	.98 + 8.68	.30	.94 + 8.68	.25
TRANSMISSION AND AXLE PLANT	T/L 45,172 lbs. Shipt.	T/L 33,305 lbs. Shipt.	LTL 1,888 lbs. Shipt.		LTL as 15,000 lbs. Shipt.		LTL 142 lbs. Shipt.
No. 1 Rate Base A	.13	.21	.70 + 8.68		.36		Min. 5.42
No. 2 Rate Base B	.14	.23	.73 + 8.68		.37		Min. 5.44
No. 3 Rate Base B	.14	.23	.73 + 8.68		.37		Min. 5.44
No. 4*Rate Base C	.15	.23	.80 + 8.68		.36		Min. 6.21
No. 5 Rate Base B	.14	.29	.88 + 8.68		.37		Min. 6.30
No. 6 Rate Base G	.19	.25	.84 + 8.68		.37		Min. 6.25

1/ LTL = Less Than Truckload

2/ T/L = Truckload

* Mid-point in rate structure taken as standard for study and used in Table B.2.

Acknowledgement: The assistance of ASL Traffic Management Limited (Industrial Freight Consultants) of Oakville, Ontario, was secured in selecting the appropriate rates from the Detroit Commercial Zone Tariff Publications.

TABLE B.4

ADJUSTED INBOUND TRANSPORTATION COST CHARGES BETWEEN DETROIT AND BRANTFORD, ON ANALYSED PORTION OF MATERIAL REQUIREMENTS AS PROJECTED IN STUDY FOR MASSEY-FERGUSON INDUSTRIES LIMITED AND AS REVISED WITH ADDITIONAL DATA

		Brantford Costs Lower/(Higher) than Detroit Costs		
		Original Costs from Table B.1[1/] ($000)	Adjustment from Table B.2 ($000)	Net Cost Charge ($000)
Outside Purchased Items				
Purchased in Detroit area (showing no freight costs in current part of equation)	Tractor assembly	(571.2)	156.6	(414.6)
	Transmission and axle	(63.6)	21.7	(41.9)
		(634.8)	178.3	(456.5)
Purchased outside Detroit area (showing freight costs in current part of equation)	Tractor assembly	(192.3)	-	(192.3)
	Transmission and axle	30.6	-	30.6
		(161.7)	-	(161.7)
Total	Tractor assembly	(763.5)	156.6	(606.9)
	Transmission and axle	(33.0)	21.7	(11.3)
		(796.5)	178.3	(618.2)

1/ Massey-Ferguson Industries Limited data.

The study prepared for Massey-Ferguson Industries Limited proceeded to develop ratios (for the portion of inbound freight costs analysed) for the two plant locations, Detroit and Brantford, the base of the ratio being the Detroit freight. Increasing the base cost by adding the calculated amount of local Detroit freight included in the purchase order price changes the ratios between the two plant locations.

A further reduction in the relationship between the two locations can be justified by looking at the calculation of the inbound freight and costs to Brantford in the sample of parts analysed. The transportation specialist consulted for assistance in the analysis of the "hidden" Detroit freight advised that most types of parts listed in the study prepared for Massey-Ferguson Industries Limited could be carried to Brantford as "auto parts" at between .97 and .74 a cwt. The rates used in the study prepared for Massey-Ferguson Industries Limited were all to some degree above this level for items still sourced in Detroit. Table B.5 examines the reduction in Brantford freight costs which would be attainable on Detroit-sourced items by using the available auto parts rates.

Table B.6 consolidates the comparison of Brantford and Detroit freight costs, and indicates that instead of the $1.7 million inbound transportation cost penalty shown in the brief of Massey-Ferguson to the Commission, the penalty should probably be of the order of $1.2 million. Because of the much higher Detroit freight cost when "hidden" freight is included, the increase in freight costs (at least for the purpose of this study on locational advantages) can be considered to be $1.2 million on a base of $1.0 million instead of $.6 million to $2.3, $1.7 million on a base of $.6 million, a ratio of 121 per cent instead of 285 per cent.

TABLE B.5

CALCULATION OF BRANTFORD FREIGHT FOR DETROIT SOURCED ITEMS USING "AUTO PARTS" RATES

Category of Materials	Annual Weight Requirements in Cwt.	Cost at Rates Projected by Consultant: Rate per Cwt.	Cost at Rates Projected by Consultant: Amount ($000)	Cost Projected in Study for Massey-Ferguson ($000)	Difference ($000)
I TRACTOR ASSEMBLY PLANT					
Machined parts	205,048	.83 1/ 2/	170.0	191.6	21.6
Bearings (50% Detroit)	294	.97 1/ 2/	.3	.6	.3
Engine accessories	3,266	.97 1/	3.2	7.4	4.2
Fasteners (50% Detroit)	33,821	.83 1/ 2/	28.1	44.4	16.3
Screens and flights	336	.97 1/	.3	.8	.5
Stampings (50% Detroit)	172,740	.74 1/	127.8	225.4	97.6
			329.7	470.2	140.5
II TRANSMISSION AND AXLE PLANT					
Machine parts	49,958	.83 1/ 2/	41.5	46.7	5.2
Bearings (50% of total requirements, Detroit)	774	.97 1/ 2/	.8	1.3	.5
Fasteners (50% Detroit)	6,069	.83 1/ 2/	5.0	8.0	3.0
			47.3	56.0	8.7
Total			377.0	526.2	149.2

1/ .97 per cwt. for shipments of 20,000 lbs.
.83 per cwt. for shipments of 30,000 lbs.
.74 per cwt. for shipments of 40,000 lbs.
(ASL Traffic Management Limited, Oakville, Ontario.)

2/ Combined shipments assumed for two plants at single Brantford location.

TABLE B.6

DEVELOPMENT OF PROJECTED BRANTFORD FREIGHT : DETROIT FREIGHT COSTS

I SAMPLE

	Actual Detroit Freight in Sample ($000)	Hidden Detroit Freight in "Free" Deliveries ($000)	Corrected Detroit Freight in Sample ($000)	Actual Brantford Freight in Sample ($000)	Ratios, Brantford Freight : Detroit Freight: Original Ratios (ignoring hidden freight)	Ratios, Brantford Freight : Detroit Freight: Corrected Ratios (including hidden freight)
Transmission and axle plant	68.4	21.7	90.1	101.4	1.48236:1	1.125:1
Tractor assembly plant	228.2	156.6	384.8	991.7	4.34663:1	2.577:1
Total	296.6	178.3	474.9	1,093.1	n.a.	n.a.

II TOTAL FREIGHT

	Actual Detroit Freight from Ledger Accounts ($000)	Corrected Detroit Freight (including hidden freight) ($000)	Projected Brantford Freight Using Corrected Ratios ($000)	Freight Penalty for Brantford Corrected Basis (including hidden Detroit freight) ($000)
Transmission and axle plant	Confidential	Confidential	Confidential	Confidential
Tractor assembly plant	Confidential	Confidential	Confidential	Confidential
	617.4	1,001.5	2,373.7	1,372.2
Less savings on interplant transportation			13.5	13.5
		1,001.5	2,360.2	1,358.7
Less reduction in Brantford freight using "auto rates" (Table B.5)			149.2	149.2
		1,001.5	2,211.0	1,209.5
Brantford inbound freight and inbound freight penalty as % of Detroit inbound freight		100%	220.7%	120.7%

APPENDIX C

LABOUR COSTS, VARIOUS LOCATIONS

Appendix C compares plant and office labour costs in the farm machinery industry in 1966 and 1968 in the three locations Brantford, Winnipeg, and Moline.

Total labour costs are comprised of direct labour costs, indirect labour costs, and salaried personnel costs. To a large extent, any division of labour costs among these three categories is arbitrary. In theory, direct labour is that hourly-paid labour which is directly chargeable against a production operation (e.g. assembler, painter, welder, grinder). Indirect labour then includes all hourly-paid support operations in the plant not directly related to production (e.g. maintenance costs, tool and die making costs, and possibly inspection costs). Salaried employment includes those office and some plant employees paid by weekly or monthly salary instead of hourly wages, whose work supports plant activities (e.g. foremen, production planning and control personnel, clerks paying invoices and billing out finished products, certain quality control workers particularly in laboratories, and manufacturing engineering personnel). In practice, a plant that uses more capital equipment and less direct labour in production will almost inevitably incur a higher proportion of indirect labour in maintaining and setting up its machines. The decision as to whether a certain foreman or quality control inspector is to be paid by the hour or by the month is arbitrary, and could go either way. Therefore, work done by direct labour in one plant may be handled by indirect labour in another and certain indirect labour categories move from plant to plant between indirect labour and salaried employment.

As noted in Appendix A, this study uses data prepared from the returns to the Commission's General and Financial Information

Questionnaire by the four largest farm machinery manufacturers in Canada. Their labour costs (including fringe benefits) are shown in Table A.2 as follows:

	Percentage of Total Manufacturing Costs
Direct labour	16.03
Indirect labour	7.52
Salaried labour	6.88
Total identified labour costs	30.43

Wage and Salary Rates

In order to develop average wage rate and fringe benefit costs to compare labour costs at the three chosen locations, actual wage rates paid in the farm machinery industry in 1966 were used, weighted by the number of employees in each occupational classification in a particular combine manufacturing plant in the industry in Ontario for the same year. Farm machinery companies in Ontario and Manitoba gave permission to use data from the 1966 wage survey questionnaires which they had completed for the Economics and Research Branch of the Department of Labour. No significant differences were found between the published averages by occupation and the averages developed by weighting the data by numbers of employees in the companies in each location for 1966. As noted later, therefore, unpublished Department of Labour data by occupational categories were used to develop 1968 rates.

All occupational categories, shown as having 30 or more plant employees or 15 or more office employees among all the companies in Ontario and Manitoba, were included in Table C.1A and C.1B covering 1966 and 1968 wage and salary cost data respectively.

For Brantford and Winnipeg, where wage and salary data were not available for certain particular employment categories noted, rates were taken from data for "All Industries" adjusted by the ratio between average wage or salary levels published for "All Industries" and the "Farm Machinery Industry" by the Department of Labour. For Winnipeg, salaries for certain classifications, required for comparability, were not available from the wage survey questionnaires. They were obtained from "Help Wanted" advertisements in the classified advertising section of the *Winnipeg Free Press* for October 1966.

TABLE C.1A

AVERAGE WAGE AND SALARY RATES, BRANTFORD, WINNIPEG, AND MOLINE, 1966

(Canadian dollars)

Selected Occupations	Brantford[1]	Winnipeg[1]	Moline	
Direct Labour (Plant)	Weighted Average Salary or Wage Rate (hourly wage)	Weighted Average Salary or Wage Rate (hourly wage)	Weighted Average Salary or Wage Rate (hourly wage)	
Assembler	$ 2.72	$ 1.90	$ 3.19	)
Lathe operator	2.67	2.01	3.91	)
Machine production	2.80	2.03	3.47	)
Painter-spray	3.63	2.00	3.77	)
Power shear operator	2.89	1.94	3.48	)
Punch press operator	2.57	2.01	2.87	) [2]
Spot welder	3.10	1.80	5.05	)
Welder production	3.40	2.05	2.67	)
Drill press operator	2.67	1.87	3.87	)
Labour production	2.24	1.72	3.01	)
Grinder operator	3.18	2.20	3.09	)
Weighted average	2.81	1.93	3.21	
Indirect Labour (Plant)				
Mechanic	$ 3.01	$ 2.16	$ 4.06	)
Truck power	2.49	1.96	3.38	)
Millwright operator	3.18	2.69	4.11	) [3]
Tool and die maker	3.18	2.15	4.55	)
Labour non-production	2.27	1.68	2.72	)
Inspector	2.87	2.08	3.37	)
Weighted average	2.70	2.01	3.50	
Salaried Employees (Office)	(weekly salary)	(weekly salary)	(weekly salary)	
Cost accounting, senior	$139.45	$ 70.00	$131.50	)
Draughtsman, senior	131.20	115.00	156.00	)
Draughtsman, intermediate	114.47	84.00	125.78	)
Draughtsman, junior	84.00	64.00	113.40	)
Typist, senior	70.21	55.00	111.78	)
Typist, junior	59.60	46.00	88.56	)
Steno, senior	75.73	64.00	118.80	) [3]
Steno, junior	58.95	51.00	92.36	)
Secretary, junior	79.76	63.00	131.76	)
Clerk, senior	91.11	81.00	137.16	)
Clerk, intermediate	76.94	72.75	100.17	)
Clerk, junior	60.33	53.30	86.94	)
Weighted average	81.06	65.54	111.97	

1/ Department of Labour, Economics and Research Branch, 1966 Survey of Wage and Salary Rates, General Questionnaire, Ottawa.

2/ U.S. Department of Labor, Bureau of Labor Statistics, Industry Wage Survey, Machinery Manufacturing (Special Survey, mid-1966), Bulletin No. 1563.

3/ U.S. Department of Labor, Bureau of Labor Statistics, Area Wage Survey, Davenport - Rock Island - Moline, Iowa - Illinois, Metropolitan Area, Bulletin No. 1530-19, October 1966.

TABLE C.1B

AVERAGE WAGE AND SALARY RATES, BRANTFORD, WINNIPEG, AND MOLINE, 1968

(Canadian dollars)

Selected Occupations	Brantford[1]	Winnipeg[1]	Moline[2]
Direct Labour (Plant)	Weighted Average Salary or Wage Rate (hourly wage)	Weighted Average Salary or Wage Rate (hourly wage)	Weighted Average Salary or Wage Rate (hourly wage)
Assembler	$ 3.09	$ 2.19	$ 3.42
Lathe operator	2.77	2.44	4.19
Machine production	3.59	2.39	3.72
Painter-spray	3.92	2.23	4.04
Power shear operator	3.04	2.22	3.73
Punch press operator	2.99	2.16	3.08
Spot welder	3.61	2.07	3.27
Welder production	3.80	2.33	2.87
Drill press operator	3.03	2.15	4.15
Labour production	2.67	1.98	3.23
Grinder operator	3.68	2.53	3.32
Weighted average	3.19	2.21	3.44
Indirect Labour (Plant)			
Mechanic	$ 3.61	$ 2.60	$ 4.39
Truck power	2.90	2.30	3.65
Millwright operator	4.12	3.26	4.44
Tool and die maker	3.87	2.64	4.92
Labour non-production	2.26	2.01	2.94
Inspector	3.27	2.33	3.64
Weighted average	3.11	2.36	3.78
Salaried Employees (Office)	(weekly salary)	(weekly salary)	(weekly salary)
Cost accounting, senior	$154.00	$ 77.60	$144.00
Draughtsman, senior	150.40	139.10	170.80
Draughtsman, intermediate	132.80	94.50	138.00
Draughtsman, junior	96.80	74.80	124.40
Typist, senior	80.00	65.10	122.80
Typist, junior	68.40	51.90	96.80
Steno, senior	84.80	73.20	130.00
Steno, junior	68.00	57.50	101.20
Secretary, junior	89.60	71.20	144.00
Clerk, senior	102.80	93.70	150.40
Clerk, Intermediate	88.80	80.80	109.60
Clerk, junior	69.60	60.30	95.20
Weighted average	92.00	75.20	125.20

1/ Department of Labour, Economics and Research Branch, Wage Rates, Salaries and Hours of Labour, 1968, unpublished final data; Ottawa.

2/ Percentage increase of the Moline area between 1966 and 1968 based on first 10 months in 1968 farm machinery gross average hourly earnings for production workers from monthly labour review April 1968 and 1969; U.S. Department of Labor, Bureau of Labor Statistics, Appendix C, adjustment methods.

For Moline wage and salary rates, two data sources were used. Wages for plant direct labour occupational categories in the farm machinery industry were taken from a special mid-1966 industry wage survey[1/] published by the U.S. Bureau of Labor Statistics. In order not to overweight "Moline" costs with high wage rates from the Chicago area, the weighted averages of the Great Lakes and Middle West regions were used. The Great Lakes region includes Illinois and the Middle West region, Iowa. Indirect labour wage rates and office salary rates were taken from a survey of wages in the Moline area proper.[2/] While these data are for all manufacturing industries, they are taken as presumably representing farm machinery manufacturing occupational earnings since 43 per cent of the manufacturing employees covered in this area survey were employed in farm machinery manufacturing.

In the farm machinery industry, a large proportion of employees in the direct labour category is paid on a "time plus incentive" basis instead of on a straight time basis. For all Ontario plants (used to represent Brantford) both incentive and straight time wage rates were shown in the wage survey questionnaires, and a weighted average was developed, representing actual wages paid for time worked. For Moline, the published weighted average only was available and used directly. For Winnipeg, since no incentive pay rates were reported, the straight time rates reported on the wage survey questionnaires were used.

Average direct labour wage rates at Brantford (Ontario average) are shown on Table C.1A at $2.81 an hour and indirect labour at $2.70 an hour for 1966. For Winnipeg, the rates are $1.93 and $2.01. The simple average of the two Brantford rates ($2.76) is 25 per cent above that of Winnipeg ($1.97). How indicative are these wage rates of wages generally in these areas?

1/ U.S. Department of Labor, Bureau of Labor Statistics, Industry Wage Survey, Machinery Manufacturing (Special Survey, mid-1966), Bulletin No. 1563.

2/ U.S. Department of Labor, Bureau of Labor Statistics, Area Wage Survey, Davenport - Rock Island - Moline, Iowa - Illinois, Metropolitan Area, Bulletin No. 1530-19, October 1966.

An independent source for checking average industry wage rates in Ontario and Manitoba is the *Review of Man-Hours and Hourly Earnings*,[3/] published by the Dominion Bureau of Statistics. For Ontario the average hourly earnings in agricultural implements are given as $2.77 for 1965, $2.95 in 1966, and $3.09 in 1967 (comparable to the average amounts of $2.76 from Table C.1A for 1966 and $3.15 from Table C.1B for 1968). No amount is given for industry grouping in Winnipeg, but the 1965 to 1967 rates for durable goods manufacturing, $1.97, $2.08, and $2.27, bracket the $1.97 and $2.28 averages developed in the study for Winnipeg for 1966 and 1968. The rates developed from Department of Labour data are so close to published DBS data that the difference in labour cost shown may be considered to represent accurately the real situation in the two locations.

Fringe Benefit

Fringe benefits are defined in the study as costs associated with employment of numbers of personnel or wage costs, paid for by a company which would otherwise be out-of-pocket costs to the individual employee. To this relatively simple definition should be added the note that it also appears to be customary to include in "fringe benefits" items of cost which are mandatory to the employer, but are considered to be for the employees' benefit, such as the unemployment insurance premium paid by the employer, and the cost of workmen's compensation payments. Some of these costs vary by area, some by company-union decision.

The Commission requested and received confidential data from a number of large farm machinery manufacturing companies in Canada and the United States on the cost of fringe benefits. Fringe benefits were defined according to the following list:

3/ Dominion Bureau of Statistics, Labour Division, Employment Section, Review of Man-Hours and Hourly Earnings, 1957-67 (Ottawa: Queen's Printer, March 1969).

Fringe Benefits Included	Items Not Included
Pension plan costs	
Vacation costs	
Statutory holiday costs	
Workmen's compensation costs	
Sickness and life insurance costs	
Unemployment insurance costs	
Hospital, medical and drug insurance costs	
Other "compulsory" insurance costs	
Subsidies to costs of operating cafeterias, bus services, etc.	Cost of basic cafeterias
	Cost of parking lot
	Cost of living bonuses (part of wage costs)
	Shift differentials and overtime pay (part of wage costs)

Fringe benefit data obtained for the 1966 time period included costs of pension plans, vacations, statutory holidays, workmen's compensation, supplementary unemployment benefits, unemployment insurance, health and life insurance, and other such benefits. The fringe benefit cost shown is the unweighted average of the cost of each of these items to responding companies. They were computed for the Commission's use as percentages of the gross payroll costs of actual firms in Ontario, Manitoba, and the U.S. mid-West. Because of the few major firms operating in the Moline area, fringe benefit data from other firms operating elsewhere in the U.S. mid-West were included with the Moline data to preserve confidentiality. The average rates for the three areas were respectively 36.7 per cent, 10.3 per cent, and 34.5 per cent of total payroll costs as shown in Table C.2 below. The minimum and maximum range of fringe benefits in these areas were 21.1-38.0 per cent, 8.79-14.0 per cent, and 20.1-37.8 per cent, respectively.

Discussion of Fringe Benefits -- So-called "fringe benefits" have become a major portion of labour costs. An examination of the component factors in Table C.2 is therefore of some general interest as well as providing an explanation for the cost differences noted above between areas.

TABLE C.2

AVERAGE COST OF FRINGE BENEFITS, 1966

(Shown as a Percentage of Direct Labour Costs at Each Location)

	Ontario	Manitoba	U.S. Mid-West
Pension plans	8.2	0.8	7.7
Vacations	6.0	3.5	5.5
Statutory holidays	3.9	3.0	2.9
Workmen's compensation insurance	1.4	0.5	0.7
Insurance (health, life, etc.)	6.9	1.3	5.5
Supplemental unemployment benefit	1.3	-	0.7
Unemployment insurance	1.1	1.1	1.1
Other	7.9	0.1	10 4
	36.7	10.3	34.5

Since fringe benefit costs in Ontario were determined from company financial data submitted to the Commission to be 32.4 per cent of wage and salary costs, the 36.7 per cent shown in Table C.2 appears too high. If the lower amount is used for Ontario, it appeared reasonable to reduce the amount for Moline proportionally, to 30.5 per cent. Winnipeg's fringe benefit costs, however, were so much lower already that it seemed appropriate not to reduce them. The following amounts were therefore used for fringe benefits at the three locations:

Brantford	32.4
Winnipeg	10.3
Moline	30.5

The area averages, of course, mask very wide differences not only within the component factors shown in Table C.2, but also among the companies who reported to the Commission. For example, the costs of a pension plan can vary depending on:

- whether it is fully funded
- whether a recent union settlement has obtained increased pension benefits for past service (which may or may not have been extended to persons presently on pension)
- whether a younger or older work force is involved (a Canadian actuary advised that to provide the same

pension benefits to a work force whose average age was 41 would cost almost 85 per cent more than for a work force whose average age was 30.)

None of these specific differences has any relation to plant location, as such. Similarly, the cost of vacations depends on how many employees are eligible for two weeks, three weeks, or more, a fact which is equally independent of location.[4/]

Statutory holidays are more expensive in Canada because there has been, traditionally, one more day (nine vs. eight) than in the United States. Workmen's compensation is generally more expensive in Canada than in the United States because a number of state jurisdictions regard it, literally, as insurance, and require limited coverage only through a private insurer. (Whether the employee is as well protected against injury is another matter, with which this study cannot be concerned.)[5/]

The wide range of fringe benefit costs, when organized to include the same items for Ontario companies, is shown in the tabulation below. As percentage points, items included within "fringe benefits" varied as follows:

	High	Low
Pension plans	13.4	4.5
Ontario workmen's compensation costs	1.7	1.0
Health and life insurance	7.4	6.1
Supplemental unemployment benefit plan	1.6	1.1
Unemployment insurance	2.0	0.7

On the basis of the items included, fringe benefits ranged from 21.1 to 38.0 per cent among Ontario plants whose companies responded to the Commission's request for data.

4/ The moving of a plant to a new location or the establishment of a new plant may make a sort of one-time "windfall" saving through the recruitment of a younger work force than the industry average, with lower seniority rights, shorter vacation periods, etc.

5/ For a discussion of differences in workmen's compensation benefits in Canada, see The Financial Post, Rehabilitation at Cross Roads, June 21, 1969, pp. 41-42.

To sum up, "average" fringe benefit costs hide important differences related to location (such as statutory holidays and workmen's compensation insurance), others partially so related (perhaps pension plans, supplemental unemployment benefits and such other union related benefits), and others that are indifferent to location. While the factors are combined in Table C.2 because data are not available properly to separate them, the table does reflect actual cost levels at the three locations for this important cost item.

The level of fringe benefit costs appears related to the degree and type of union organization in the area. In the Ontario area considered, west of Toronto, industry is strongly unionized, largely by major international unions, and all farm machinery companies except Deere at Welland were organized under the UAW or USWA in 1965. In Winnipeg, only about one third of the farm machinery workers surveyed belonged to an international union. The lower level of fringe benefit costs at Winnipeg, however, was applicable to both the international union members and members of independent unions, and may represent normal or accepted fringe benefit levels in the Winnipeg area.

Tables C.3A and 3B combine weighted average wage and salary rates and fringe benefits for Brantford, Winnipeg, and Moline from Tables C.1 and C.2. The rounded numbers in parentheses in Table C.3A are transferred to Table 3.3 and 3.5 to provide relative costs for the same input of labour hours at the three locations in 1966 and 1968.

From Table C.3A, the effect of fringe benefits on costs of labour is apparent. Winnipeg's wage rate for direct labour is about 69 per cent of Brantford's; its fringe benefit cost in relation to direct labour is only 10.3 per cent, while Brantford's is 32.4 per cent. The combined cost of the two component factors gives a cost of direct labour at Winnipeg which is only 57 per cent of Brantford's.

While Moline's fringe benefits cost only 30.5 per cent in relation to its direct labour wages as opposed to Brantford's 32.4 per cent, the higher wage rate at Moline makes the dollar cost of its fringe benefits greater. The cost of direct labour including fringes is 13 per cent higher than at Brantford.

TABLE C.3A

WAGE, SALARY, AND FRINGE BENEFIT RELATIONSHIPS FOR FARM MACHINERY MANUFACTURING PLANTS AT BRANTFORD, WINNIPEG, AND MOLINE, 1966

	Brantford (including Hamilton)			Winnipeg			Moline		
	Wage or Salary	Fringe Benefits	Total	Wage or Salary	Fringe Benefits	Total	Wage or Salary	Fringe Benefits	Total
Direct Labour									
Actual Can. $	$ 2.81	$ .91	$ 3.72	$ 1.93	$ .20	$ 2.13	$ 3.21	$ .98	$ 4.19
With wage rate cost at locations as 100	100	32.4	132.4	100	10.3	110.3	100	30.5	130.5
With Brantford wage rates, fringe benefits and total costs as 100	100	100	100	68.7 (69)	22.0 (22)	57.3 (57)	114.2 (114)	107.7 (108)	112.6 (113)
Indirect Labour									
Weighted average	$ 2.70	$ .87	$ 3.57	$ 2.01	$ .21	$ 2.22	$ 3.50	$ 1.07	$ 4.57
With wage rate cost at locations as 100	100	32.2	132.2	100	10.3	110.3	100	30.5	130.5
With Brantford wage rates, fringe benefits and total costs as 100	100	100	100	74.4 (74)	24.1 (24)	62.2 (62)	129.6 (130)	123.0 (123)	128.0 (128)
Salaried Employees									
Weighted average	$81.06	$26.26	$107.32	$65.54	$ 6.75	$72.29	$111.97	$34.15	$146.12
With salary rate costs at locations as 100	100	32.4	132.4	100	10.3	110.3	100	30.5	130.5
With Brantford salary rates, fringe benefits and total costs as 100	100	100	100	80.9 (81)	25.7 (26)	67.4 (67)	138.1 (138)	130.0 (130)	136.2 (136)

Note: Rounded numbers in parentheses transferred to Table 3.4.

Source: As noted in text.

Updating Labour Cost Comparisons to 1968 Level

Although all cost differences including labour for the three locations were initially examined in the 1966 period, the importance of the differences in labour costs as a factor in locational advantage suggested updating labour cost data to the extent possible. Table C.1B, therefore, examined the wage and salary rates for the same categories of workers, at the 1968 cost level. Relatively the same relationship between wage and salary costs at the three locations appears on Table C.3B for 1968 as for 1966, although all wages and salaries have increased.

Certain aspects of the construction of Tables C.1B and C.3B (for 1968) should be noted. For Brantford and Winnipeg, fully comparable wage and salary rates were obtained from unpublished data on wage rates, salaries, and hours of labour for 1968.[6/] Wage rates for these areas have therefore a high level of validity. No complete labour statistics, comparable to the wage surveys[7/] used for 1966 data, were available for Moline for 1968. The 1966 data were therefore adjusted by the percentage increases shown for labour in the farm machinery industry between 1966 and 1968 for the United States as a whole. Somewhat less certainty would therefore be attached to the wage rates for the Moline area than the other areas, but they would still probably be sufficiently accurate to represent the comparative situation.

Fringe benefits shown on Table C.3B should be examined with reservations. The fringe benefit costs for 1966, expressed as percentages of wages and salaries paid in each area, were simply used again to estimate fringe benefit costs in the later period. Fringe benefit costs in dollars certainly did not go down between 1966 and 1968, but they may have altered their percentage relationships to the wage and salary rates in the three areas. The fringe

---

6/ Canada, Department of Labour, Economics and Research Branch, Wage Rates, Salaries and Hours of Labour, unpublished 1968 final data.

7/ U.S. Department of Labor, Bureau of Labor Statistics, Area Wage Survey, op. cit.; surveys identified in detail in Footnote 1 and Footnote 2 to this appendix.

TABLE C.3B

WAGE, SALARY, AND FRINGE BENEFIT RELATIONSHIPS FOR FARM MACHINERY MANUFACTURING PLANTS AT BRANTFORD, WINNIPEG, AND MOLINE, 1968

	Brantford (including Hamilton)			Winnipeg			Moline		
	Wage or Salary	Fringe Benefits	Total	Wage or Salary	Fringe Benefits	Total	Wage or Salary	Fringe Benefits	Total
Direct Labour									
Actual Can. $	$ 3.19	$ 1.03	$ 4.22	$ 2.21	$ .23	$ 2.44	$ 3.44	$ 1.05	$ 4.49
With wage rate cost at locations as 100	100	32.4	132.4	100	10.3	110.3	100	30.5	130.5
With Brantford wage rates, fringe benefits and total costs as 100	100	100	100	69.3 (69)	22.3 (22)	57.8 (58)	107.8 (108)	101.9 (102)	106.4 (106)
Indirect Labour									
Weighted average	$ 3.11	$ 1.01	$ 4.12	$ 2.36	$ .24	$ 2.60	$ 3.78	$ 1.15	$ 4.93
With wage rate cost at locations as 100	100	32.4	132.4	100	10.3	110.3	100	30.5	130.5
With Brantford wage rates, fringe benefits and total costs as 100	100	100	100	75.9 (76)	23.8 (24)	63.1 (63)	121.5 (122)	113.9 (114)	119.7 (120)
Salaried Employees									
Weighted average	$92.30	$29.90	$122.20	$75.30	$ 7.80	$83.10	$131.60	$40.10	$171.70
With salary rate costs at locations as 100	100	32.4	132.4	100	10.3	110.3	100	30.5	130.5
With Brantford salary rates, fringe benefits and total costs as 100	100	100	100	81.6 (82)	26.1 (26)	68.1 (68)	142.6 (143)	134.1 (134)	140.5 (141)

Note: Rounded numbers in parentheses transferred to Table 3.5.

Source: As noted in text.

benefit amounts shown in Table C.3B should then be regarded as broad estimates only, based on the assumption that the relationship among the costs of fringe benefits at the different locations remained constant from 1966 to 1968. Unless a major collective bargaining break-through was accomplished by union groups at one or another location, the assumption seems reasonable.

A major caveat should be entered at this juncture. While the low wage and salary rates and costs of fringe benefits shown at Winnipeg accurately reflect 1966 and 1968 conditions, the cost advantages shown could well prove to be ephemeral if a large, international farm machinery company were to locate a plant there. The UAW, for example, has characteristically not fought against a company's decision to build a plant where the company's economic analysis dictated it should go. The union has used the arrangements in the company-union agreement to protect workers' interests in matters of seniority, job security, and transfer. But it does not agree that companies with which it has agreements should establish new plants in low-cost labour areas, and pay that low cost. New plants should pay the rate they would pay in the companies' other, unionized establishments.[8/]

The advantage of wage and fringe benefit costs, so obviously enjoyed today by firms in Winnipeg, would therefore tend to evaporate quickly if Massey-Ferguson Industries Limited, John Deere Limited or International Harvester of Canada Limited were to decide to locate a major plant there. There would, however, probably be some continuing advantage related to such costs as pensions, vacation pay, SUB (supplementary unemployment benefits), and the like, fringe benefits either associated with the younger work force which would probably be recruited or with the lower average seniority level in the new plant.

8/ e.g. General Motors assembly plant, Ste Thérèse, Québec.

APPENDIX D

DIFFERENCES IN OUTBOUND TRANSPORTATION COSTS TO THE NORTH AMERICAN FARM MACHINERY MARKET FROM CANADIAN AND U.S. MANUFACTURING LOCATIONS

Prepared for the

ROYAL COMMISSION ON FARM MACHINERY

by

Kates, Peat, Marwick & Co.

I - TERMS OF REFERENCE

The terms of reference were set forth in Treasury Board Minute No. 664063, and were further clarified and defined through discussion and correspondence.

The Royal Commission on Farm Machinery requested that this Study report on the effect of transportation rates on the competitive position of the Canadian farm machinery industry in respect of the North American market.[1/]

The competitive position was to be analysed by comparison with the position of the major competitor in the North American market, the U.S. farm machinery industry.

The competitive position of Canadian locations was to be determined with respect to transportation rates associated with the distribution of farm machinery from factory locations.

It was further required that the Study should assume distribution from alternative single manufacturing locations to the entire North American market.

The Study was to be based on full carload rates available to all shippers. It was also requested that loading and blocking charges be studied.

Finally, it was required that the effect of transportation rates be related to Canadian farm machinery industry costs and profits.

1/ As per Table D.3.

II - SUMMARY OF FINDINGS

The Study confirms that there is a transportation cost disadvantage in shipping farm machinery to the North American market from the industry's major manufacturing locations in Canada, rather than from the major locations in the United States.

The examples of cost disadvantages constitute only small percentages of cost, but are large enough to have potential importance in terms of profit margins.

As most farm machinery is shipped at the same rates per hundredweight, the disadvantages amount to a larger proportion of cost for those machines with lower value-to-weight ratios. This may account to a degree for the existence of local manufacture and distribution of simpler farm implements, such as tillage equipment.

The main reason for the Canadian industry's outbound transportation cost disadvantage is the difference in distances to major market areas. Major U.S. manufacturing centres, such as Moline, Ill., are located centrally to the North American market. Canadian centres, such as Brantford and Winnipeg, are located peripherally. (The major portion of the North American market is located in the United States and is concentrated within a few hundred miles of Moline.)

It was found that for shipments of equal weights over equal distances, rates were generally slightly lower in Canada than in the United States. The availability of lower rates for heavier shipments was greater in Winnipeg than in Moline, Ill., with the least availability in Brantford. In the context of the entire North American market, even large differences between Canadian and U.S. rates for equal services would have but a small effect on the cost disadvantages.

COST DIFFERENTIALS

(+ advantage; - disadvantage)

	From Brantford		From Winnipeg	
	$ Per Unit	% of Whlsl. Value	$ Per Unit	% of Whlsl. Value
Actual rail rates				
--Differences in distances to major market areas	-32	-0.69	-52	-1.13
--Differences in rates for transporting shipments of equal weights over equal distances	+7	+0.15	+2	+0.04
--Differences in availability of lower rates for heavier shipments	-5	-0.11	+8	+0.17
--Balance	-1	-0.02	-5	-0.10
--Actual rail rates net	-31	-0.67	-47	-1.02
Low-cost factory-to-dealer truck transportation from Moline to the large local market surrounding that centre				
--Rail loading and blocking charges*	-4	-0.09	-4	-0.09
Lower loading and blocking charges				
--Incurred by using specially equipped flat cars generally available in the United States but not in Canada	-7	-0.15	-7	-0.15
Total Cost Differentials	-42	-0.91	-58	-1.26
Hypothetical increase of 20% in Canadian rail rates from a level equal to U.S. rates	-5	-0.11	-3	-0.06

* Assumes shipment into Moline's local market area by rail, and transfer to truck for delivery to dealer. Rail loading and blocking charges on Moline-bound units are averaged over all units. Truck loading and blocking charges would be included in truck rates. There would, however, be an additional nominal transfer cost.

Rail rate disadvantages are included in actual rail rate figures.

Figures are based on data in Tables D.2, D.6, D.17, D.38, and D.39.

The effects of distance differences and of other minor factors are presented in terms of estimated, average, per-unit-cost penalties for transporting representative wheeled tractors (the most important farm machine type) to major market areas from Brantford and Winnipeg, rather than from Moline. Although not noted specifically as tractor manufacturing centres, the three origins represent farm machinery manufacturing concentrations. Averages are weighted to reflect the market distribution pattern. Calculations are based on a per-unit weight of 6,100 pounds and wholesale value of $4,616.

The per-unit-cost penalties of $42 and $58 for wheeled tractors from Brantford and Winnipeg, respectively, may be examined as to impact on large-volume production. Based on the 1965 North American sales of 189,000 units, a supplier of 20 per cent of the total volume (in each market area) would incur a total penalty for transportation from Brantford of $1.6 million, and from Winnipeg of $2.2 million.

For automatic balers and tandem wheel-type disk harrows, as well as wheeled tractors, the cost penalties from Winnipeg were greater than from Brantford. The market for self-propelled combines, however, is so heavily concentrated in the West that the cost penalty from Winnipeg was less than from Brantford.

Tandem wheel-type disk harrows have a considerably lower value per pound than wheeled tractors ($0.34 versus $0.76). For the former machine type, with its lower value-to-weight ratio, total net actual rate cost disadvantages were estimated at 1.4 per cent and 1.9 per cent of representative wholesale value from Brantford and Winnipeg, respectively. Rail loading and blocking charge penalties for shipments by rail into the Moline local market area were calculated to be 0.3 per cent. No cost disadvantage was incurred due to the absence of specially equipped flat cars in Canada, since these implements cannot be loaded and blocked in the required manner.

As there is a Canadian-U.S. free market for farm machinery, consideration of the Canadian market in isolation was limited. It is noted, however, that, as the major portion of the Canadian market is concentrated on the Prairies, Winnipeg enjoys a major locational advantage compared with Brantford and Moline, and Moline enjoys a locational advantage compared with Brantford, for this nation's market.

III - FINDINGS

Relative Rate Advantage

For the machine/route examples studied, it was shown that, in terms of average lowest quoted outbound rail rates weighted to reflect the distribution of the North American market for farm machinery by market areas, there was a rate advantage in transporting to major market areas from Moline, relative to transporting from either Brantford or Winnipeg.

Farm Machine	Weighted Average Rate from Moline $ per cwt.	Weighted Average Rate Penalty from Brantford $ per cwt.	Brantford % of Moline	Winnipeg $ per cwt.	Winnipeg % of Moline
Wheeled tractor	1.13	0.50	44.2	0.77	68.1
Self-propelled combine	1.12	0.71	63.4	0.47	42.0
Automatic baler	1.20	0.49	40.8	0.61	50.8
Tandem wheel-type disk harrow	1.22	0.49	40.2	0.65	53.3

As shown in the data above, the weighted average rates for transportation from Brantford were lower than the comparable rates from Winnipeg, except for transportation of self-propelled combines.

The relative rate advantages were analysed from two points of view:

(1) Impact on cost and profit.

(2) Analysis of differences.

Impact on Cost and Profit -- The relative rate advantages of transportation from Moline, rather than from Brantford or Winnipeg, were considered from three points of view:

(1) Impact on average cost for distribution of machines to all major market areas.

(2) Impact on average cost of machines with different value-to-weight ratios.

(3) Impact on specific cost for distribution of machines to the two key major market areas.

In the tabulation below the weighted average lowest quoted rail rates for transportation from Moline, and the rate penalties for transportation from Brantford and Winnipeg, to the major North American market areas are expressed in per-unit terms and as percentages of representative wholesale value.

Farm Machine	Representative Wholesale Value		Weighted Average per Unit Rate from Moline		Weighted Average per Unit Rate Penalty from			
					Brantford		Winnipeg	
	$ per Unit	$ per lb.	$	% of Whlsl.	$	% of Whlsl.	$	% of Whlsl.
Wheeled tractor	4,616	0.76	69	1.5	31	0.7	47	1.0
Self-propelled combine	7,314	0.75	110	1.5	69	0.9	46	0.6
Automatic baler	1,436	0.60	29	2.0	12	0.8	15	1.0
Tandem wheel-type disk harrow	718	0.34	26	3.6	10	1.4	14	1.9

For the machines of relatively high per-unit value, wheeled tractors ($4,616) and self-propelled combines ($7,314), the penalties at the two locations ranged from $31 to $69. For the tandem wheel-type disk harrows, with the relatively low per-unit value of $718, the penalties ranged from $10 to $14 at Brantford and Winnipeg.

Most types of farm machinery may be shipped over most routes at the same rates, as indicated in Table D.13. The data shown above indicate the absolute dollar value and the percentage of wholesale value impact of the penalties on values of farm machines with different value-to-weight ratios. As expected, the impact is less severe on the machines with higher values per pound. Penalties for the higher-valued wheeled tractor and self-propelled combine ranged from 0.6 per cent to 1.0 per cent of representative wholesale value, and for the lower-valued tandem wheel-type disk harrows

from 1.4 per cent to 1.9 per cent on the same basis as the previous paragraph.

Below are displayed data on the per-unit rail rates for transportation from Moline, and rate penalties relative to Moline for transportation from Brantford and Winnipeg, to destination points within the two key major market areas. The importance of the U.S. East and West North Central Regions market (Chart D.1 and Table D.10) justifies particular interest in the impact of penalties on costs of transportation into these two market areas, especially for high-volume machines such as wheeled tractors and self-propelled combines. The penalties ranged from 0.5 per cent to 3.9 per cent of representative wholesale value.

Farm Machine and Destination Point	% Share of N.A. Market	Lowest Rate per Unit from Moline		Lowest Rate Penalty per Unit from Brantford		Lowest Rate Penalty per Unit from Winnipeg	
		$	% of Whlsl.	$	% of Whlsl.	$	% of Whlsl.
Wheeled Tractor							
East North Central (Logansport, Ind.)	19.4	35	0.8	24	0.5	81	1.8
West North Central (Omaha, Neb.)	22.8	51	1.1	52	1.1	48	1.0
Self-Propelled Combine							
East North Central (Logansport, Ind.)	24.9	57	0.8	39	0.5	130	1.8
West North Central (Omaha, Neb.)	28.2	82	1.1	83	1.1	76	1.0
Automatic Baler							
East North Central (Logansport, Ind.)	15.4	14	1.0	10	0.7	32	2.2
West North Central (Omaha, Neb.)	23.5	20	1.4	20	1.4	19	1.3
Tandem Wheel-Type Disk Harrow							
East North Central (Logansport, Ind.)	17.0	12	1.7	8	1.1	28	3.9
West North Central (Omaha, Neb.)	20.9	18	2.5	18	2.5	16	2.2

While the percentage relation of the rate penalties amounts to a minor part of the value of the farm machines studied, profits may also be in the same percentage range. Therefore, the rate penalties indicated could be significant in relation to profits.

Analysis of Differences -- The relative rate advantages for transportation from the three selected origin points were analysed with respect to three factors:

(1) Differences in distances to major market areas.

(2) Differences in rates for equal service (equal services were taken to be the transportation of shipments of equal weight over equal distances).

(3) Differences in availability of lower rates for heavier shipments (rail rates per hundredweight may be progressively lower for shipments of succeedingly higher minimum weights).

In Table D.17 it is shown that the major causes of relative rate advantages for distribution to the major North American market areas from Moline, rather than from Brantford or Winnipeg, are differences in distances to major markets. In every one of the examples, rail rates for equal services were lower from Brantford and Winnipeg versus Moline. This resulted in minor offsets to the Moline-based relative rate advantages.

Further minor offsets due to greater availability of lower rates for heavier shipments were applied to the Moline distance advantage versus Winnipeg. In comparison with Moline, however, the availability of lower rates for heavier shipments was more restricted for transportation from Brantford. Thus this factor reinforced the relative rate advantages for distribution from Moline rather than from Brantford.

Canadian Rate Leverage

It has already been noted that the differences in rates for equal services were a minor factor in the weighted-average rate penalties for transportation from Brantford and Winnipeg relative to transportation from Moline. Without suggesting that such a spread between Canadian and U.S. rates would ever exist, it is of interest to examine the effect of a hypothetical 20 per cent increase in Canadian rates from a level equal to U.S. rates, in terms of change in rate penalties. This is illustrated below.

Farm Machine	Origin	$ per cwt. Moline Rate	Penalty due to 20% Cdn. Rate Increase	Penalty as % of Moline Rate
Wheeled tractor	Brantford	1.13	0.09	8.4
	Winnipeg	1.13	0.05	4.4
Self-propelled combine	Brantford	1.12	0.15	13.4
	Winnipeg	1.12	0.02	1.8
Automatic baler	Brantford	1.20	0.11	9.2
	Winnipeg	1.20	0.06	5.0
Tandem wheel-type disk harrow	Brantford	1.22	0.12	9.8
	Winnipeg	1.22	0.08	6.6

These percentage penalties may be related to the previously displayed per-unit penalties for transporting wheeled tractors from Brantford, $31, and from Winnipeg, $47. The Canadian rate-increase penalties would be $5 and $3, respectively.

Thus the proportional effect of a given Canadian rate increase on the weighted-average rate differences would be less than the proportion of the price increase, especially in the case of differences between weighted-average rates from Moline and from Winnipeg. Due to the relative importance of the U.S. part of the North American market, farm machines distributed to the continent from any of the three origins must be dispatched via U.S. rails over long distance. Distribution routes from Brantford are somewhat more dependent on Canadian rails than routes from Winnipeg; and routes from Moline are the least dependent (Tables D.18, D.19, D.23, D.24, D.28, D.29, D.33, and D.34).

Truck-Competitive Local Market Size

Especially over shorter routes, truck rates can be lower[2/] than rail rates (Table D.38). Of interest is the effect of these lower rates on the locational advantage of origins (such as Moline) surrounded by large local markets, as opposed to origins (such as Brantford or Winnipeg) surrounded by smaller local markets. The effect of the lower truck rates was found to be insignificant.

2/ Royal Commission on Canada's Economic Prospects, Transportation in Canada, Appendix A, an Appraisal of the Motor Carrier Industry, by A. F. Hailey (Ottawa: Queen's Printer and Controller of Stationery, 1957), pp. 148-50.

Lower cost factory-to-dealer truck shipments may be employed with greater frequency from the origin point centred in a large local market. Shipments from an origin point well outside the large local market can, however, be transported into the area by rail and transferred to truck for delivery to dealers.

There would be a small rate advantage in shipping by truck from a centre surrounded by a large truck-competitive market. Truck rates have a higher increment per mile than rail rates, but rail rates have a higher "first mile" cost. Thus, over distances of up to a few hundred miles, truck transport is lower in cost. Averaged over the entire North American market, however, this advantage is not significant.

To explain further, Chart D.2 indicates that for 20,000-pound shipments by rail, the "first mile" charge is about 40 cents per cwt. with a charge of .2 cents per cwt. per subsequent mile. Let it be assumed that there is no start-up charge for truck, and that the increment is .3 cents per mile. (This is less than the lowest increment in Table D.38 -- .35 cents per mile from Moline to Logansport.) The additional per-mile increment by truck of .1 cent will equal the 40 cents "first mile" rail charge at a distance of 400 miles. At longer distances the higher truck-rate increment will generate a cost greater than rail. If it is further assumed that one half of the East and West North Central market for tractors is within 400 miles of Moline, the advantage of shipment by truck of a 6,100-pound wheeled tractor would be about $2.50, averaged over shipments to the entire North American market. Chart D.3 indicates the "first mile" rail charge for 40,000-pound shipments to be about 10 cents. Thus about 100 miles would represent the break-even distance for truck and rail rates for heavier shipments, assuming the truck increment per mile exceeded that for rail by .1 cent. For 40,000-pound shipments, the truck-competitive rate advantage in transporting from Moline would be less than $1 per unit, averaged over the entire North American market.

It may be helpful to discuss this point in relation to the distribution of self-propelled combines. A high proportion of the sales of this machine are concentrated within the truck competitive market centred on Moline. Thus the market favours distribution by truck from Moline.

During the last few years, particularly in the U.S. Midwest, rail has improved its competitive position versus truck. Special rail equipment and rates notwithstanding, truck transport remains the least-cost alternative over shorter distances. Door-to-door service by a single carrier eliminates costs of transfer from one mode to another. Truck transportation is often the lowest-cost mode for smaller shipments. There can also be fortuitous economies. For instance, a dealer may need some sort of pick-up trailer for transporting farm machinery to and from customers. If the dealer is located close enough to the factory the same pick-up trailer can be used to move farm machinery from the factory to the dealership. Such use generates additional variable mileage costs but does not affect the dealer's fixed costs of maintaining a pick-up truck.

In order to simplify estimation of this "extra" saving by the use of truck versus rail, it was assumed that all shipments to markets within 200 miles of a factory were by truck. The markets within 200 miles of the example Canadian centres, Brantford and Winnipeg, are quite small. No calculation was made of the savings through the use of distribution from these centres by truck rather than rail. Thus an estimate was made only for savings on truck distribution from the selected U.S. Midwest centre, Moline. It was assumed that truck transportation by conventional and special rigs under normal and fortuitous conditions produced an average per-mile cost of 25 cents. This assumption was based partly on a trucking industry rule of thumb that a conventional highway rig must earn at least 50 cents per mile travelled in order to operate in the black, and partly on the fact that many dealers can move farm machinery from the factory for only a few cents per mile out-of-pocket costs. The example shipment was taken as two self-propelled combines weighing 9,800 pounds each. We believe these assumptions tend to overstate the savings available through the use of truck rather than rail transport from a factory located in the U.S. Midwest.

Based on visual area pro-ration of state sales, it is estimated that 13.8 per cent of the self-propelled combines purchased in Canada and the United States in 1965 were sold within 200 miles of Moline; 1.3 per cent within 50 miles, 3.7 per cent from 50 to 100 miles, and 8.8 per cent within 100 to 200 miles. These proportions

were used to average estimates over all Canadian and U.S. units. Truck and rail comparisons were taken at 25, 75, and 150 miles. Truck costs were taken in two situations: shipper pays only for one-way distance, and shipper pays for distance both ways. Rail rates were based on the equations in Charts D.2 and D.3 for 20,000- and 40,000-pound rail rates.

Cost Advantage per Unit for Local Distribution by Truck Rather than Rail from Moline, Averaged over all Canadian and U.S. Units

	Versus 20,000-Pound Rail Rates	Versus 40,000-Pound Rail Rates
Shipper pays for truck one way only	$5.60	$4.45
Shipper pays for truck both ways	2.00	-

These costs would be of secondary importance compared with the total transportation cost penalties for distribution from Brantford or Winnipeg rather than Moline.

	Brantford Cost over Moline	Winnipeg Cost over Moline
Rail rates	$70.00	$46.00
Rail loading and blocking on shipments into Moline's local truck market	14.00	14.00
Loading and blocking on special rail cars available in the United States	16.00	16.00
	$100.00	$76.00

The loading and blocking savings for local trucking were based on truck service to the entire East and West North Central regions. In effect this generous assumption provided for savings based on differences between truck rates (including fortuitous costs) and rail charges.

Loading and Blocking Charges, Transfer Costs

Although the locational advantage of origin points in local markets of varying size is not affected by low truck rates, loading and blocking charges, and costs of transferring shipments from rail to truck, exert minor influences.

Truck rates include loading and blocking charges, whereas these charges are additional to rail rates. Thus rail shipments

from a remote origin point into a local market area incur loading and blocking charges that are not incurred in factory-to-dealer shipments by truck from a point within the local market area. Therefore, these charges will increase the locational advantage of the origin point centred in the large market area, depending on the difference in size of local market areas of the origin points being compared.

The effect, however, would be minor. For example, it will be recalled that the weighted-average-per-unit-rate penalties for distributing wheeled tractors from Brantford and Winnipeg, rather than from Moline, were $31 and $47, respectively. If it is assumed that all of the East and West North Central regions constitute the truck-competitive local market for Moline, the estimated $9 loading and blocking charge for a 6,100-pound unit (Table D.39, 6,100-pound unit as a composite of a 4,000- and 10,000-pound unit), would increase the penalties by $4, on a weighted-average basis.

Transfer costs would be minor and would be analysed in a similar way. It may be pointed out that since truck rates include loading and blocking charges, transfer costs would not include such charges.

Specially Equipped Cars

A small locational advantage accrues to U.S. origin points over Canadian, in that rail flat cars specially equipped for low-cost loading are generally available in the United States. These are known as "ag", "F.M.S." or "TTX" cars. They are equipped with four lengthwise channels, one on each side and two inboard. Within the channels are winches that may be recessed in the channels if not used. If desired, the winches may be flipped up and moved along the channels to stations three inches apart. Chains are then run at right angles to the winches in order to secure the machinery. These cars may be used for farm machines such as tractors and self-propelled combines. Examples of the estimated cost saving are shown in Table D.39. For a tractor weighing 6,100 pounds, loading and blocking would cost approximately $7 less on a specially equipped car, as opposed to a conventional car.

Canadian Market in Isolation

The largest portion of the Canadian market (53 per cent of the wheeled tractors, 85 per cent of the self-propelled combines,

53 per cent of the automatic balers, and 51 per cent of the tandem wheel-type disk harrows) is located in the Prairie Provinces (Tables D.6, D.7, D.8, and D.9). Except for the small market in British Columbia, the remaining farm machinery purchases occur in the East, mainly in Ontario.

Given such a distribution of the market, and the previously demonstrated importance of distance as a rate factor, it is of interest to compare rail mileages (Table D.11) from the three selected origins to Regina in the West and London in the East.

	Brantford	Winnipeg	Moline
		(Rail miles)	
Regina, Sask.	1,623	357	1,058
London, Ont.	56	1,336	531

As long as the major portion of the Canadian market is located in the Prairies, there will be a locational advantage in distributing to this nation's market from Winnipeg, compared with distributing from the other two origin points. It would also appear that there will be a smaller locational advantage in distributing from Moline, compared with Brantford. Compared to Brantford, Moline is much closer to the large market in the Canadian Prairies, and this more than compensates for the remoteness of Moline from Canada's markets in the East.

The effect of a hypothetical 20 per cent decrease in Canadian rail rates, from a level equal to U.S. rates, may be observed on the per-unit rates to transport representative wheeled tractors from the three origin points to Regina and London.

	Brantford	Winnipeg	Moline
	(Percentage decrease in rate)		
Regina, Sask.	20.0	20.0	3.7
London, Ont.	20.0	20.0	4.1

The effect of the hypothetical decrease would be directly proportional on the rates from the Canadian origin points, since the routes involved are entirely over Canadian rails. On the rates from Moline, the effect would be much less than proportional, since the routes involved are mainly over U.S. rails.

The competitive position of Brantford and Winnipeg compared with Moline would be significantly improved.

IV - SUPPORTING MATERIAL

Use of Examples

From several aspects, the distribution of farm machinery presented a variety and complexity that defied development of simplifying general expressions.

(1) There are many and varied types of farm machines.
(2) Manufacturing plants are located throughout North America.
(3) Farm machines are transported to ultimate consumers all across the continent.
(4) Farm machines are moved by different modes of transport.
(5) The transportation of farm machines to ultimate consumer usually occurs in several stages.

Therefore, examples were selected to represent the most common activity patterns and also to represent some of the variety observed.

Distribution Stages -- In order to assess the effect of transportation rates on the competitive position of the Canadian farm machinery industry, it was necessary to study the transportation rates for the stage of distribution in which farm machinery is moved from factory to points en route within general market areas. It is within this stage that transportation rates vary, depending on factory location. Thus the selected destinations are destination points in terms of example routes, and points en route in terms of the total distribution process.

Subsequent stages of progressively more localized distribution can be important in terms of absolute transportation costs. Nevertheless, costs incurred in these subsequent stages can be (with the exceptions noted below) equal, regardless of factory location.

Machine Types, Origin Points, Destination Points -- Machine types, origin points, and destination points were selected to make up machine/route examples.

The dollar-sales importance and variety of farm machine types selected may be assessed by reference to Tables D.1 and D.2. The origin points are within market areas that account for more than 80 per cent of the farm machine manufacturing activity (Table D.5). Destination points are centrally located within major retail areas of the North American market (Table D.10). The 90 machine/route examples, covering more than 70 per cent of the retail sales studied, are set out below.

	Origin Points: Brantford, Winnipeg, Moline			
Destination Points:	Wheeled Tractor	Self-Propelled Combine	Automatic Baler	Tandem Wheel-Type Disk Harrow
Sherbrooke, Quebec	X		X	
London, Ontario	X		X	X
Winnipeg, Manitoba		X		X
Regina, Saskatchewan	X	X	X	X
Edmonton, Alberta	X	X	X	X
Charlotte, N. Carolina	X			X
Nashville, Tennessee			X	
Dallas, Texas	X	X	X	X
Logansport, Indiana	X	X	X	X
Omaha, Nebraska	X	X	X	X

The destination points were selected to be central to the sales volume within the regions and to co-ordinate with points used in other Royal Commission studies. The analysis is reasonably insensitive to changes in destination points. First, after the first mile, rail-rate increments per mile are low. Second, no one destination point is critical, especially those points within regions with low sales volumes. Third, most of the regions are outside the triangle formed by lines joining the three origin points. Therefore, moving the destination points in the outside regions would affect rates from all the origins rather than the differences in rates.

Mode of Transport -- Rail was selected as the mode of transport. From the point of view of the Canadian industry, it is the more important. In the transportation examples studied, rail is the traditional carrier. Most distances are sufficiently long to be well within rail's competitive distance range. The use of low truck-competitive rates and specially equipped rail cars (in the United States) indicates a desire on the part of railroads to continue to transport farm machinery in the future.

Effects of Selection and Manipulation of Data

Over the distribution stage considered, rail rates constituted the major share of the transportation cost and, therefore, analysis was concentrated on these rates.

Exclusive Use of Rail Rates -- Although the exclusive use of rail rates for the calculation of weighted-average rates facilitated analysis, the practice led to bias. Over shorter hauls, truck transportation can be of lower cost than rail. Even when the rates per hundredweight appear to be about equal for truck and rail transport, two factors must be kept in mind:

(1) Loading and blocking charges are included in truck, but not in rail, rates.

(2) Truck shipments may be dispatched directly to the dealer, or even to the ultimate consumer, whereas rail shipments can go only as far as a siding. The dealer must detail men and equipment to move the shipment from the siding further on its journey to the final purchaser.

The market within a few hundred miles of Moline is several times as large as the markets within comparable ranges of either Brantford or Winnipeg. Thus the use of rail rates to calculate local haulage costs tends to more seriously overstate those costs, because of market volume, in the case of distribution from Moline. It will be noted that this upward pressure on the weighted average of rates originating from Moline generates a slight understatement of the advantages of distribution from that centre.

Concentration on Major Markets -- Transportation costs from the three selected origins to the major North American market areas were compared on the basis of averages weighted so as to reflect the distribution of unit sales by market area. Some market areas were excluded because of their small size and peripheral location in relation to all three origin points. If rates to these minor areas had been included, an increase in all the weighted averages would have resulted because of the higher rates to the peripheral areas. There would, however, have been little change in the difference between the weighted averages, and it was these differences that reflected locational advantages.

Weighting by Unit Volume -- Rail rates are based on shipment tonnage. Thus the weighting factors, which were based on unit sales, are inaccurate due to differences in average machine size in the various market areas. It was possible to prepare for wheeled tractors an estimated distribution by tonnage and compare the distribution of estimated tonnage and unit retail sales. The differences would not have been significant for the purpose of this study. It was assumed that the situation would be similar for the other machine type.

Estimation of Sales for Disk Harrows -- While reliable information on the other three types of farm machinery was available, it was necessary to estimate U.S. unit sales for tandem wheel-type disk harrows. It is unlikely that any error in these estimates would materially affect the conclusions. The estimate did provide an assumption of sales distribution in order that weighted-average calculations might proceed for a farm machine with a value per pound considerably less than that of the other three machine types.

The data for the Canadian market areas are as per DBS 1965 Farm Implement and Equipment Sales.

The U.S. and Canadian shares were calculated as the ratios of the following two quantities to their total:

U.S. Share: [1963 U.S. Census Wholesale Trade, Farm and Garden Machinery Equipment Establishment Sales] x 1.0775

Canadian Share: [1961 Canadian Census Wholesale Trade, Farm Machinery and Equipment Location Sales] x [DBS Farm Implement and Equipment Sales (including Repair Parts)] for year 1963 ÷ year 1961

For the South Atlantic and Pacific regions, the U.S. Census gives the number of wholesale farm and garden machinery establishments, but does not give regional sales. That part of the national sales total not classified to other regions was assigned to these two regions as per the ratio of the numbers of establishments in each of the two regions.

Balancing Entries in Analysis of Rate Advantage -- Analysis was conducted in order to determine the relative importance of three factors in the differences in weighted-average rates from the three origin points. The three factors were:

(1) Differences in distances to major market areas.
(2) Differences in rate prices for equal services.
(3) Differences in availability of lower rates for heavier shipments.

In Table D.17 may be found balancing entries that indicate inaccuracies due to oversimplification. First, the least-square lines, which were used to place rate values on the differences in weighted-average rail mileage, are not perfect expressions of the relationship between rates and distances (Charts D.2 and D.3). Secondly, rate price-level differences are based on trend-line rates for 20,000- and 40,000-pound shipments. Rates were not in all cases, however, quoted on the basis of these figures for minimum and maximum shipment weights, respectively (Table D.13). (Price-level differences for routes originating from Winnipeg and Moline were adjusted for rates on shipments exceeding 40,000 pounds.) Thirdly, the value of lower rates for heavier shipments is calculated using an assumption of minimum shipment weight of 20,000 pounds. As noted above, minimum rates were not in all cases quoted for shipments of that weight.

Wheeled-Tractor Price and Horsepower Data

Table D.40 and Charts D.6 and D.7 are intended to show that there are rough relationships among tractor price, weight, and power. In Chart D.6 it is observed that tractor weight per power take-off horsepower is about the same for tractors of low- and high-power ratings. Transportation rates are generally based on weight. Thus transportation cost is a roughly constant cost per horsepower.

In Chart D.7 it is observed that one power take-off horsepower is priced about the same, whether the tractor has a low- or high-power rating. The transportation cost, which is roughly constant per horsepower, is, then, also roughly constant relative to horsepower cost, as measured by suggested retail price.

TABLE D.1

DOLLAR SALES AND PERCENTAGE OF TOTAL DOLLAR SALES FOR SELECTED FARM MACHINERY TYPES IN CANADA, 1966

Farm Machinery	Wholesale Value '000	Percentage of Total	Cumulative Percentage of Total
Wheeled tractor	118,763	32.2	32.2
Self-propelled combine	68,566	18.5	50.7
Automatic baler	17,561	4.7	55.4
Tandem wheel-type disk harrow	2,724	0.7	56.1
Total	207,614	56.1	-
Total farm implement and equipment sales, less garden tractors	369,920	100.0	-

Source: Calculations based on DBS 1965 Farm Implement and Equipment Sales data.

TABLE D.2

AVERAGE-PER-UNIT VALUE AND WEIGHT CHARACTERISTICS OF SELECTED FARM MACHINERY TYPES

		Royal Commission Representative Models		
			Wholesale Value	
Farm Machinery Type	Wholesale Value DBS $	Weight cwt.	$ per Unit	$ per Lb.
Wheeled tractor	4,422	61	4,616	0.76
Self-propelled combine	7,951	98	7,314	0.75
Automatic baler	1,527	24	1,436	0.60
Tandem wheel-type disk harrow	658	21	718	0.37

Source: Calculations based on DBS 1965 Farm Implement Equipment Sales and Royal Commission data.

TABLE D.3

PROVINCES OR STATES WITHIN MARKET AREAS OF NORTH AMERICA, AND SELECTED ORIGIN AND DESTINATION POINTS

Market Area	Provinces or States	Origin Points	Destination Points
Canada			
Atlantic Provinces	P.E.I., N.S., N.B. Newfoundland	-	Moncton, N.B.
Quebec	Quebec	-	Sherbrooke, Que.
Ontario	Ontario	Brantford, Ont.	London, Ont.
Manitoba	Manitoba	Winnipeg, Man.	Winnipeg, Man.
Saskatchewan	Saskatchewan	-	Regina, Sask.
Alberta	Alberta	-	Edmonton, Alta.
British Columbia	British Columbia	-	Vancouver, B.C.
United States			
New England and Middle Atlantic	Me., N.H., Vt., Mass., R.I., Conn., N.Y., N.J., P.A.	-	Binghampton, N.Y.
South Atlantic	Del., Md., D.C., Va., W.Va., N.C., S.C., Ga., Fla.	-	Charlotte, N.C.
East South Central	Tenn., Ala., Miss., Ky.	-	Nashville, Tenn.
West South Central	Ark., La., Okla., Tex.	-	Dallas, Texas
East North Central	O., Ind., Ill., Mich.,	Moline, Ill.	
	Wisc.	Moline, Ill.	Logansport, Ind.
West North Central	Minn., Ia., Mo., N.D., S.D., Neb., Kan.	Moline, Ill.	Omaha, Neb.
Mountain	Mont., Ida., Wyo., Colo., N.M., Ariz., Nev., Ut.	-	Salt Lake City, Ut.
Pacific	Wash., Ore., Cal.	-	Sacramento, Cal.

Source: Market areas based on DBS and U.S. Bureau of the Census geographic divisions.

TABLE D.4

DOLLAR VALUE OF FACTORY SHIPMENTS OF FARM MACHINERY IN NORTH AMERICA, AND PERCENTAGE DISTRIBUTION BY ORIGIN MARKET AREA, 1963

Origin Market Area	Value $	Percentage of Total Canada	U.S.	N.A.
Canada				
Atlantic Provinces	*	-		-
Quebec	4,604	2.5		0.1
Ontario	152,792	83.7		4.7
Manitoba	17,982	9.9		0.6
Saskatchewan	2,761	1.5		0.1
Alberta	4,352	2.4		0.1
British Columbia	-	-		-
	182,491	100.0		5.6
United States				
New England and Middle Atlantic	144,379		4.7	4.4
South Atlantic	92,661		3.0	2.9
East South Central	228,128		7.4	7.0
West South Central	54,173		2.0	1.7
East North Central	1,525,972		49.7	47.1
West North Central	902,033		29.4	27.8
Mountain	24,180		0.8	0.7
Pacific	90,991		3.0	2.8
	3,062,517		100.0	94.4
Total North America	3,245,008	-	-	100.0

* Not disclosed in order to protect confidential nature of data.

Source: Calculations based on DBS, Bank of Canada, and U.S. Bureau of the Census data.

TABLE D.5

DOLLAR VALUE AND PERCENTAGE SHARES OF FACTORY SHIPMENTS OF FARM MACHINERY IN NORTH AMERICA ORIGINATING FROM MAJOR SOURCE MARKET AREAS, 1963, AND SELECTED ORIGIN POINTS

Major Source Market Area and Selected Origin Points	Value '000	Percentage of Total Canada	U.S.	N.A.
Canada				
Ontario				
Brantford, Ontario	152,792	83.7		4.7
Manitoba				
Winnipeg, Manitoba	17,982	9.9		.6
Total Ontario and Manitoba	170,774	93.6		5.3
United States				
East North Central and West North Central				
Moline, Illinois	2,428,005		79.1	74.9
Total major source market areas in North America	2,598,779	-	-	80.2

Source: Table D.4.

TABLE D.6

UNIT AND ESTIMATED TONNAGE VOLUME OF RETAIL SALES OF WHEELED TRACTORS IN NORTH AMERICA, AND PERCENTAGE DISTRIBUTION BY RETAIL MARKET AREA, 1965

Retail Market Area	Unit Retail Sales: Units Retailed	Unit Retail Sales: Percentage of Total Can. or U.S.	Unit Retail Sales: Percentage of Total N.A.	Estimated Tonnage: Estimated Tons	Estimated Tonnage: Percentage of Total Can. or U.S.	Estimated Tonnage: Percentage of Total N.A.
Canada						
Atlantic Provinces	1,270	4.7	0.7	2,363	3.2	0.4
Quebec	3,556	13.2	1.9	6,344	8.7	1.2
Ontario	6,897	25.8	3.5	14,849	20.3	2.8
Manitoba	3,037	11.3	1.6	9,493	13.0	1.8
Saskatchewan	6,534	24.3	3.5	22,663	31.0	4.2
Alberta	4,680	17.4	2.5	15,720	21.5	2.9
British Columbia	881	3.3	0.5	1,667	2.3	0.3
Total Canada	26,855	100.0	14.2	73,099	100.0	13.6
United States						
New England and Middle Atlantic	8,655	5.3	4.6	20,820	4.5	3.9
South Atlantic	21,146	13.0	11.2	44,671	9.6	8.3
East South Central	18,337	11.3	9.7	42,707	9.2	7.9
West South Central	21,459	13.2	11.3	65,922	14.2	12.3
East North Central	36,816	22.7	19.4	112,436	24.2	20.9
West North Central	43,212	26.6	22.8	141,519	30.4	26.3
Mountain	7,106	4.4	3.8	22,149	4.8	4.1
Pacific	5,751	3.5	3.0	14,636	3.1	2.7
Total United States	162,482	100.0	85.8	464,860	100.0	86.4
Total North America	189,337	-	100.0	537,959	-	100.0

Source: Calculations based on DBS, Farm and Industrial Equipment Institute, Chicago, and Royal Commission data.

TABLE D.7

UNIT VOLUME RETAIL SALES OF SELF-PROPELLED COMBINES IN NORTH AMERICA, AND PERCENTAGE DISTRIBUTION BY RETAIL MARKET AREA, 1965

Retail Market Area	Units Retailed	Percentage of Total		
		Canada	U.S.	N.A.
Canada				
Atlantic Provinces	52	0.6		0.1
Quebec	246	2.9		0.5
Ontario	938	10.9		2.0
Manitoba	1,314	15.2		2.8
Saskatchewan	3,698	42.9		8.0
Alberta	2,306	26.7		5.0
British Columbia	70	0.8		0.2
Total Canada	8,624	100.0		18.6
United States				
New England and Middle Atlantic	570		1.5	1.2
South Atlantic	2,825		7.5	6.1
East South Central	2,082		5.5	4.5
West South Central	4,944		13.1	10.7
East North Central	11,536		30.6	24.9
West North Central	13,050		34.6	28.2
Mountain	1,563		4.2	3.4
Pacific	1,127		3.0	2.4
Total United States	37,697		100.0	81.4
Total North America	46,321	-	-	100.0

Source: Calculations based on DBS and Farm and Industrial Equipment Institute, Chicago, data.

TABLE D.8

UNIT VOLUME RETAIL SALES OF AUTOMATIC BALERS IN NORTH AMERICA, AND PERCENTAGE DISTRIBUTION BY RETAIL MARKET AREA, 1965

Retail Market Area	Units Retailed	Percentage of Total Canada	U.S.	N.A.
Canada				
Atlantic Provinces	589	5.1		1.0
Quebec	2,171	18.9		3.7
Ontario	2,337	20.3		4.0
Manitoba	1,212	10.5		2.1
Saskatchewan	2,321	20.2		4.0
Alberta	2,539	22.1		4.4
British Columbia	333	2.9		0.6
Total Canada	11,502	100.0		19.8
United States				
New England and Middle Atlantic	4,493		9.7	7.8
South Atlantic	3,743		8.1	6.5
East South Central	4,739		10.2	8.2
West South Central	5,001		10.8	8.6
East North Central	8,892		19.2	15.4
West North Central	13,623		29.4	23.5
Mountain	4,200		9.0	7.3
Pacific	1,686		3.6	2.9
Total United States	46,377		100.0	80.2
Total North America	57,879	-	-	100.0

Source: Calculations based on DBS and Farm and Industrial and Equipment Institute, Chicago, data.

TABLE D.9

ESTIMATED UNIT VOLUME RETAIL SALES OF TANDEM WHEEL-TYPE DISK HARROWS IN NORTH AMERICA, AND ESTIMATED PERCENTAGE DISTRIBUTION BY RETAIL MARKET AREA, 1965

Retail Market Area	Units Retailed	Percentage of Total		
		Canada	U.S.	N.A.
Canada				
Atlantic Provinces	69	1.7		0.4
Quebec	130	3.1		0.7
Ontario	1,749	42.3		8.8
Manitoba	150	3.6		0.8
Saskatchewan	331	8.0		1.7
Alberta	1,621	39.1		8.1
British Columbia	91	2.2		0.5
Total Canada	4,141	100.0		21.0
United States				
New England and Middle Atlantic	1,106		7.1	5.6
East North Central	3,349		21.5	17.0
West North Central	4,112		26.4	20.9
East South Central	1,059		6.8	5.4
West South Central	1,963		12.6	9.9
South Atlantic	1,854		11.9	9.4
Mountain	1,013		6.5	5.1
Pacific	1,122		7.2	5.7
Total United States	15,578		100.0	79.0
Total North America	19,719	-	-	100.0

Source: Calculations of estimates based on DBS, Canadian Census, and U.S. Bureau of the Census data.

TABLE D.10

PERCENTAGE SHARES OF UNIT RETAIL SALES OF SELECTED TYPES OF FARM MACHINES CONSUMED BY MAJOR RETAIL MARKET AREAS IN NORTH AMERICA, 1965, AND SELECTED DESTINATION POINTS

Major Retail Market Area and Selected Destination Points	Wheeled Tractors		Self-Propelled Combine		Automatic Baler		Tandem Wheel-Type Disk Harrow	
	% of Total		% of Total		% of Total		% of Total	
	Canadian or U.S.	N.A.	Canadian or U.S.	N.A.	Canadian or U.S.	N.A.	Canadian or U.S.	N.A.
Canada								
Sherbrooke, Quebec	13.2	1.9	-	-	18.9	3.7		
London, Ontario	25.8	3.5	-	-	20.3	4.0	42.3	8.8
Winnipeg, Manitoba	-	-	15.2	2.8	-	-	3.6	0.8
Regina, Saskatchewan	24.3	3.5	42.9	8.0	20.2	4.0	8.0	1.7
Edmonton, Alberta	17.4	2.5	26.7	5.0	22.1	4.4	39.1	8.1
Total Canadian major destination market areas	80.7	11.4	84.8	15.8	81.5	16.1	93.0	19.4
United States								
South Atlantic Charlotte, North Carolina	13.0	11.2	-	-	-	-	11.9	9.4
East North Central Logansport, Indiana	22.7	19.4	30.6	24.9	19.2	15.4	21.5	17.0
West North Central Omaha, Nebraska	26.6	22.8	34.6	28.2	29.4	23.5	26.4	20.9
East South Central Nashville, Tennessee	-	-	-	-	10.2	8.2	-	-
West South Central Dallas, Texas	13.2	11.3	13.1	10.7	10.8	8.6	12.6	9.9
Total U.S. major destination market areas	75.5	64.7	78.3	63.8	69.6	55.7	72.4	57.2
Total North American major destination market areas	-	76.1	-	79.6	-	71.8	-	76.6

Source: Tables D.6, D.7, D.8, and D.9.

TABLE D.11

RAIL MILEAGES FOR SELECTED MACHINE/ROUTE EXAMPLES

Destination Points	Origin Points		
	Brantford, Ont.	Winnipeg, Man.	Moline, Ill.
	Rail miles		
Sherbrooke, Quebec	492	1,507	1,078
London, Ontario	56	1,336	531
Winnipeg, Manitoba	1,267	-	754
Regina, Saskatchewan	1,623	357	1,058
Edmonton, Alberta	2,060	794	1,505
Logansport, Indiana	375	946	246
Omaha, Nebraska	908	705	320
Charlotte, North Carolina	921	1,646	940
Nashville, Tennessee	707	1,228	495
Dallas, Texas	1,302	1,377	802

Source: KPM & Co. Survey.

TABLE D.12

CANADIAN AND U.S. RAIL MILEAGES FOR SELECTED MACHINE/ ROUTE EXAMPLES THAT CROSS THE CANADIAN-U.S. BORDER

Destination Points		Origin Points: Brantford, Ont.	Winnipeg, Man.	Moline, Ill.
		Rail miles		
Sherbrooke, Que.	Cdn.	-	-	657
	U.S.	-	-	421
	Total			1,078
London, Ont.	Cdn.	-	-	110
	U.S.	-	-	421
	Total			531
Winnipeg, Man.	Cdn.	-	-	66
	U.S.	-	-	688
	Total			754
Regina, Sask.	Cdn.	-	-	196
	U.S.	-	-	862
	Total			1,058
Edmontona, Alta.	Cdn.	-	-	643
	U.S.	-	-	862
	Total			1,505
Logansport, Ind.	Cdn.	167	66	-
	U.S.	208	880	-
	Total	375	946	
Omaha, Neb.	Cdn.	167	66	-
	U.S.	741	639	-
	Total	908	705	
Charlotte, N.C.	Cdn.	167	66	-
	U.S.	754	1,580	-
	Total	921	1,646	
Nashville, Ten.	Cdn.	167	66	-
	U.S.	540	1,162	-
	Total	707	1,228	
Dallas, Tex.	Cdn.	167	66	-
	U.S.	1,135	1,311	-
	Total	1,302	1,377	

Source: KPM & Co. Survey.

TABLE D.13

RANGE OF RAIL RATES AND SHIPMENT WEIGHT MINIMA QUOTED FOR SELECTED MACHINE/ROUTE EXAMPLES

Origin Points	Destination Points	Minimum Weights ('000 lbs.) 18	20	24	30	40	50	60
		Rates, $ per cwt.						
Brantford, Ont.	Sherbrooke, Que.	1.33	1.33	-	1.33	-	-	-
Winnipeg, Man.	Sherbrooke, Que.	-	2.61	-	-	-	-	-
Moline, Ill.	Sherbrooke, Que.	-	3.26 1/	3.26 2/	-	-	-	-
Brantford, Ont.	London, Ont.	0.48	0.48	-	0.48	-	-	-
Winnipeg, Man.	London, Ont.	-	2.49	-	-	-	-	-
Moline, Ill.	London, Ont.	-	1.16 3/	1.16 4/	-	-	-	-
Brantford, Ont.	Winnipeg, Man.	2.49	2.49	-	-	-	-	-
Winnipeg, Man.	Winnipeg, Man.	-	-	-	-	-	-	-
Moline, Ill.	Winnipeg, Man.	-	2.14 5/	2.05 6/	1.94 5/	1.58 5/	-	-
Brantford, Ont.	Regina, Sask.	3.14	3.14	-	-	-	-	-
Winnipeg, Man.	Regina, Sask.	-	-	0.67	0.62	0.57	-	-
Moline, Ill.	Regina, Sask.	-	2.47	-	2.40	2.17	-	-
Brantford, Ont.	Edmonton, Alta.	3.90	3.90	-	-	-	-	-
Winnipeg, Man.	Edmonton, Alta.	-	-	1.43	1.35	1.24	1.19	1.14
Moline, Ill.	Edmonton, Alta.	-	3.36	-	3.30	3.07	-	-
Brantford, Ont.	Logansport, Ind.	-	0.98	-	-	-	-	-
Winnipeg, Man.	Logansport, Ind.	-	2.37	2.26	2.14	1.91	-	-
Moline, Ill.	Logansport, Ind.	-	0.87	0.78	0.68	0.58	-	-
Brantford, Ont.	Omaha, Neb.	-	2.11	2.00	1.90	1.69	-	-
Winnipeg, Man.	Omaha, Neb.	-	2.06	1.96	1.87	1.68	1.62	-
Moline, Ill.	Omaha, Neb.	-	1.12	1.06	0.98	0.84	-	-
Brantford, Ont.	Charlotte, N.C.	-	2.05	1.98	1.85	1.64	-	-
Winnipeg, Man.	Charlotte, N.C.	-	3.26	3.09	2.92	2.57	2.44	-
Moline, Ill.	Charlotte, N.C.	-	2.02	1.92	1.80	1.54	1.37	-
Brantford, Ont.	Nashville, Tenn.	-	1.82	1.74	1.64	1.48	-	-
Winnipeg, Man.	Nashville, Tenn.	-	2.76	2.61	2.48	2.21	2.08	-
Moline, Ill.	Nashville, Tenn.	-	1.40	1.32	1.23	1.06	0.93	-
Brantford, Ont.	Dallas, Tex.	-	2.61	2.47	2.34	2.06	-	-
Winnipeg, Man.	Dallas, Tex.	-	2.91	2.76	2.60	2.37	2.19	-
Moline, Ill.	Dallas, Tex.	-	1.87	1.76	1.64	1.40	1.27	-

1/ Not applicable to balers or harrows.
2/ Not applicable to combines or tractors.
3/ Not applicable to harrows.
4/ Not applicable to combines, tractors or balers.
5/ Not applicable to tractors or harrows:
Tractors -- 20,000 lbs. minimum weight at $2.10 per cwt.
Harrows -- 24,000 lbs. minimum weight at $1.90 per cwt.

Source: KPM & Co. Survey.

TABLE D.14

RANGE OF RAIL RATES AND CANADIAN AND U.S. RATE CONTENT AND SHIPMENT WEIGHT MINIMA QUOTED FOR SELECTED MACHINE/ ROUTE EXAMPLES CROSSING THE CANADIAN-U.S. BORDER

Origin Points	Destination Points		Minimum Weights ('000 lbs.) 18	20	24	30	40	50	60
			Rates, $ per cwt.						
Moline	Sherbrooke	Total	-	3.26	3.26	-	-	-	-
Moline	London, Ont.	Total	-	1.16	1.16	-	-	-	-
Moline	Winnipeg	Cdn.	-	0.50	0.50	0.50	0.50	-	-
		U.S.	-	1.64	1.55	1.44	1.08	-	-
		Total	-	2.14	2.05	1.94	1.58	-	-
Moline	Regina	Cdn.	-	0.74	-	0.74	0.74	-	-
		U.S.	-	1.73	-	1.66	1.43	-	-
		Total	-	2.47	-	2.40	2.17	-	-
Moline	Edmonton	Cdn.	-	1.59	-	1.59	1.59	-	-
		U.S.	-	1.77	-	1.71	1.48	-	-
		Total	-	3.36	-	3.30	3.07	-	-
Brantford	Logansport, Ind.	Total	-	0.98	-	-	-	-	-
Winnipeg	Logansport, Ind.	Cdn.	-	0.50	0.50	0.50	0.50	-	-
		U.S.	-	1.87	1.76	1.64	1.41	-	-
		Total	-	2.37	2.26	2.14	1.91	-	-
Brantford	Omaha, Neb.	Cdn.	-	0.38½	0.38½	0.38½	0.38½	-	-
		U.S.	-	1.72½	1.61½	1.51½	1.30½	-	-
		Total	-	2.11	2.00	1.90	1.69	-	-
Winnipeg	Omaha, Neb.	Cdn.	-	0.50	0.50	0.50	0.50	0.50	-
		U.S.	-	1.56	1.46	1.37	1.18	1.12	-
		Total	-	2.06	1.96	1.87	1.68	1.62	-
Brantford	Charlotte, N.C.	Cdn.	-	0.38½	0.38½	0.38½	0.38½	-	-
		U.S.	-	1.66½	1.59½	1.46½	1.23½	-	-
		Total	-	2.05	1.98	1.85	1.64	-	-
Winnipeg	Charlotte, N.C.	Cdn.	-	0.50	0.50	0.50	0.50	0.50	-
		U.S.	-	2.76	2.59	2.42	2.07	1.94	-
		Total	-	3.26	3.09	2.92	2.57	2.44	-
Brantford	Nashville, Tenn.	Cdn.	-	0.38½	0.38½	0.38½	0.38½	-	-
		U.S.	-	1.43½	1.35½	1.25½	1.09½	-	-
		Total	-	1.82	1.74	1.64	1.48	-	-
Winnipeg	Nashville, Tenn.	Cdn.	-	0.50	0.50	0.50	0.50	0.50	-
		U.S.	-	2.26	2.11	1.98	1.71	1.58	-
		Total	-	2.76	2.61	2.48	2.21	2.08	-
Brantford	Dallas, Texas	Cdn.	-	0.38½	0.38½	0.38½	0.38½	-	-
		U.S.	-	2.22½	2.08½	1.95½	1.67½	-	-
		Total	-	2.61	2.47	2.34	2.06	-	-
Winnipeg	Dallas, Texas	Cdn.	-	0.50	0.50	0.50	0.50	0.50	-
		U.S.	-	2.41	2.26	2.10	1.87	1.69	-
		Total	-	2.91	2.76	2.60	2.37	2.19	-

Source: KPM & Co. Survey.

TABLE D.15

AMOUNT AND PERCENTAGE OF RATE REDUCTION FROM 20,000 LBS. TO 40,000 LBS. SHIPMENT WEIGHT MINIMA FOR SELECTED MACHINE/ROUTE EXAMPLES WHERE BOTH RATES WERE QUOTED

Origin Points	Destination Points	Minimum Shipment Weight		Rate Reduction	
		20,000 lbs.	40,000 lbs.		
		Rates, $ per cwt.		$	%
Moline, Ill.	Winnipeg, Man.	2.14	1.58	0.56	35.4
Moline, Ill.	Regina, Sask.	2.47	2.17	0.30	13.8
Moline, Ill.	Edmonton, Alta.	3.36	3.07	0.29	9.4
Winnipeg, Man.	Logansport, Ind.	2.37	1.91	0.46	24.1
Moline, Ill.	Logansport, Ind.	0.87	0.58	0.29	50.0
Brantford, Ont.	Omaha, Neb.	2.11	1.69	0.42	24.9
Winnipeg, Man.	Omaha, Neb.	2.06	1.68	0.38	22.6
Moline, Ill.	Omaha, Neb.	1.12	0.84	0.28	33.3
Brantford, Ont.	Charlotte, N.C.	2.05	1.64	0.41	25.0
Winnipeg, Man.	Charlotte, N.C.	3.26	2.57	0.69	26.8
Moline, Ill.	Charlotte, N.C.	2.02	1.54	0.48	31.2
Brantford, Ont.	Nashville, Tenn.	1.82	1.48	0.34	23.0
Winnipeg, Man.	Nashville, Tenn.	2.76	2.21	0.55	24.9
Moline, Ill.	Nashville, Tenn.	1.40	1.06	0.34	32.1
Brantford, Ont.	Dallas, Tex.	2.61	2.06	0.55	26.7
Winnipeg, Man.	Dallas, Tex.	2.91	2.37	0.54	22.8
Moline, Ill.	Dallas, Tex.	1.87	1.40	0.47	33.6

Source: Calculations based on KPM & Co. Survey data in Table D.13.

TABLE D.16

LOWEST-QUOTED TREND LINE RAIL RATES FOR SELECTED MACHINE/ROUTE EXAMPLES

Origin Points	Destination Points	Minimum Shipments Weight 20,000 lbs.	40,000 lbs.
		Rates, $ per cwt	
Brantford, Ont.	Sherbrooke, Que.	1.32	-
Winnipeg, Man.	Sherbrooke, Que.	3.17	-
Moline, Ill.	Sherbrooke, Que.	2.38	-
Brantford, Ont.	London, Ont.	0.52	-
Winnipeg, Man.	London, Ont.	2.85	-
Moline, Ill.	London, Ont.	1.39	-
Brantford, Ont.	Winnipeg, Man.	2.73	-
Moline, Ill.	Winnipeg, Man.	-	1.42 1/
Moline, Ill.	Winnipeg, Man.	1.79 2/	-
Brantford, Ont.	Regina, Sask.	3.38	-
Winnipeg, Man.	Regina, Sask.	-	0.72
Moline, Ill.	Regina, Sask.	-	1.95
Brantford, Ont.	Edmonton, Alta.	4.17	-
Winnipeg, Man.	Edmonton, Alta.	-	1.49
Moline, Ill.	Edmonton, Alta.	-	2.74
Brantford, Ont.	Logansport, Ind.	1.10	-
Winnipeg, Man.	Logansport, Ind.	-	1.76
Moline, Ill.	Logansport, Ind.	-	0.53
Brantford, Ont.	Omaha, Neb.	-	1.69
Winnipeg, Man.	Omaha, Neb.	-	1.33
Moline, Ill.	Omaha, Neb.	-	0.66
Brantford, Ont.	Charlotte, N.C.	-	1.71
Winnipeg, Man.	Charlotte, N.C.	-	2.99
Moline, Ill.	Charlotte, N.C.	-	1.75
Brantford, Ont.	Nashville, Tenn.	-	1.34
Winnipeg, Man.	Nashville, Tenn.	-	2.25
Moline, Ill.	Nashville, Tenn.	-	0.96
Brantford, Ont.	Dallas, Tex.	-	2.38
Winnipeg, Man.	Dallas, Tex.	-	2.51
Moline, Ill.	Dallas, Tex.	-	1.50

1/ Combines and balers.

2/ Tractors and harrows.

Source: Calculations based on KPM & Co. Survey data in Table D.13, Charts D.2 and D.3.

TABLE D.17

FACTORS IN WEIGHTED-AVERAGE LOWEST-QUOTED RATE ADVANTAGES FOR DISTRIBUTION FROM MOLINE OVER BRANTFORD AND OVER WINNIPEG TO SELECTED DESTINATION POINTS IN MAJOR NORTH AMERICAN MARKET AREAS FOR SELECTED FARM MACHINE TYPES

Farm Machines	Advantage in Rate + from Moline - from Brantford or Winnipeg			
	Brantford		Winnipeg	
	$ per cwt.	%	$ per cwt.	%
Wheeled Tractor				
Rates for equal services	-0.12	- 24.0	-0.04	- 5.2
Low rates for heavy shipments	+0.09	+ 18.0	- .13	- 16.9
Distances to major market areas	+0.52	+104.0	+0.85	+110.4
Balance	+0.01	+ 2.0	+0.09	+ 11.7
Total net advantage	+0.50	100.0	+0.77	100.0
Self-Propelled Combine				
Rates for equal services	-0.23	- 32.4	-0.02	- 4.3
Low rates for heavy shipments	+0.11	+ 15.5	-0.10	- 21.3
Distances to major market areas	-0.76	+107.0	+0.52	+110.7
Balance	+0.07	+ 9.9	+0.07	+ 14.9
Total net advantage	+0.71	100.0	+0.47	100.0
Automatic Baler				
Rates for equal services	-0.18	- 36.7	-0.10	- 16.4
Low rates for heavy shipments	+0.07	+ 14.3	-0.12	- 19.7
Distances to major market areas	+0.56	+114.2	+0.74	+121.3
Balance	+0.04	+ 8.2	+0.09	+ 14.8
Total net advantage	+0.49	100.0	+0.61	100.0
Tandem Wheel-Type Disk Harrow				
Rates for equal services	-0.12	- 24.5	-0.06	- 9.1
Low rates for heavy shipments	+0.09	+ 18.4	-0.12	- 18.5
Distances to major market areas	+0.49	+100.0	+0.74	+113.8
Balance	+0.03	+ 6.1	+0.09	+ 13.8
Total net advantage	+0.49	100.0	+0.65	100.0

Source: Calculations based on KPM & Co. Survey data in Charts D.2 and D.3, and Tables D.18, D.20, D.21, D.22, D.23, D.25, D.26, D.27, D.28, D.30, D.31, D.32, D.33, D.35, D.36, and D.37.

TABLE D.18

WEIGHTED-AVERAGE RAIL MILEAGE FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL EIGHT SELECTED DESTINATION POINTS FOR WHEELED TRACTORS

(Weights reflect distribution of North American unit retail sales)

		Origin Points					
		Brantford, Ont.		Winnipeg, Man.		Moline, Ill.	
Destination Points	N.A. Market Weight Factor	Rail Miles	Miles x Factor	Rail Miles	Miles x Factor	Rail Miles	Miles x Factor
Sherbrooke, Que.	1.9	492	934.8	1,507	2,863.3	1,078	2,048.2
London, Ont.	3.5	56	196.0	1,336	4,676.0	531	1,858.5
Regina, Sask.	3.5	1,623	5,680.5	357	1,249.5	1,058	3,703.0
Edmonton, Alta.	2.5	2,060	5,150.0	794	1,985.0	1,505	3,762.5
Charlotte, N.C.	11.2	921	10,315.2	1,646	18,435.2	940	10,528.0
Logansport, Ind.	19.4	375	7,275.0	946	18,352.4	246	4,772.4
Omaha, Neb.	22.8	908	20,702.4	705	16,074.0	320	7,296.0
Dallas, Tex.	11.3	1,302	14,712.6	1,377	15,560.1	802	9,062.6
	76.1		64,966.5		79,195.5		43,031.2
Weighted Average:		854		1,041		565	

Source: Calculations based on KPM & Co. Survey data in Table D.10 and data in Table D.11.

TABLE D.19

WEIGHTED-AVERAGE CANADIAN RAIL MILEAGE FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL EIGHT SELECTED DESTINATION POINTS FOR WHEELED TRACTORS

(Weights reflect distribution of North American unit retail sales)

Destination Points	N.A. Market Weight Factor	Origin Points: Brantford, Ont. Cdn. Miles	Brantford, Ont. Miles x Factor	Winnipeg, Man. Cdn. Miles	Winnipeg, Man. Miles x Factor	Moline, Ill. Cdn. Miles	Moline, Ill. Miles x Factor
Sherbrooke, Que.	1.9	492	934.8	1,507	2,863.3	657	1,248.3
London, Ont.	3.5	56	196.0	1,336	4,676.0	110	385.0
Regina, Sask.	3.5	1,623	5,680.5	357	1,249.5	196	686.0
Edmonton, Alta.	2.5	2,060	5,150.0	794	1,985.0	643	1,607.5
Charlotte, N.C.	11.2	167	1,870.4	66	739.2	-	-
Logansport, Ind.	19.4	167	3,239.8	66	1,280.4	-	-
Omaha, Neb.	22.8	167	3,807.6	66	1,504.8	-	-
Dallas, Tex.	11.3	167	1,887.1	66	745.8	-	-
	76.1		22,766.2		15,044.0		3,926.8
Weighted Average:		299		198		52	

Source: Calculations based on KPM & Co. Survey data in Table D.10 and data in Table D.12.

TABLE D.20

WEIGHTED-AVERAGE LOWEST-QUOTED RAIL RATE PER HUNDREDWEIGHT FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL EIGHT SELECTED DESTINATION POINTS FOR WHEELED TRACTORS

(Weights reflect distribution of North American unit retail sales)

Destination Points	N.A. Market Weight Factor	Origin Points: Brantford, Ont. Rail Rate	Brantford, Ont. Rate x Factor	Winnipeg, Man. Rail Rate	Winnipeg, Man. Rate x Factor	Moline, Ill. Rail Rate	Moline, Ill. Rate x Factor
		$		$		$	
Sherbrooke, Que.	1.9	1.33	2.53	2.61	4.96	3.26	6.19
London, Ont.	3.5	0.48	1.68	2.49	8.72	1.16	4.06
Regina, Sask.	3.5	3.14	10.99	0.57	2.00	2.17	7.60
Edmonton, Alta.	2.5	3.90	9.75	1.14	2.85	3.07	7.68
Charlotte, N.C.	11.2	1.64	18.37	2.44	27.33	1.37	15.34
Logansport, Ind.	19.4	0.98	19.01	1.91	37.05	0.58	11.25
Omaha, Neb.	22.8	1.69	38.53	1.62	36.94	0.84	19.15
Dallas, Tex.	11.3	2.06	23.28	2.19	24.75	1.27	14.35
	76.1		124.14		144.60		85.62
Weighted Average:		1.63		1.90		1.13	

Source: Calculations based on KPM & Co. Survey data in Table D.10 and data in Table D.13.

TABLE D.21

WEIGHTED-AVERAGE RAIL RATE PER HUNDREDWEIGHT FOR 20,000-POUND SHIPMENTS FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL EIGHT SELECTED DESTINATION POINTS FOR WHEELED TRACTORS

(Weights reflect distribution of North American unit retail sales)

Destination Points	N.A. Market Weight Factor	Origin Points: Brantford, Ont. Rail Rate $	Brantford, Ont. Rate x Factor	Winnipeg, Man. Rail Rate $	Winnipeg, Man. Rate x Factor	Moline, Ill. Rail Rate $	Moline, Ill. Rate x Factor
Sherbrooke, Que.	1.9	1.33	2.53	2.61	4.96	3.26	6.19
London, Ont.	3.5	0.48	1.68	2.49	8.72	1.16	4.06
Regina, Sask.	3.5	3.14	10.99	0.67	2.35	2.47	8.65
Edmonton, Alta.	2.5	3.90	9.75	1.43	3.58	3.36	8.40
Charlotte, N.C.	11.2	2.05	22.96	3.26	36.51	2.02	22.62
Logansport, Ind.	19.4	0.98	19.01	2.37	45.98	0.87	16.88
Omaha, Neb.	22.8	2.11	48.11	2.06	46.97	1.12	25.54
Dallas, Tex.	11.3	2.61	29.49	2.91	32.88	1.87	21.13
	76.1		144.52		181.95		113.47
Weighted Average:		1.90		2.39		1.49	

Source: Calculations based on KPM & Co. Survey data in Table D.10 and data in Table D.13.

TABLE D.22

WEIGHTED-AVERAGE LOWEST-QUOTED TREND LINE RAIL RATE PER HUNDREDWEIGHT FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL EIGHT SELECTED DESTINATION POINTS FOR WHEELED TRACTORS

(Weights reflect distribution of North American unit retail sales)

Destination Points	N.A. Market Weight Factor	Origin Points: Brantford, Ont. Trend Rate $	Brantford, Ont. Rate x Factor	Winnipeg, Man. Trend Rate $	Winnipeg, Man. Rate x Factor	Moline, Ill. Trend Rate $	Moline, Ill. Rate x Factor
Sherbrooke, Que.	1.9	1.32	2.508	3.17	6.023	2.38	4.522
London, Ont.	3.5	0.52	1.820	2.85	9.975	1.39	4.865
Regina, Sask.	3.5	3.38	11.830	0.72	2.520	1.95	6.825
Edmonton, Alta.	2.5	4.17	10.425	1.49	3.725	2.74	6.850
Charlotte, N.C.	11.2	1.71	19.152	2.99	33.488	1.75	19.600
Logansport, Ind.	19.4	1.10	21.340	1.76	34.144	0.53	10.282
Omaha, Neb.	22.8	1.69	38.532	1.33	30.324	0.66	15.048
Dallas, Tex.	11.3	2.38	26.894	2.51	28.363	1.50	16.950
	76.1		132.501		148.562		84.942
Weighted Average:		1.74		1.95		1.12	

Source: Calculations based on KPM & Co. Survey data in Charts D.2 and D.3, and data in Table D.10.

TABLE D.23

WEIGHTED-AVERAGE RAIL MILEAGE FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL SIX SELECTED DESTINATION POINTS FOR SELF-PROPELLED COMBINES

(Weights reflect distribution of North American unit retail sales)

Destination Points	N.A. Market Weight Factor	Origin Points: Brantford, Ont. Rail Miles	Brantford, Ont. Miles x Factor	Winnipeg, Man. Rail Miles	Winnipeg, Man. Miles x Factor	Moline, Ill. Rail Miles	Moline, Ill. Miles x Factor
Winnipeg, Man.	2.8	1,267	3,547.6	-	-	754	2,111.2
Regina, Sask.	8.0	1,623	12,984.0	357	2,856.0	1,058	8,464.0
Edmonton, Alta.	5.0	2,060	10,300.0	794	3,970.0	1,505	7,525.0
Logansport, Ind.	24.9	375	9,337.5	946	23,555.4	246	6,125.4
Omaha, Neb.	28.2	908	25,605.6	705	19,881.0	320	9,024.0
Dallas, Tex.	10.7	1,302	13,931.4	1,377	14,733.9	802	8,581.4
	79.6		75,706.1		64,996.3		41,831.0
Weighted Average:		951		817		526	

Source: Calculations based on KPM & Co. Survey data in Table D.10 and data in Table D.11.

TABLE D.24

WEIGHTED-AVERAGE CANADIAN RAIL MILEAGE FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL SIX SELECTED DESTINATION POINTS FOR SELF-PROPELLED COMBINES

(Weights reflect distribution of North American unit retail sales)

Destination Points	N.A. Market Weight Factor	Origin Points: Brantford, Ont. Cdn. Miles	Brantford, Ont. Miles x Factor	Winnipeg, Man. Cdn. Miles	Winnipeg, Man. Miles x Factor	Moline, Ill. Cdn. Miles	Moline, Ill. Miles x Factor
Winnipeg, Man.	2.8	1,267	3,547.6	-	-	66	184.8
Regina, Sask.	8.0	1,623	12,984.0	357	2,856.0	196	1,568.0
Edmonton, Alta.	5.0	2,060	10,300.0	794	3,970.0	643	3,215.0
Logansport, Ind.	24.9	167	4,158.3	66	1,643.4	-	-
Omaha, Neb.	28.2	167	4,709.4	66	1,861.2	-	-
Dallas, Tex.	10.7	167	1,786.9	66	706.2	-	-
	79.6		37,486.2		11,036.8		4,967.8
Weighted Average:		471		139		62	

Source: Calculations based on KPM & Co. Survey data in Table D.10 and data in Table D.12.

TABLE D.25

WEIGHTED-AVERAGE LOWEST-QUOTED RAIL RATE PER HUNDREDWEIGHT FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL SIX SELECTED DESTINATION POINTS FOR SELF-PROPELLED COMBINES

(Weights reflect distribution of North American unit retail sales)

Destination Points	N.A. Market Weight Factor	Origin Points: Brantford, Ont. Rail Rate $	Brantford, Ont. Rate x Factor	Winnipeg, Man. Rail Rate $	Winnipeg, Man. Rate x Factor	Moline, Ill. Rail Rate $	Moline, Ill. Rate x Factor
Winnipeg, Man.	2.8	2.49	6.97	-	-	1.58	4.42
Regina, Sask.	8.0	3.14	25.12	0.57	4.56	2.17	17.36
Edmonton, Alta.	5.0	3.90	19.50	1.14	5.70	3.07	15.35
Logansport, Ind.	24.9	0.98	24.40	1.91	47.56	0.58	14.44
Omaha, Neb.	28.2	1.69	47.66	1.62	45.68	0.84	23.69
Dallas, Tex.	10.7	2.06	22.04	2.19	23.43	1.27	13.59
	79.6		145.69		126.93		88.85
Weighted Average:		1.83		1.59		1.12	

Source: Calculations based on KPM & Co. Survey data in Table D.10 and data in Table D.13.

TABLE D.26

WEIGHTED-AVERAGE RAIL RATE PER HUNDREDWEIGHT FOR 20,000-POUND SHIPMENTS FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL SIX SELECTED DESTINATION POINTS FOR SELF-PROPELLED COMBINES

(Weights reflect distribution of North American unit retail sales)

Destination Points	N.A. Market Weight Factor	Origin Points: Brantford, Ont. Rail Rate $	Brantford, Ont. Rate x Factor	Winnipeg, Man. Rail Rate $	Winnipeg, Man. Rate x Factor	Moline, Ill. Rail Rate $	Moline, Ill. Rate x Factor
Winnipeg, Man.	2.8	2.49	6.972	-	-	2.14	5.992
Regina, Sask.	8.0	3.14	25.120	0.67	5.360	2.47	19.760
Edmonton, Alta.	5.0	3.90	19.500	1.43	7.150	3.36	16.800
Logansport, Ind.	24.9	0.98	24.402	2.37	59.013	0.87	21.663
Omaha, Neb.	28.2	2.11	59.502	2.06	58.092	1.12	31.584
Dallas, Tex.	10.7	2.61	27.927	2.91	31.137	1.87	20.009
	79.6		163.423		160.752		115.808
Weighted Average:		2.05		2.02		1.45	

Sources: Calculations based on KPM & Co. Survey data in Table D.10 and data in Table D.13.

TABLE D.27

WEIGHTED-AVERAGE LOWEST-QUOTED TREND LINE RAIL RATE PER HUNDREDWEIGHT FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL SIX SELECTED DESTINATION POINTS FOR SELF-PROPELLED COMBINES

(Weights reflect distribution of North American unit retail sales)

Destination Points	N.A. Market Weight Factor	Origin Points: Brantford, Ont. Trend Rate $	Brantford, Ont. Rate x Factor	Winnipeg, Man. Trend Rate $	Winnipeg, Man. Rate x Factor	Moline, Ill. Trend Rate $	Moline, Ill. Rate x Factor
Winnipeg, Man.	2.8	2.73	7.644	-	-	1.42	3.976
Regina, Sask.	8.0	3.38	27.040	0.72	5.760	1.95	15.600
Edmonton, Alta.	5.0	4.17	20.850	1.49	7.450	2.74	13.700
Logansport, Ind.	24.9	1.10	27.390	1.76	43.824	0.53	13.197
Omaha, Neb.	28.2	1.69	47.658	1.33	37.506	0.66	18.612
Dallas, Tex.	10.7	2.38	25.466	2.51	26.857	1.50	16.050
	79.6		156.048		121.397		81.135
Weighted Average:		1.96		1.53		1.02	

Source: Calculations based on KPM & Co. Survey data in Charts D.2 and D.3, and data in Table D.10.

TABLE D.28

WEIGHTED-AVERAGE RAIL MILEAGE FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL EIGHT SELECTED DESTINATION POINTS FOR AUTOMATIC BALERS

(Weights reflect distribution of North American unit retail sales)

Destination Points	N.A. Market Weight Factor	Origin Points: Brantford, Ont. Rail Miles	Brantford, Ont. Miles x Factor	Winnipeg, Man. Rail Miles	Winnipeg, Man. Miles x Factor	Moline, Ill. Rail Miles	Moline, Ill. Miles x Factor
Sherbrooke, Que.	3.7	492	1,820.4	1,507	5,575.9	1,078	3,988.6
London, Ont.	4.0	56	224.0	1,336	5,344.0	531	2,124.0
Regina, Sask.	4.0	1,623	6,492.0	357	1,428.0	1,058	4,232.0
Edmonton, Alta.	4.4	2,060	9,064.0	794	3,493.6	1,505	6,622.0
Logansport, Ind.	15.4	375	5,775.0	946	14,568.4	246	3,788.0
Omaha, Neb.	23.5	908	21,338.0	705	16,567.5	320	7,520.4
Nashville, Tenn.	8.2	707	5,797.4	1,228	10,069.6	495	4,059.0
Dallas, Tex.	8.6	1,302	11,197.2	1,377	11,842.2	802	6,897.2
	71.8		61,708.0		68,889.2		39,231.2
Weighted Average:		859		959		546	

Source: Calculations based on KPM & Co. Survey data in Table D.10 and data in Table D.11.

TABLE D.29

WEIGHTED-AVERAGE CANADIAN RAIL MILEAGE FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL OF THE EIGHT SELECTED DESTINATION POINTS FOR AUTOMATIC BALERS

(Weights reflect distribution of North American unit retail sales)

Destination Points	N.A. Market Weight Factor	Origin Points: Brantford, Ont. Cdn. Miles	Brantford, Ont. Miles x Factor	Winnipeg, Man. Cdn. Miles	Winnipeg, Man. Miles x Factor	Moline, Ill. Cdn. Miles	Moline, Ill. Miles x Factor
Sherbrooke, Que.	3.7	492	1,820.4	1,507	5,575.9	657	2,430.9
London, Ont.	4.0	56	224.0	1,336	5,344.0	110	440.0
Regina, Sask.	4.0	1,623	6,492.0	357	1,428.0	196	784.0
Edmonton, Alta.	4.4	2,060	9,064.0	794	3,493.6	643	2,829.2
Logansport, Ind.	15.4	167	2,571.8	66	1,016.4	-	
Omaha, Neb.	23.5	167	3,924.5	66	1,551.0	-	
Nashville, Tenn.	8.2	167	1,369.4	66	541.2	-	
Dallas, Tex.	8.6	167	1,436.2	66	567.6	-	
	71.8		26,902.3		19,517.7		6,484.1
Weighted Average:		375		272		90	

Source: Calculations based on KPM & Co. Survey data in Table D.10 and data in Table D.12.

TABLE D.30

WEIGHTED-AVERAGE LOWEST-QUOTED RAIL RATE PER HUNDREDWEIGHT FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL OF THE EIGHT SELECTED DESTINATION POINTS FOR AUTOMATIC BALERS

(Weights reflect distribution of North American unit retail sales)

Destination Points	N.A. Market Weight Factor	Origin Points: Brantford, Ont. Rail Rate $	Brantford, Ont. Rate x Factor	Winnipeg, Man. Rail Rate $	Winnipeg, Man. Rate x Factor	Moline, Ill. Rail Rate $	Moline, Ill. Rate x Factor
Sherbrooke, Que.	3.7	1.33	4.92	2.61	9.66	3.26	12.06
London, Ont.	4.0	0.48	1.92	2.49	9.96	1.16	4.64
Regina, Sask.	4.0	3.14	12.56	0.57	2.28	2.17	8.68
Edmonton, Alta.	4.4	3.90	17.16	1.14	5.02	3.07	13.51
Logansport, Ind.	15.4	0.98	15.09	1.91	29.41	0.58	8.93
Omaha, Neb.	23.5	1.69	39.72	1.62	38.07	0.84	19.74
Nashville, Tenn.	8.2	1.48	12.14	2.08	17.06	0.93	7.63
Dallas, Tex.	8.6	2.06	17.72	2.19	18.83	1.27	10.92
	71.8		121.23		130.29		86.11
Weighted Average:		1.69		1.81		1.20	

Source: Calculations based on KPM & Co. Survey data in Table D.10 and data in Table D.13.

TABLE D.31

WEIGHTED-AVERAGE RAIL RATE PER HUNDREDWEIGHT FOR 20,000-POUND SHIPMENTS FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL OF THE EIGHT SELECTED DESTINATION POINTS FOR AUTOMATIC BALERS

(Weights reflect distribution of North American unit retail sales)

Destination Points	N.A. Market Weight Factor	Origin Points: Brantford, Ont. Rail Rate $	Brantford, Ont. Rate x Factor	Winnipeg, Man. Rail Rate $	Winnipeg, Man. Rate x Factor	Moline, Ill. Rail Rate $	Moline, Ill. Rate x Factor
Sherbrooke, Que.	3.7	1.33	4.921	2.61	9.657	3.26	12.062
London, Ont.	4.0	0.48	1.920	2.49	9.960	1.16	4.640
Regina, Sask.	4.0	3.14	12.560	0.67	2.680	2.47	9.880
Edmonton, Alta.	4.4	3.90	17.160	1.43	6.292	3.36	14.784
Logansport, Ind.	15.4	0.98	15.092	2.37	36.498	0.87	13.398
Omaha, Neb.	23.5	2.11	49.585	2.06	48.410	1.12	26.320
Nashville, Tenn.	8.2	1.82	14.924	2.76	22.632	1.40	11.480
Dallas, Tex.	8.6	2.61	22.446	2.91	25.026	1.87	16.082
	71.8		138.608		161.155		108.646
Weighted Average:		1.93		2.24		1.51	

Source: Calculations based on KPM & Co. Survey data in Table D.10 and data in Table D.13.

TABLE D.32

WEIGHTED-AVERAGE LOWEST-QUOTED TREND LINE RAIL RATE PER HUNDREDWEIGHT FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL EIGHT SELECTED DESTINATION POINTS FOR AUTOMATIC BALERS

(Weights reflect distribution of North American unit retail sales)

Destination Points	N.A. Market Weight Factor	Origin Points: Brantford, Ont. Trend Rate $	Brantford, Ont. Rate x Factor	Winnipeg, Man. Trend Rate $	Winnipeg, Man. Rate x Factor	Moline, Ill. Trend Rate $	Moline, Ill. Rate x Factor
Sherbrooke, Que.	3.7	1.32	4.884	3.17	11.729	2.38	8.806
London, Ont.	4.0	0.52	2.080	2.85	11.400	1.39	5.560
Regina, Sask.	4.0	3.38	13.520	0.72	2.880	1.95	7.800
Edmonton, Alta.	4.4	4.17	18.348	1.49	6.556	2.74	12.056
Logansport, Ind.	15.4	1.10	16.940	1.76	27.104	0.53	8.162
Omaha, Neb.	23.5	1.69	39.715	1.33	31.255	0.66	15.510
Nashville, Tenn.	8.2	1.34	10.988	2.25	18.450	0.96	7.872
Dallas, Tex.	8.6	2.38	20.468	2.51	21.586	1.50	12.900
	71.8		126.943		130.960		78.666
Weighted Average:		1.77		1.82		1.10	

Source: Calculations based on KPM & Co. Survey data in Charts D.2 and D.3, and data in Table D.10.

TABLE D.33

WEIGHTED-AVERAGE RAIL MILEAGE FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL EIGHT SELECTED DESTINATION POINTS FOR TANDEM WHEEL-TYPE DISK HARROWS

(Weights reflect estimated distribution of North American unit retail sales)

Destination Points	N.A. Market Weight Factor	Origin Points: Brantford, Ont. Rail Miles	Brantford, Ont. Miles x Factor	Winnipeg, Man. Rail Miles	Winnipeg, Man. Miles x Factor	Moline, Ill. Rail Miles	Moline, Ill. Miles x Factor
London, Ont.	8.8	56	492.8	1,336	11,756.8	531	4,672.8
Winnipeg, Man.	0.8	1,267	1,013.6	-	-	754	603.2
Regina, Sask.	1.7	1,623	2,759.1	357	606.9	1,058	1,798.6
Edmonton, Alta.	8.1	2,060	16,686.0	794	6,431.4	1,505	12,190.5
Charlotte, N.C.	9.4	921	8,657.4	1,646	15,472.4	940	8,836.0
Logansport, Ind.	17.0	375	6,375.0	946	16,082.0	246	4,182.0
Omaha, Neb.	20.9	908	18,977.2	705	14,734.5	320	6,688.0
Dallas, Tex.	9.9	1,302	12,889.8	1,377	13,632.3	802	7,939.8
	76.6		67,850.9		78,716.3		46,910.9
Weighted Average:		886		1,028		612	

Source: Calculations based on KPM & Co. Survey data in Table D.10 and data in Table D.11.

TABLE D.34

WEIGHTED-AVERAGE CANADIAN RAIL MILEAGE FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL EIGHT SELECTED DESTINATION POINTS FOR TANDEM WHEEL-TYPE DISK HARROWS

(Weights reflect estimated distribution of North American unit retail sales)

Destination Points	N.A. Market Weight Factor	Origin Points: Brantford, Ont. Cdn. Miles	Brantford, Ont. Miles x Factor	Winnipeg, Man. Cdn. Miles	Winnipeg, Man. Miles x Factor	Moline, Ill. Cdn. Miles	Moline, Ill. Miles x Factor
London, Ont.	8.8	56	492.8	1,336	11,756.8	110	968.0
Winnipeg, Man.	0.8	1,267	1,013.6	-	-	66	52.8
Regina, Sask.	1.7	1,623	2,759.1	357	606.9	196	333.2
Edmonton, Alta.	8.1	2,060	1,686.0	794	6,431.4	643	5,208.3
Charlotte, N.C.	9.4	167	1,569.8	66	620.4	-	-
Logansport, Ind.	17.0	167	2,839.0	66	1,122.0	-	-
Omaha, Neb.	20.9	167	3,490.3	66	1,379.4	-	-
Dallas, Tex.	9.9	167	1,653.3	66	653.4	-	-
	76.6		30,503.9		22,570.3		6,562.3
Weighted Average:		398		295		86	

Source: Calculations based on KPM & Co. Survey data in Table D.10 and data in Table D.12.

TABLE D.35

WEIGHTED-AVERAGE LOWEST-QUOTED RAIL RATE PER HUNDREDWEIGHT FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL EIGHT SELECTED DESTINATION POINTS FOR TANDEM WHEEL-TYPE DISK HARROWS

(Weights reflect estimated distribution of North American unit retail sales)

Destination Points	N.A. Market Weight Factor	Origin Points: Brantford, Ont. Rail Rate $	Brantford, Ont. Rate x Factor	Winnipeg, Man. Rail Rate $	Winnipeg, Man. Rate x Factor	Moline, Ill. Rail Rate $	Moline, Ill. Rate x Factor
London, Ont.	8.8	0.48	4.22	2.49	21.91	1.16	10.21
Winnipeg, Man.	0.8	2.49	1.99	-	-	1.90	1.52
Regina, Sask.	1.7	3.14	5.34	0.57	.97	2.17	3.69
Edmonton, Alta.	8.1	3.90	31.59	1.14	9.23	3.07	24.87
Charlotte, N.C.	9.4	1.64	15.42	2.44	22.94	1.37	12.88
Logansport, Ind.	17.0	0.98	16.66	1.91	32.47	0.58	9.86
Omaha, Neb.	20.9	1.69	35.32	1.62	33.86	0.84	17.56
Dallas, Tex.	9.9	2.06	20.39	2.19	21.68	1.27	12.57
	76.6		130.93		143.06		93.16
Weighted Average:		1.71		1.87		1.22	

Source: Calculations based on KPM & Co. Survey data in Table D.10 and data in Table D.13.

TABLE D.36

WEIGHTED-AVERAGE RAIL RATE PER HUNDREDWEIGHT FOR 20,000-POUND SHIPMENTS FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL EIGHT SELECTED DESTINATION POINTS FOR TANDEM WHEEL-TYPE DISK HARROWS

(Weights reflect estimated distribution of North American unit retail sales)

Destination Points	N.A. Market Weight Factor	Origin Points: Brantford, Ont. Rail Rate $	Brantford, Ont. Rate x Factor	Winnipeg, Man. Rail Rate $	Winnipeg, Man. Rate x Factor	Moline, Ill. Rail Rate $	Moline, Ill. Rate x Factor
London, Ont.	8.8	0.48	4.22	2.49	21.91	1.16	10.21
Winnipeg, Man.	0.8	2.49	1.99	-	-	1.90	1.52
Regina, Sask.	1.7	3.14	5.34	0.67	1.14	2.47	4.20
Edmonton, Alta.	8.1	3.90	31.59	1.43	11.58	3.36	27.22
Charlotte, N.C.	9.4	2.05	19.27	3.26	30.64	2.02	18.99
Logansport, Ind.	17.0	0.98	16.66	2.37	40.29	0.87	14.79
Omaha, Neb.	20.9	2.11	44.10	2.06	43.05	1.12	23.41
Dallas, Tex.	9.9	2.61	25.84	2.91	28.81	1.87	18.51
	76.6		149.01		177.42		118.85
Weighted Average:		1.95		2.32		1.55	

Source: Calculations based on KPM & Co. Survey data in Table D.10 and data in Table D.13.

TABLE D.37

WEIGHTED-AVERAGE LOWEST-QUOTED TREND LINE RAIL RATE PER HUNDREDWEIGHT FROM EACH OF THE THREE SELECTED ORIGIN POINTS FOR ROUTES TO ALL EIGHT SELECTED DESTINATION POINTS FOR TANDEM WHEEL-TYPE DISK HARROWS

(Weights reflect estimated distribution of North American unit retail sales)

Destination Points	N.A. Market Weight Factor	Origin Points: Brantford, Ont. Trend Rate $	Brantford, Ont. Rate x Factor	Winnipeg, Man. Trend Rate $	Winnipeg, Man. Rate x Factor	Moline, Ill. Trend Rate $	Moline, Ill. Rate x Factor
London, Ont.	8.8	0.52	4.576	2.85	25.080	1.39	12.232
Winnipeg, Man.	0.8	2.73	2.184	-	-	1.79	1.432
Regina, Sask.	1.7	3.38	5.746	0.72	1.224	1.95	3.315
Edmonton, Alta.	8.1	4.17	33.777	1.49	12.069	2.74	22.194
Charlotte, N.C.	9.4	1.71	16.074	2.99	28.106	1.75	16.450
Logansport, Ind.	17.0	1.10	18.700	1.76	29.920	0.53	9.010
Omaha, Neb.	20.9	1.69	35.321	1.33	27.797	0.66	13.794
Dallas, Tex.	9.9	2.38	23.562	2.51	24.849	1.50	14.850
	76.6		139.940		149.045		93.277
Weighted Average:		1.83		1.95		1.22	

Source: Calculations based on KPM & Co. Survey data in Charts D.2 and D.3, and data in Table D.10.

TABLE D.38

EXAMPLE COMPARISONS OF TRUCK AND RAIL DATA FOR SHIPMENT FROM SELECTED ORIGIN POINTS TO SELECTED DESTINATION POINTS OF SELF-PROPELLED COMBINES

Origin Points	Destination Points	Mode	Route Miles	Shipment Weight (lbs.)	Rate $ per cwt.
Brantford, Ont.	London, Ont.	Truck	59	20,000	0.51
		Rail	56	18,000	0.48
Winnipeg, Man.	Brandon, Man.	Truck	131	20,000	0.53
		Rail	134	20,000	0.69
Moline, Ill.	Logansport, Ind.	Truck	316	24,000	1.11
		Rail	246	20,000	0.87

Source: KPM & Co. Survey.

TABLE D.39

EXAMPLES OF ACTUAL LOADING AND BLOCKING COSTS ASSOCIATED WITH RAIL SHIPMENT, AS ESTIMATED BY A LEADING FARM MACHINERY MANUFACTURER

Farm Machine		Ordinary Car			Special Car		Savings Using Special Car	
Type	Weight lbs.	Material $	Direct Labour $	Total $	Direct Labour $	Total $	Direct Labour $	Total $
Wheeled tractor	10,000	10.80	5.22	16.02	3.13	3.13	2.09	12.89
	(per cwt.)	-	-	0.16	-	0.03	-	0.13
Wheeled tractor	4,000	3.00	2.60	5.60	1.96	1.96	0.94	3.64
	(per cwt.)	-	-	0.14	-	0.05	-	0.09
Self-propelled combine	10,000	12.00	14.00	26.00	10.00	10.00[E]	4.00	16.00
	(per cwt.)	-	-	0.26	-	0.10	-	0.16
Automatic baler	2,400	2.12	2.60	4.72	special cars			
	(per cwt.)	-	-	0.16	not used			
Tandem wheel-type disk harrow	1,600	2.40	3.98	6.38	special cars			
	(per cwt.)	-	-	0.40	not used			

E - estimate

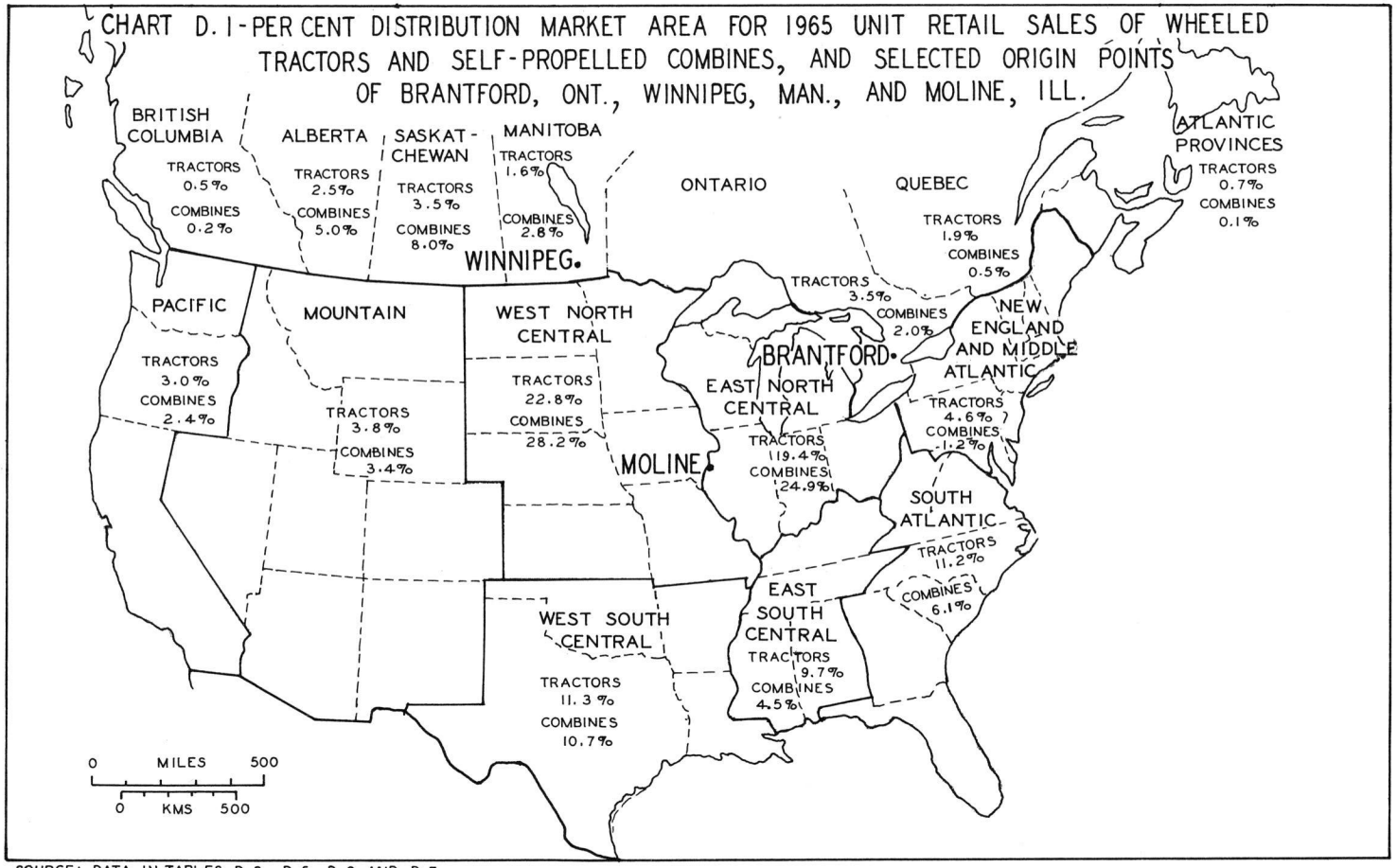
Source: KPM & Co. Survey.

TABLE D.40

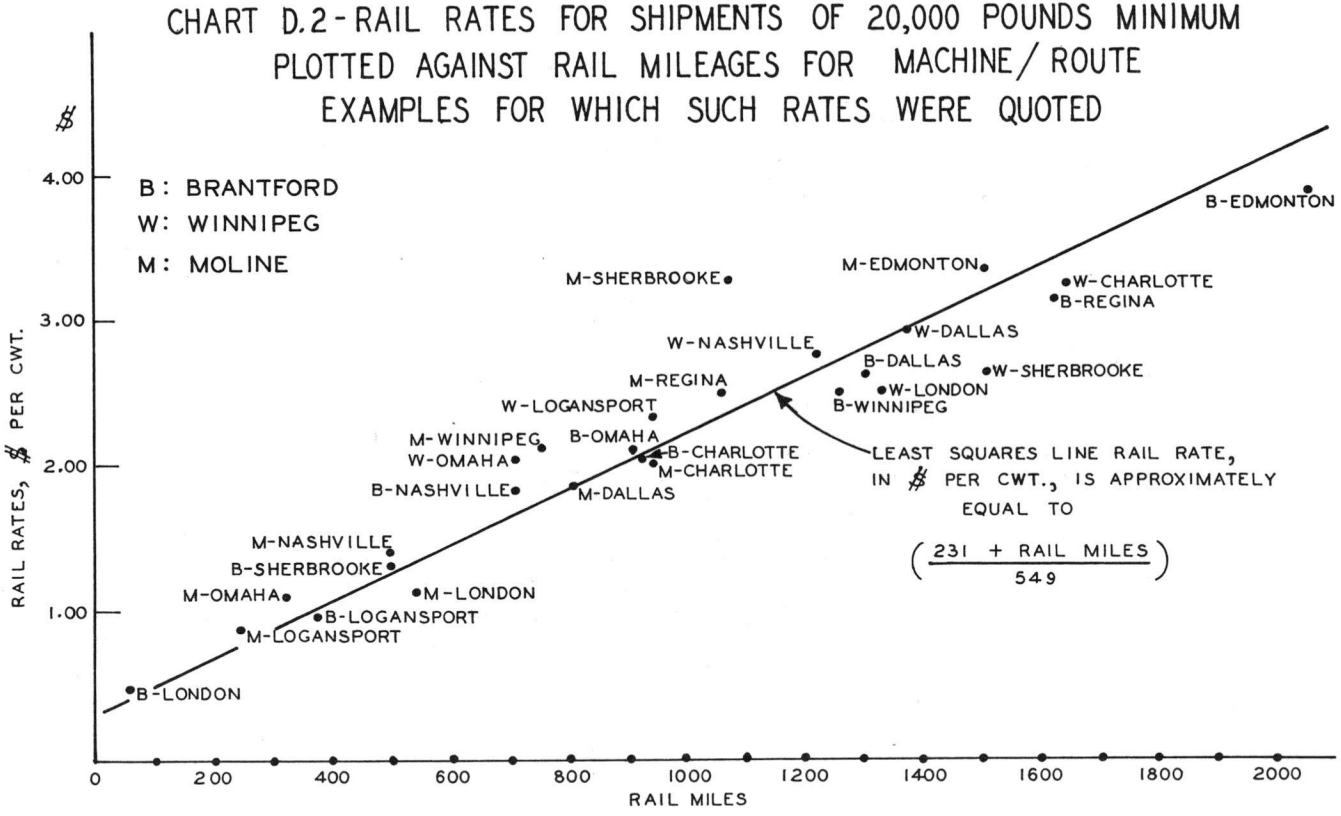
POWER TAKE-OFF HORSEPOWER, WEIGHT, AND SUGGESTED RETAIL PRICE FOR 20 REPRESENTATIVE MODELS OF WHEELED TRACTORS

Model Code Letter	PTO Horsepower	Weight	Suggested Retail Price
	h.p.	lbs.	$
A	37.0	3160	3246
B	36.9	3679	3450
C	38.5	3420	3301
D	71.3	6531	3401
E	68.5	5726	5927
F	78.8	7943	6288
G	63.8	6295	5400
H	94.9	7789	6734
I	94.9	8667	7290
J	80.7	8350	6410
K	52.4	4725	4669
L	53.0	3862	4380
M	132.0	11096	10775
N	47.5	4150	3619
O	55.3	5240	4587
P	65.0	6750	6075
Q	46.4	4548	4352
R	72.4	6926	5351
S	54.0	3904	4448
T	92.0	9465	8542

Source: Royal Commission on Farm Machinery data.

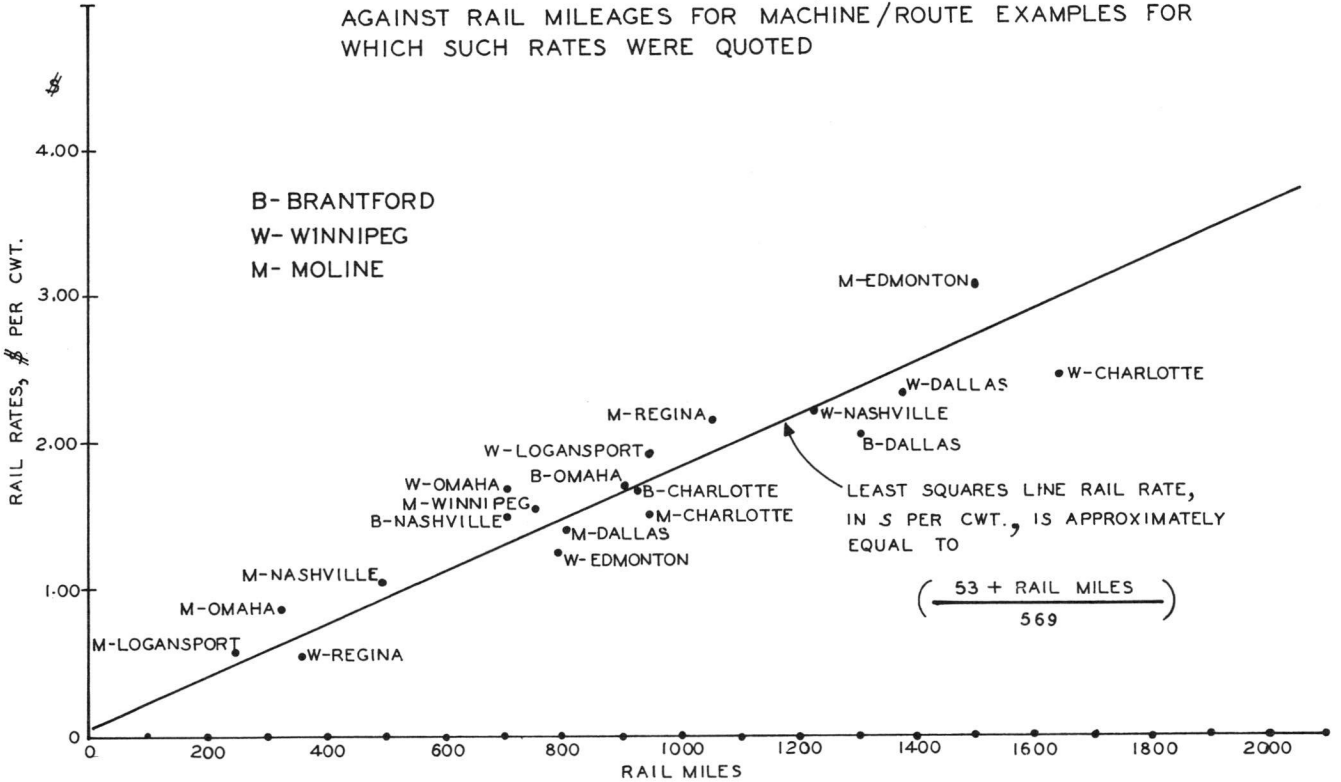


SOURCE: DATA IN TABLES D.3, D.5, D.6 AND D.7



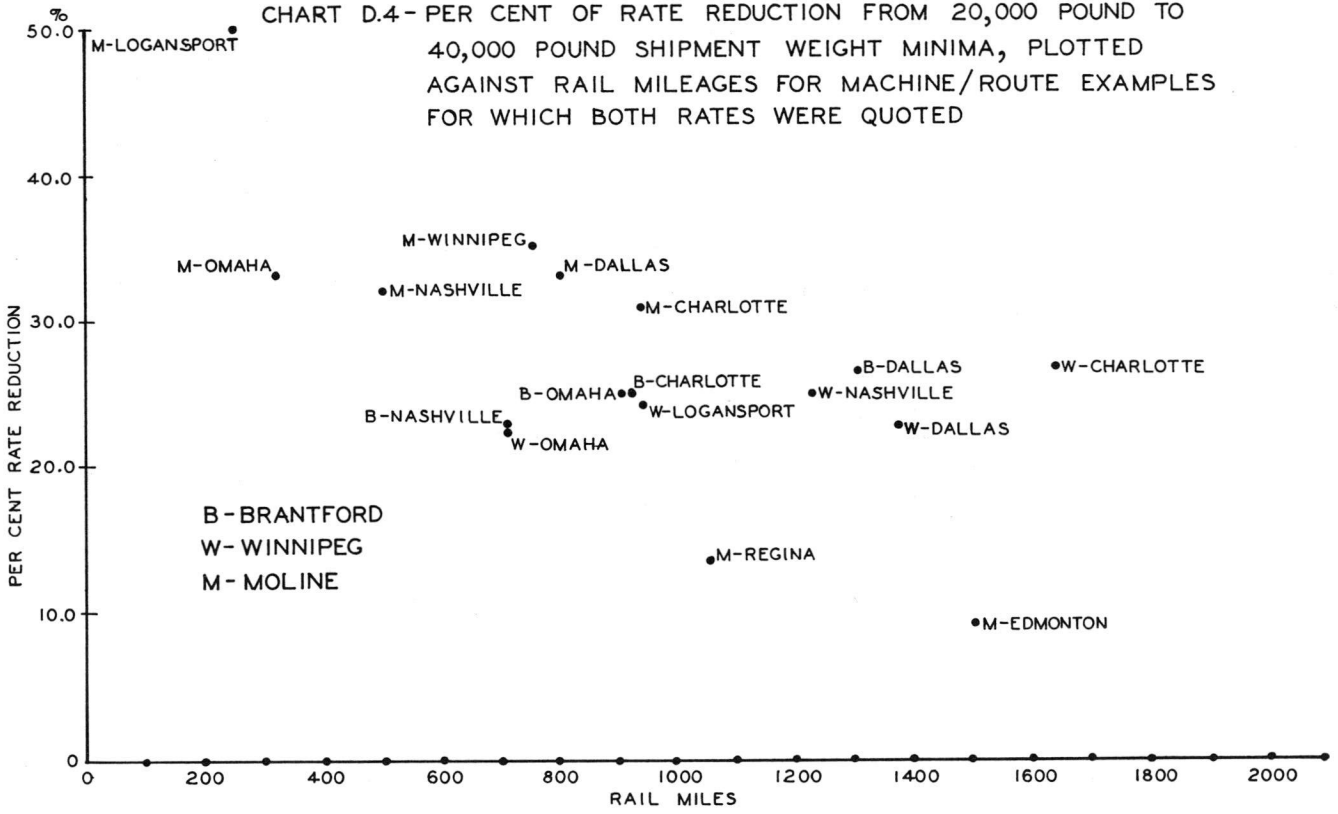
SOURCE: CALCULATIONS BASED ON K. P. M. SURVEY DATA IN TABLES D.11 AND D.13

CHART D.3 - RAIL RATES FOR SHIPMENTS OF 40,000 POUNDS MINIMUM PLOTTED AGAINST RAIL MILEAGES FOR MACHINE/ROUTE EXAMPLES FOR WHICH SUCH RATES WERE QUOTED



SOURCE: CALCULATIONS BASED ON K.P.M. SURVEY DATA IN TABLES D.11 AND D.13

CHART D.4 - PER CENT OF RATE REDUCTION FROM 20,000 POUND TO 40,000 POUND SHIPMENT WEIGHT MINIMA, PLOTTED AGAINST RAIL MILEAGES FOR MACHINE/ROUTE EXAMPLES FOR WHICH BOTH RATES WERE QUOTED



SOURCE: K. P. M. SURVEY DATA IN TABLES D.11 AND D.13

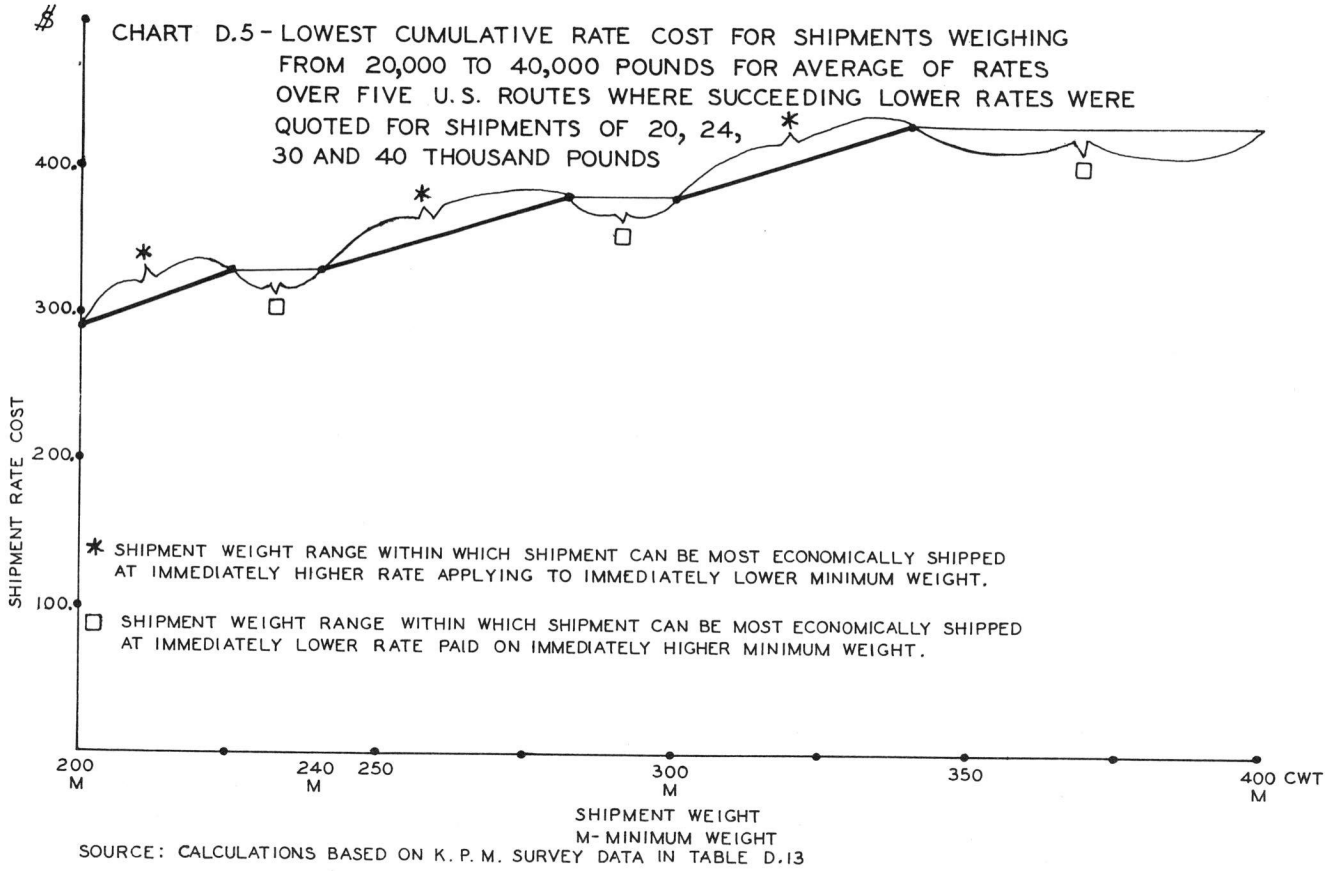
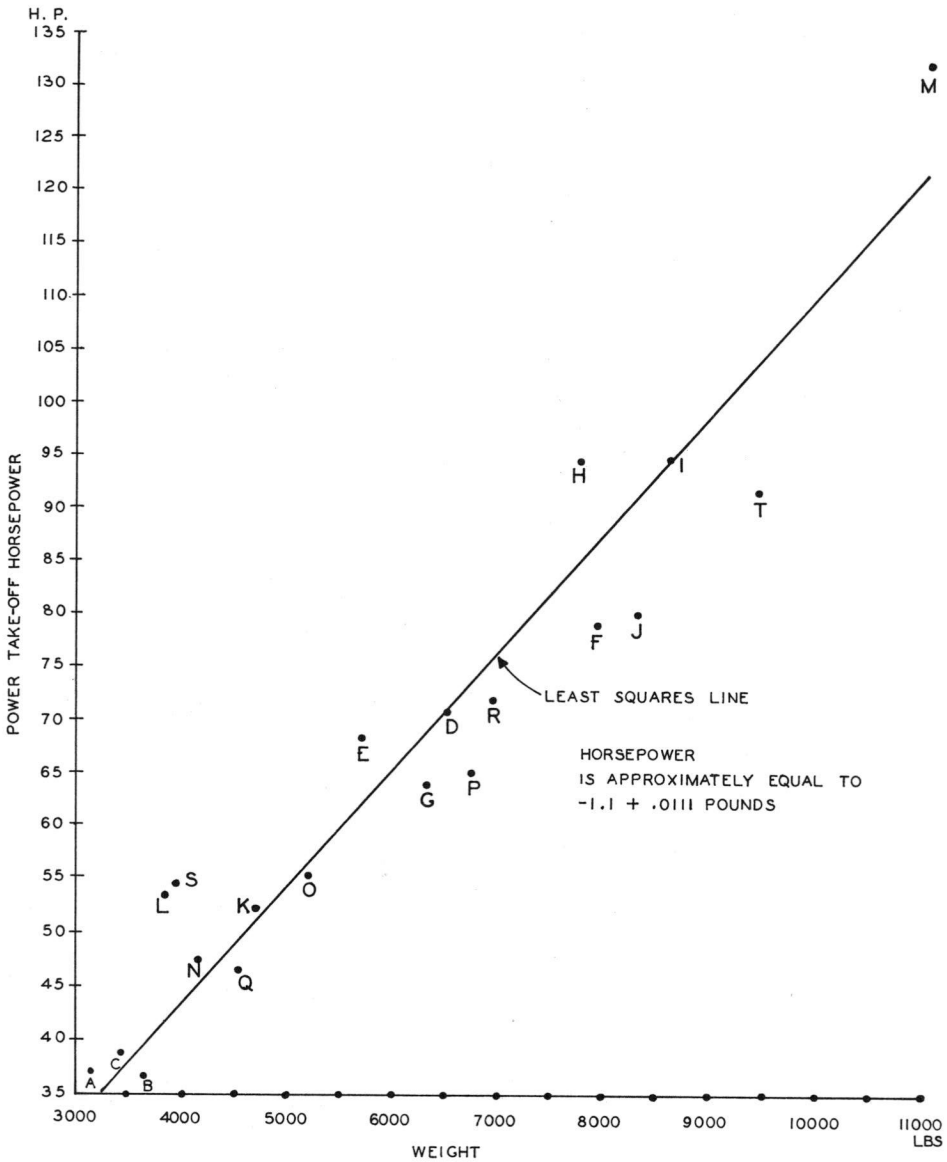


CHART D.5 - LOWEST CUMULATIVE RATE COST FOR SHIPMENTS WEIGHING FROM 20,000 TO 40,000 POUNDS FOR AVERAGE OF RATES OVER FIVE U.S. ROUTES WHERE SUCCEEDING LOWER RATES WERE QUOTED FOR SHIPMENTS OF 20, 24, 30 AND 40 THOUSAND POUNDS

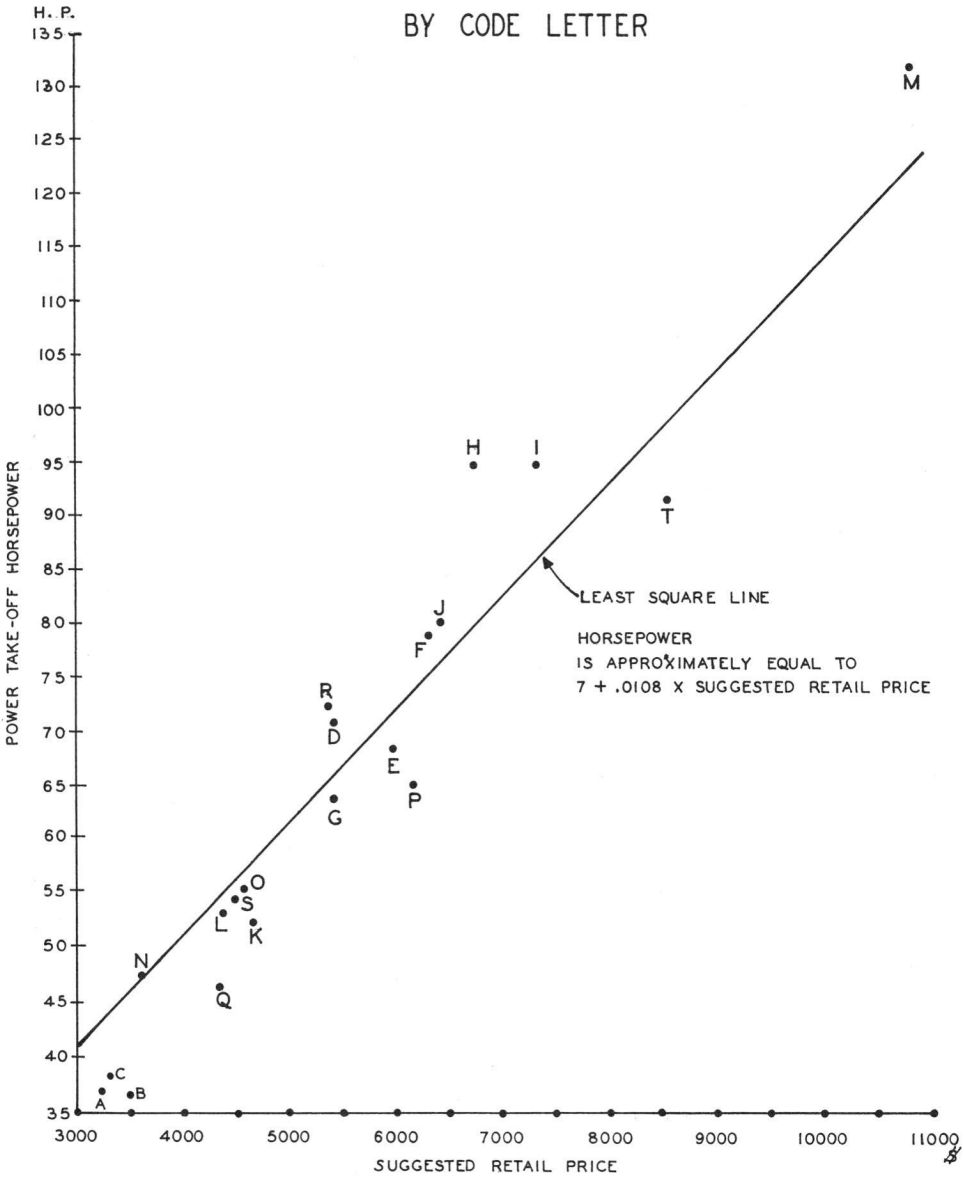
SOURCE: CALCULATIONS BASED ON K. P. M. SURVEY DATA IN TABLE D.13

CHART D.6 - POWER TAKE-OFF HORSEPOWER PLOTTED AGAINST WEIGHT, FOR TWENTY REPRESENTATIVE MODELS OF WHEELED TRACTOR IDENTIFIED BY CODE LETTER



SOURCE: CALCULATIONS BASED ON ROYAL COMMISSION DATA, TABLE D.40

CHART D.7 - POWER TAKE-OFF HORSEPOWER PLOTTED AGAINST SUGGESTED RETAIL PRICE, FOR TWENTY REPRESENTATIVE MODELS OF WHEELED TRACTOR IDENTIFIED BY CODE LETTER



SOURCE: CALCULATIONS BASED ON ROYAL COMMISSION DATA, TABLE D.40

APPENDIX E

REAL COMPARATIVE SELLING PRICES, DELIVERED BASIS

In analysing the advantages of different possible locations for a farm machinery (combine) plant, the assumption was made that the same mix of products (combines) would be made in the three plants, using the same amounts of the different cost inputs. As a result, a further assumption could logically follow, that the combines could be sold at the same price in each market, no matter where they had been made, the price being a combination of the price set by the company owning the plant most advantageously situated to supply the market, plus its cost of transportation for its combines to the market. Other suppliers who wished to enter the market would have to do so by matching or beating the first company's price. While for each sub-market one location would presumably have an advantage, for the whole market one location would have an over-all transportation advantage, represented by the amounts shown in Table 4.4, with Moline the lowest-cost location.

Just how does this approach relate to real world data? Are prices of combines of Massey-Ferguson and Cockshutt (Oliver), produced at Brantford, lower to absorb the differences in transportation costs over those of Deere and International Harvester, produced at Moline?

Tables E.1 to E.4 record the suggested retail and net wholesale prices for four groupings of combines, suggested by industry standards.[1/] The products of the five companies manufacturing combines in the three locations are shown f.o.b.

1/ Royal Commission on Farm Machinery, Special Report on Prices of Tractors and Combines in Canada and Other Countries (Ottawa: Queen's Printer, December 1969), Table C.5.

factory and delivered to six locations, none of which is a manufacturing location. The shipping costs used were obtained from the farm machinery companies concerned. Winnipeg appears as a source in the table covering the third size group only (E.3), and International Harvester does not appear in Table E.1 because its entry in this group, the model 105, is made in Hamilton rather than Moline.

All four groups therefore represent what the industry appears to feel are groupings of machines which compete with one another. Although their specifications are far from being identical, each group generally has engines of approximately the same horsepower and therefore, presumably, similar work capacity.

What is immediately striking is the relatively inconsequential effect of the differences in outbound transportation costs on the competitive position of the combine make, both in terms of suggested retail price and net wholesale price levels. This is the result, of course, of transportation costs at their highest level (the largest transportation cost relative to the lowest net wholesale price, for the Massey-Ferguson MF205 delivered to Edmonton) never exceeding 6.5 per cent of net wholesale price. The *difference* in transportation costs is even lower, Massey-Ferguson's excess transportation costs for this model over Deere's equivalent machine being about $62, or about 1 per cent of its net wholesale price. The highest differential for the Group 3 models shown occurs in shipments to Des Moines, between Cockshutt (Oliver) and Deere, with Cockshutt's transportation costs to Des Moines being about $170 above Deere's.

The differential or penalty of $170 is less than 2 per cent of Deere's factory price, while the Cockshutt (Oliver) factory price is 18.6 per cent below that of Deere. The penalty can therefore hardly be a major factor in delivered price competition at Des Moines between these two companies.

It would appear that the difference in prices shown must be explained by other reasons than allowances to cover differences in transportation costs. In the case of Massey-Ferguson, for example, whose prices are lowest in all groups (except for Versatile) it would seem reasonable to suggest:

1) the desire to compete in the U.S. market, and,

2) the use of the most modern combine manufacturing facility in North America

to explain the reasons for and the justification of the Massey-Ferguson price differential.

TABLE E.1

SUGGESTED RETAIL AND NET WHOLESALE PRICES[1] AND DELIVERY COSTS[2] OF SELECTED, COMPARABLE SELF-PROPELLED COMBINES MADE AT BRANTFORD AND MOLINE, GROUP 1 (1968)

Origin Point	Price of Machine F.O.B. Factory (ex delivery charge)		Delivery Point											
			Des Moines (Iowa)		Bismarck (N.D.)		Brandon (Man.)		Regina (Sask.)		Saskatoon (Sask.)		Edmonton (Alta.)	
	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $
Brantford														
Cockshutt 525 (U.S. = Oliver)	8,446.00	6,165.58	8,446.00	6,165.58	8,446.00	6,165.58	8,446.00	6,165.58	8,446.00	6,165.58	8,446.00	6,165.58	8,446.00	6,165.58
Delivery charges			220.48	220.48	276.64	276.64	287.00	287.00	330.00	330.00	347.00	347.00	408.00	408.00
Total			8,666.48	6,386.06	8,722.64	6,442.22	8,733.00	6,452.58	8,776.00	6,495.58	8,793.00	6,512.58	8,854.00	6,573.58
Relative number[3]	100.46	100.46	102.16	102.78	101.81	102.29	100.89	101.05	101.31	101.61	101.16	101.41	101.15	101.39
Massey-Ferguson 205	8,171.00	5,964.83	8,171.00	5,964.83	8,171.00	5,964.83	8,171.00	5,964.83	8,171.00	5,964.83	8,171.00	5,964.83	8,171.00	5,964.83
Delivery charges			175.00	175.00	266.00	266.00	287.00	287.00	329.00	329.00	348.00	348.00	408.00	408.00
Total			8,346.00	6,139.83	8,437.00	6,230.83	8,458.00	6,251.83	8,500.00	6,293.83	8,519.00	6,312.83	8,579.00	6,372.83
Relative number[3]	97.20	97.20	98.38	98.81	98.47	98.94	97.72	97.90	98.12	98.45	98.01	98.30	98.01	98.29
Moline														
John Deere 45	8,407.00	6,137.11	8,407.00	6,137.11	8,407.00	6,137.11	8,407.00	6,137.11	8,407.00	6,137.11	8,407.00	6,137.11	8,407.00	6,137.11
Delivery charges			76.50[4]	76.50[4]	160.75	160.75	248.56	248.56	255.84	255.84	284.96	284.96	346.28	346.28
Total			8,483.50	6,213.61	8,567.15	6,297.86	8,655.56	6,385.67	8,662.84	6,392.95	8,691.96	6,422.07	8,753.28	6,483.39
Relative number[3]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
International Harvester 105 (made in Hamilton)														

1/ Suggested retail prices are taken from: Royal Commission on Farm Machinery, Special Report on Prices of Tractors and Combines in Canada and Other Countries, (Ottawa: Queen's Printer, 1969), data used to prepare Table 5.7. Prices not rounded to allow actual transportation costs to be shown. (Net wholesale prices are shown as 73 per cent of suggested retail prices.)

2/ Delivery costs secured from companies concerned through correspondence.

3/ Prices shown relative to John Deere's price at destination as 100.

4/ Delivered by truck.

TABLE E.2

SUGGESTED RETAIL AND NET WHOLESALE PRICES[1] AND DELIVERY COSTS[2] OF SELECTED, COMPARABLE SELF-PROPELLED COMBINES MADE AT BRANTFORD AND MOLINE, GROUP 2 (1968)

Origin Point	Price of Machine F.O.B. Factory (ex delivery charge)		Delivery Point											
			Des Moines (Iowa)		Bismarck (N.D.)		Brandon (Man.)		Regina (Sask.)		Saskatoon (Sask.)		Edmonton (Alta.)	
	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $
Brantford														
Cockshutt 535 (U.S. = Oliver)	9,982.00	7,286.86	9,982.00	7,286.86	9,982.00	7,286.86	9,982.00	7,286.86	9,982.00	7,286.86	9,982.00	7,286.86	9,982.00	7,286.86
Delivery charges			220.48	220.48	276.64	276.64	287.00	287.00	330.00	330.00	347.00	347.00	408.00	408.00
Total			10,202.48	7,507.34	10,258.64	7,563.50	10,269.00	7,573.86	10,312.00	7,616.86	10,329.00	7,633.86	10,390.00	7,694.86
Relative number[3]	96.53	96.53	97.94	98.45	97.55	97.92	96.80	96.89	97.09	97.29	96.95	97.10	96.91	97.04
Massey-Ferguson 300	9,082.00	6,629.86	9,082.00	6,629.86	9,082.00	6,629.86	9,082.00	6,629.86	9,082.00	6,629.86	9,082.00	6,629.86	9,082.00	6,629.86
Delivery charges			172.73	172.73	262.54	262.54	283.27	283.27	324.72	324.72	343.48	343.48	402.70	402.70
Total			9,254.73	6,802.59	9,344.54	6,892.40	9,365.27	6,913.13	9,406.72	6,954.58	9,425.48	6,973.34	9,484.70	7,032.56
Relative number[3]	87.82	87.82	88.84	89.21	88.86	89.23	88.28	88.44	88.57	88.83	88.47	88.70	88.46	88.68
Moline														
John Deere 55	10,341.00	7,548.93	10,341.00	7,548.93	10,341.00	7,548.93	10,341.00	7,548.93	10,341.00	7,548.93	10,341.00	7,548.93	10,341.00	7,548.93
Delivery charges			76.50[4]	76.50[4]	175.55	175.55	267.66	267.66	280.08	280.08	313.20	313.20	380.83	380.83
Total			10,417.50	7,625.43	10,516.55	7,724.48	10,608.66	7,816.59	10,621.08	7,829.01	10,654.20	7,862.13	10,721.83	7,929.76
Relative number[3]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
International Harvester 315	9,792.00	7,148.16	9,792.00	7,148.16	9,792.00	7,148.16	9,792.00	7,148.16	9,792.00	7,148.16	9,792.00	7,148.16	9,792.00	7,148.16
Delivery charges			73.71	73.71	143.78	143.78	228.41	228.41	234.78	234.78	262.08	262.08	318.50	318.50
Total			9,865.71	7,221.87	9,935.78	7,291.94	10,020.41	7,376.57	10,026.78	7,382.94	10,054.08	7,410.24	10,110.50	7,466.66
Relative number[3]	94.69	94.69	94.70	94.71	94.48	94.40	94.46	94.37	94.40	94.30	94.37	94.25	94.30	94.16

1/ Suggested retail prices are taken from: Royal Commission on Farm Machinery, Special Report on Prices of Tractors and Combines in Canada and Other Countries, (Ottawa: Queen's Printer, 1969), data used to prepare Table 5.7. Prices not rounded to allow actual transportation costs to be shown. (Net wholesale prices are shown as 73 per cent of suggested retail prices.)

2/ Delivery costs secured from companies concerned through correspondence.

3/ Prices shown relative to John Deere's price at destination as 100.

4/ Delivered by truck.

TABLE E.3

SUGGESTED RETAIL AND NET WHOLESALE PRICES[1] AND DELIVERY COSTS[2] OF SELECTED, COMPARABLE SELF-PROPELLED COMBINES MADE AT BRANTFORD, WINNIPEG, AND MOLINE, GROUP 3 (1968)

Origin Point	Price of Machine F.O.B. Factory (ex delivery charge)		Delivery Point											
			Des Moines (Iowa)		Bismarck (N.D.)		Brandon (Man.)		Regina (Sask.)		Saskatoon (Sask.)		Edmonton (Alta.)	
	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $
Brantford														
Cockshutt 542 (U.S. = Oliver)	9,953.00	7,265.69	9,953.00	7,265.69	9,953.00	7,265.69	9,953.00	7,265.69	9,953.00	7,265.69	9,953.00	7,265.69	9,953.00	7,265.69
Delivery charges			246.53	246.53	304.30	304.30	315.70	315.70	363.00	363.00	381.70	381.70	448.80	448.80
Total			10,199.53	7,512.22	10,257.30	7,569.99	10,268.70	7,581.39	10,316.00	7,628.69	10,334.70	7,647.39	10,401.80	7,714.49
Relative number[3]	80.54	80.54	82.03	82.58	81.76	82.19	81.22	81.46	81.48	81.81	81.38	81.68	81.44	81.75
Massey-Ferguson 410	11,407.00	8,327.11	11,407.00	8,327.11	11,407.00	8,327.11	11,407.00	8,327.11	11,407.00	8,327.11	11,407.00	8,327.11	11,407.00	8,327.11
Delivery charges			210.00	210.00	294.00	294.00	337.20	337.20	386.60	386.60	408.90	408.90	479.40	479.40
Total			11,617.00	8,537.11	11,701.00	8,621.11	11,744.20	8,664.31	11,793.60	8,713.71	11,815.90	8,736.01	11,886.40	8,806.51
Relative number[3]	92.31	92.31	93.43	93.84	93.26	93.61	92.89	93.10	93.15	93.44	93.05	93.31	93.06	93.33
Winnipeg														
Versatile 420	8,900.00	6,497.00	8,900.00	6,497.00	8,900.00	6,497.00	8,900.00	6,497.00	8,900.00	6,497.00	8,900.00	6,497.00	8,900.00	6,497.00
Delivery charges			262.28	262.28	151.20	151.20	147.00	147.00	124.00	124.00	168.80	168.80	237.60	237.60
Total			9,162.28	6,759.28	9,051.20	6,648.20	9,047.00	6,644.00	9,024.00	6,621.00	9,068.80	6,665.80	9,137.60	6,734.60
Relative number[3]	72.02	72.02	73.69	74.30	72.14	72.19	71.56	71.39	71.27	71.00	71.41	71.20	71.54	71.37
Moline														
John Deere 95	12,357.00	9,020.61	12,357.00	9,020.61	12,357.00	9,020.61	12,357.00	9,020.61	12,357.00	9,020.61	12,357.00	9,020.61	12,357.00	9,020.61
Delivery charges			76.50[4]	76.50[4]	189.20	189.20	285.79	285.79	304.51	304.51	341.95	341.95	415.58	415.58
Total			12,433.50	9,097.11	12,546.20	9,209.81	12,642.79	9,306.40	12,661.51	9,325.12	12,698.95	9,362.56	12,772.58	9,436.19
Relative number[3]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
International Harvester 403	11,596.00	8,465.08	11,596.00	8,465.08	11,596.00	8,465.08	11,596.00	8,465.08	11,596.00	8,465.08	11,596.00	8,465.08	11,596.00	8,465.08
Delivery charges			88.74	88.74	171.36	171.36	256.02	256.02	263.16	263.16	293.76	293.76	357.00	357.00
Total			11,684.74	8,553.82	11,767.36	8,636.44	11,852.02	8,721.10	11,859.16	8,728.24	11,889.76	8,758.84	11,953.00	8,822.08
Relative number[3]	93.84	93.84	93.98	94.03	93.79	93.77	93.74	93.71	93.66	93.60	93.63	93.55	93.58	93.49

1/ Suggested retail prices are taken from: Royal Commission on Farm Machinery, Special Report on Prices of Tractors and Combines in Canada and Other Countries (Ottawa: Queen's Printer, 1969), data used to prepare Table 5.7. Prices not rounded to allow actual transportation costs to be shown. (Net wholesale prices are shown as 73 per cent of suggested retail prices.)

2/ Delivery costs secured from companies concerned through correspondence.

3/ Prices shown relative to John Deere's prices at destination as 100.

4/ Delivered by truck.

TABLE E.4

SUGGESTED RETAIL AND NET WHOLESALE PRICES[1] AND DELIVERY COSTS[2] OF SELECTED, COMPARABLE SELF-PROPELLED COMBINES MADE AT BRANTFORD AND MOLINE, GROUP 4 (1968)

Origin Point	Price of Machine F.O.B. Factory (ex delivery charge)		Delivery Point											
			Des Moines (Iowa)		Bismarck (N.D.)		Brandon (Man.)		Regina (Sask.)		Saskatoon (Sask.)		Edmonton (Alta.)	
	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $	SRP $	NWP $
Brantford														
Cockshutt 545 (U.S. = Oliver)	12,034.00	8,784.82	12,034.00	8,784.82	12,034.00	8,784.82	12,034.00	8,784.82	12,034.00	8,784.82	12,034.00	8,784.82	12,034.00	8,784.82
Delivery charges			246.53	246.53	304.30	304.30	315.70	315.70	363.00	363.00	381.70	381.70	448.80	448.80
Total			12,280.53	9,031.35	12,338.30	9,089.12	12,349.70	9,100.52	12,397.00	9,147.82	12,415.70	9,166.52	12,482.80	9,233.62
Relative number[3]	83.06	83.06	84.11	84.49	83.89	84.18	83.28	83.35	83.41	83.54	83.32	83.41	83.23	83.29
Massey-Ferguson 510	13,646.00	9,961.58	13,646.00	9,961.58	13,646.00	9,961.58	13,646.00	9,961.58	13,646.00	9,961.58	13,646.00	9,961.58	13,646.00	9,961.58
Delivery charges			236.30	236.30	330.80	330.80	387.50	387.50	444.20	444.20	469.80	469.80	550.80	550.80
Total			13,882.30	10,197.88	13,976.80	10,292.38	14,033.50	10,349.08	14,090.20	10,405.78	14,115.80	10,431.38	14,196.80	10,512.38
Relative number[3]	94.19	94.19	95.08	95.41	95.03	95.33	94.63	94.79	94.80	95.02	94.72	94.91	94.66	94.82
Moline														
John Deere 105	14,488.00	10,576.24	14,488.00	10,576.24	14,488.00	10,576.24	14,488.00	10,576.24	14,488.00	10,576.24	14,488.00	10,576.24	14,488.00	10,576.24
Delivery charges			112.50	112.50	220.50	220.50	341.64	341.64	374.40	374.40	414.08	414.08	510.12	510.12
Total			14,600.50	10,688.74	14,708.50	10,796.74	14,829.64	10,917.88	14,862.40	10,950.64	14,902.08	10,990.32	14,998.12	11,086.36
Relative number[3]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
International Harvester 503	14,343.00	10,470.39	14,343.00	10,470.39	14,343.00	10,470.39	14,343.00	10,470.39	14,343.00	10,470.39	14,343.00	10,470.39	14,343.00	10,470.39
Delivery charges			97.20	97.20	188.16	188.16	281.12	281.12	288.96	288.96	322.56	322.56	392.00	392.00
Total			14,440.20	10,567.59	14,531.16	10,658.55	14,624.12	10,751.51	14,631.96	10,759.35	14,665.56	10,792.95	14,735.00	10,862.39
Relative number[3]	99.00	99.00	98.90	98.87	98.79	98.72	98.61	98.48	98.45	98.25	98.41	98.20	98.24	97.98

1/ Suggested retail prices are taken from: Royal Commission on Farm Machinery, Special Report on Prices of Tractors and Combines in Canada and Other Countries (Ottawa: Queen's Printer, 1969), data used to prepare Table 5.7. Prices not rounded to allow actual transportation costs to be shown. (Net wholesale prices are shown as 73 per cent of suggested retail prices.)

2/ Delivery costs secured from companies concerned through correspondence.

3/ Prices shown relative to John Deere's price at destination as 100.

PUBLICATIONS OF THE ROYAL COMMISSION ON FARM MACHINERY

Reports

Special Report on Prices of Tractors and Combines in Canada and Other Countries
(Z1-1966/4-1-1, $2.50)

Available in French:

Rapport Spécial sur les Prix des Tracteurs et des Moissonneuses-Batteuses au Canada et dans d'Autres Pays
(Z1-1966/4-1-1F, $2.50)

Studies

1. Farm Machinery Safety: Physical Welfare Effects of the Man-Machine Interaction on Farms
   - Graham F. Donaldson
   (Z1-1966/4, $1.00)

   Available in French:

   La Sécurité Agricole: Répercussions sur la Santé de l'Interaction de l'Homme et de la Machine dans les Exploitations Agricoles
   - Graham F. Donaldson
   (Z1-1966/4F, $1.00)

2. Farm Tractor Production Costs: A Study in Economies of Scale
   - N.B. MacDonald, W.F. Barnicke, F.W. Judge, K.E. Hansen
   (Z1-1966/4-2, $3.00)

3. Productivity in the Farm Machinery Industry: A Comparative Analysis between Canada and the United States
   - Christopher J. Maule
   (Z1-1966/4-3, $1.00)

4. Farmers' Attitudes to Farm Machinery Purchases: A Survey Conducted in the Prairie Provinces, in Mid-1967
   - Alexander Segall
   (Z1-1966/4-4, $1.25)

5. The Prairie Farm Machinery Co-operative: "The Canadian Co-operative Implements Limited"
   - Rubin Simkin
   (Z1-1966/4-5, $1.50)

Copies of the above publications may be obtained from the Canadian Government Book Shops listed on the reverse side of the title page. Payment should accompany orders to avoid possible delay in shipment.

Mimeographed Studies Prepared for the Canadian Agriculture Congress - Ottawa, 1969

Farm Tractor Prices in Canada Compared with Those in England and Other Countries

Les Prix des Tracteurs Agricoles au Canada en Comparaison avec Ceux d'Angleterre et des Autres Pays

Farm Machinery Costs and Productivity

Coût et Productivité des Machines Agricoles

Technological Changes in Farm Machinery and Canadian Agriculture

Les Transformations Techniques dans le Domaine de l'Outillage Agricole et Leur Portée sur l'Agriculture Canadienne

---

These studies can be obtained from the Royal Commission on Farm Machinery, Ottawa.