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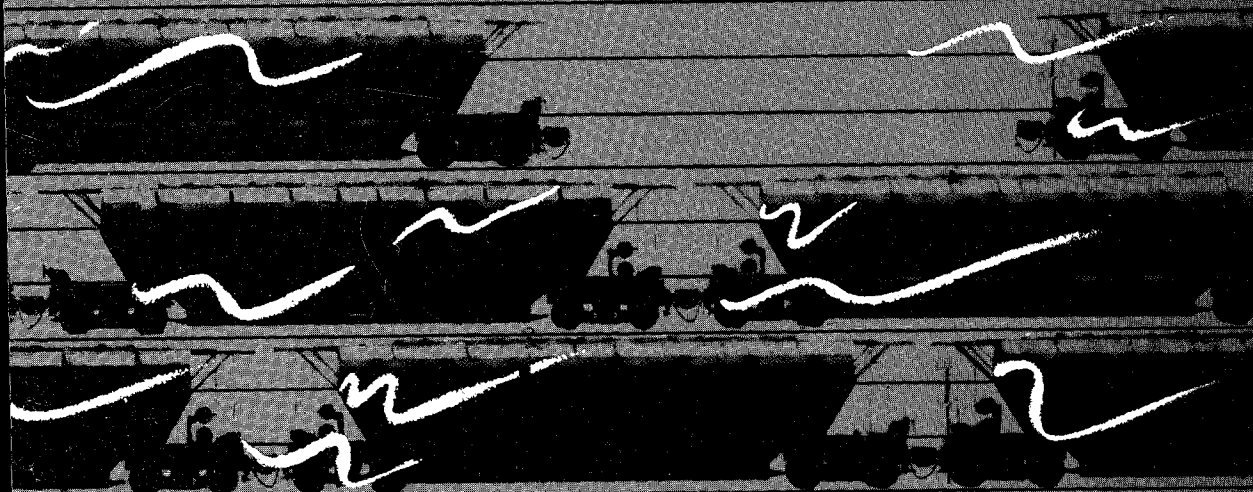
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OCCASIONAL
PAPER

99

INSTITUTIONAL ARRANGEMENTS IN THE WHEAT DISTRIBUTION SYSTEM



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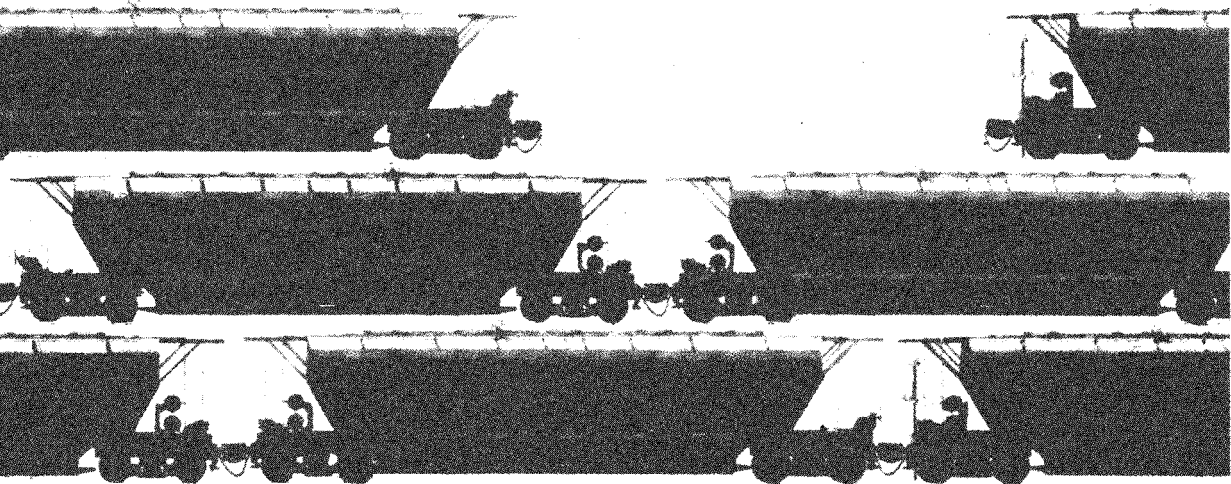
BUREAU OF
AGRICULTURAL ECONOMICS

OCCASIONAL
PAPER 99

INSTITUTIONAL ARRANGEMENTS IN THE WHEAT DISTRIBUTION SYSTEM

PROJECT 41332

JOHN SPRIGGS, JANE GELDARD,
WALTER GERARDI AND
RHONDA TREADWELL



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Foreword

The costs of handling, storage and transport services make up an important part of the overall cost of marketing Australia's wheat crop and significantly affect the returns to Australian wheat growers. In recent years the organisations involved in providing these services have been subject to scrutiny by farm groups and others. In a rural policy statement in April 1986 the Minister for Primary Industry proposed a royal commission into grain storage, handling and transport. This royal commission was established in October 1986 and is required to provide recommendations by 31 January 1988.

There is widespread agreement that problems exist in some aspects of the handling, storage and transport of wheat, but far less agreement on the appropriate solutions. This study was undertaken on the premise that a more complete economic perspective on the existing institutional arrangements in this area was needed in order to advance the debate. I hope that this study will stimulate further discussion and ultimately lead to the development of policies that will ensure greater economic efficiency in the storage, handling and transport of Australia's wheat crop.

ROBERT BAIN

Director

Bureau of Agricultural Economics
Canberra ACT

May 1987

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The authors are particularly grateful to the many representatives of organisations concerned with wheat distribution who gave freely of their time. These organisations included the Australian Wheat Board, the Australian Wheatgrowers Federation (now the Grains Council of Australia) and, in each state, the bulk handling authority, the rail authority, the government departments responsible for bulk handling and rail transport, and the farmer organisations representing wheat growers.

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SUMMARY

Control over the wheat distribution system is largely exercised by statutory authorities established by Commonwealth or state legislation. Each of these authorities has some monopoly power in the supply of some elements of the storage, handling, transport and marketing services required by the wheat industry. The Australian Wheat Board has sole responsibility for marketing the Australian wheat crop. In each wheat exporting state a single bulk handling authority is responsible for handling virtually all the wheat sold by the Australian Wheat Board, and a single rail authority is responsible for much of the inland transport of wheat delivered to the bulk handling authority. While each authority has a considerable degree of monopoly power over some part of the distribution system, all face some restrictions on the extent to which they are permitted to operate as commercial enterprises.

There were many factors underlying the setting up of the statutory authorities and the associated legislation. However, one common theme was the belief that private firms either would be unable or unwilling to make the necessary large investments or, if they did so, would extract monopoly profits from users. Since the time the statutory authorities were established, the grains industry has changed greatly, in particular in the areas of finance, communications and transport systems. Thus it is timely to consider which institutional arrangements are the most appropriate.

In this paper the effects of institutional arrangements on the efficiency of wheat distribution are examined. Some evidence of inefficiencies associated with these arrangements is presented and options for improving efficiency are suggested.

Economic implications of the arrangements

Economically, the most important powers conferred by legislation on the bulk handling and rail authorities are those which protect them from competition by other potential suppliers of the services. The rail authority is the only legal rail carrier of wheat in each state, and there are (except in South Australia) restrictions on commercial road carriers of wheat.

These powers are reinforced by some arrangements specified in commercial agreements between the authorities. For example, though some wheat — such as

'permit wheat' for stock feed, and direct grower to buyer sales — might not be handled by the bulk handling authorities, the authorities in New South Wales, Queensland and Victoria receive payments on such sales. These payments reinforce the within-state monopoly powers of the authorities by increasing the cost of sales which bypass them.

In Queensland, South Australia and Western Australia, rail rate concessions are provided for carrying a certain market share or share of a grower's crop — a different principle from basing discounts on absolute volume, which may promote efficiency through the realisation of

economies of size. These measures are designed to help the rail authorities to maintain market share rather than to promote efficiency. Where road is the cheaper mode of transport, total costs of moving the wheat crop will be raised by such practices. Another practice having the same effect, in South Australia, is the surcharge imposed on grain moved by road out of rail based silos.

The imposition of non-commercial objectives on the statutory authorities is a further source of costs. In the case of the rail authorities, the responsible ministers have used their powers of direction in setting grain freight rates, providing subsidised transport services and maintaining uneconomic branch lines.

In the case of the bulk handling authorities, non-commercial objectives may also be imposed by the boards of directors. These boards are composed primarily of representatives of groups such as growers, governments, unions and marketing authorities. Because the interests of these groups diverge from the commercial interests of the authority, they may impose non-commercial objectives on it. A notable example is the general insistence on the pooling of charges to growers. Pooling the costs of wheat distribution raises the total cost of the distribution service because the users of the service do not then know its true cost, and have no incentive to achieve an efficient pattern of using the service.

The reliance on state authorities and on the state oriented rail systems has discouraged interstate transport of wheat and raised total transport costs where least cost routes to ports cross state borders. However, some interstate transport by both road and rail does occur. Interstate road transport is not restricted, but interstate rail transport of wheat requires either co-ordination between authorities or legislation.

Three exceptions to the general constraint on interstate transport may be mentioned here. By virtue of legislation the Victorian State Transport Authority and the Grain Elevators Board of Victoria operate in southern New South Wales to transport grain from that region to ports in

Victoria — a less costly routing than to ports in New South Wales. Also, the Grain Handling Authority of New South Wales has arranged for interstate rail transport of wheat delivered to certain silos. In addition, the relevant authorities have agreed to use the less costly interstate transport routes for grain grown in the north-western region of Victoria and the south-eastern region of South Australia.

The achievement of a lower cost distribution system has been encouraged by written commercial agreements that include explicit incentives. The Grain Storage and Handling Agreement between the bulk handling authorities and the Australian Wheat Board is an attempt to promote efficiency in the wheat distribution system, by the extensive use of rewards and penalties related to performance and by attempting as far as possible to direct the actual costs of services back to growers. For example, there are specific penalties and rewards relating to the length of time to load ships and to defective outturn. The written agreements between the bulk handling and rail authorities in Queensland, South Australia and Western Australia provide some incentives for efficient transport arrangements, such as surcharges on stopovers on direct lines and rebates for using unit train loads.

Improvements in efficiency have also been encouraged by more formal attempts at intrastate co-ordination between bulk handling and rail authorities, involving the establishment of joint working parties and meetings on operational and investment issues.

An important means of encouraging efficiency within an organisation is accountability. The existing accountability requirements of the statutory authorities, however, have a major drawback: they work more by penalty than by reward, and thus cannot be expected to encourage excellent performance. The accountability of authorities on internal efficiency is generally to their boards of directors or commissioners.

The Grain Elevators Board, the State Transport Authority in Victoria and Australian National Railways (which

operates the South Australian rail system) have specific accountability requirements in addition to audited annual financial reports. In the latter two cases, legislation requires accountability to parliament on the attainment of specified financial and managerial targets. The Grain Elevators Board is also required to provide a rate of return report.

Evidence of inefficiency

It has not been possible in this study to provide a total estimate of the benefits and costs of changing institutional arrangements in the wheat distribution industry. Such an estimate would require a large quantity of detailed information, including that on cost structures of the statutory authorities in the wheat distribution industry, as well as on cost structures of potential competitors and of wheat farms. Much of this information is not available. However, there is some piecemeal evidence related to the efficiency of parts of the wheat distribution industry.

Over the period 1975–81 several management audits of the New South Wales Grain Handling Authority contained some criticism of its managerial performance. It is argued in this report that these performance problems were the consequences of a lack of appropriate incentives. Incentive structures are similar in other statutory authorities in the wheat distribution system.

In the present study, comparisons are made between the country handling and storage charges of the Grain Handling Authority and of private operators in New South Wales, the state where private commercial storage is most used. It is found that the wheat charges of private operators in 1985–86 were on average \$1.14/t below those of the authority — a difference of around 10 per cent of the authority charge. This difference may underestimate the potential cost savings from competitive storage and handling, because the private charges may be biased upward to the charges of the Grain Handling Authority, which has legislated rights to handle most of the wheat crop. Indeed, private charges for other grains

indicate a much larger difference in favour of private storage — around \$2.90/t.

The statutory restrictions on intrastate road transport of grain raise total transport costs in cases where road is the cheaper method of moving the grain. For those Victorian silos whose rail costs exceed road charges, the direct cost of not allowing grain to move by road is estimated to have been around \$10/t in 1984–85.

Options for change

Three options for changing the arrangements to encourage efficiency in the distribution industry are to:

- improve the incentive structure in the existing statutory authorities;
- permit competition with the existing statutory authorities; or
- introduce competition and incorporate the statutory authorities as public companies.

The *first option*, which involves the least change to the existing institutional arrangements, is to retain the present structure and powers of statutory authorities but to alter legislation to relieve them of non-commercial objectives and improve incentives relating to efficiency.

Both the bulk handling authorities and the rail authorities are subject to the imposition of non-commercial objectives and constraints. It appears that those imposed on the bulk handling authorities come mainly from grower representatives on their boards of directors, while those imposed on the rail authorities come mainly from ministerial direction. In both cases, however, legislative changes would be required to remove the possibility of the imposition of such objectives.

Legislation providing for ministerial direction could be amended so that a non-commercial objective would be pursued, under specific policies, after allowing public review and only if its fulfilment had a net social benefit. The latter decision would entail an evaluation of whether the benefits from the non-commercial objectives would outweigh the resulting losses in efficiency.

Legislation could be amended where necessary to remove the principle of board members representing outside interests

that could conflict with those of the authority. Instead, board members could be required to direct the authority as a commercial venture and could be objectively selected on the basis of qualifications and experience relevant to the organisation's operations (as is the case for Commonwealth primary industry statutory marketing authorities). Also, consideration could be given to paying board members according to the authority's performance.

In both bulk handling and railway legislation, little explicit attention has been paid to accountability on internal efficiency. Only in South Australia and Victoria does railway legislation specify several management and economic measures of accountability. Legislative arrangements could be changed in this direction in other states.

As with any monopoly, directing the authorities to use their resources in their own commercial interests might itself result in inefficiency. This is thought unlikely in the present case because the bulk handling and rail authorities face only one buyer, the Australian Wheat Board. However, one way to encourage efficient performance is to use commercial agreements specifying penalties and rewards contingent on performance. To this end it is suggested that efforts should be made to obtain written rail freight agreements in New South Wales and Victoria, the only states without such agreements.

One problem with commercial arrangements involving a monopolist which faces potential competition is that it has an incentive to negotiate terms that will reinforce its monopoly status. This has happened in commercial agreements involving both the bulk handling authorities and the rail authorities. Improved accountability requirements could be used to discourage the inclusion of anticompetitive measures in commercial agreements.

The state basis for bulk handling and railway legislation has often been criticised for creating barriers to the interstate movement of grain which in some locations would provide the least costly

route to port. Some agreements between statutory authorities to use the least costly route across state borders have been reached. Co-ordination across states could be further encouraged to improve the efficiency of wheat transport.

Joint long run planning of investment and rationalisation of the Australian wheat distribution system could be encouraged as a catalyst to improve co-ordination and efficiency.

The *second option* is to permit other potential suppliers to compete with the existing statutory authorities. Competition would improve the efficiency of the wheat distribution industry by providing more clearly defined rewards and penalties. The usefulness of this option, however, may be limited, depending on the extent to which wheat distribution is characterised by non-contestable natural monopolies — that is, by situations in which no competitor can be expected to enter due to the advantages held by a single operator.

There is a possibility of localised monopolies occurring in country silo operations and terminal facilities. However, any localised monopoly would face competition from operators in adjoining regions. The bulk handling function of co-ordinating wheat movements could be made competitive by contracting this function by tender. The tendering process should be open to the existing bulk handling authorities, the many existing freight forwarders and any newcomers.

The introduction of competition in wheat transport would involve the removal of the rail authorities' present monopoly powers and of restrictions on the road transport of wheat. Allowing competition with the rail authorities would be unlikely to result in major changes to the rail networks but might be effective in circumventing some of the inefficient aspects of the state orientation of the rail system in border areas.

The *third option* is to introduce competition, as above, and to incorporate the bulk handling authorities as public companies. This option has all the advantages of the second and would encourage public companies, whether they

were monopolies or not, to maximise their internal efficiency by trading their shares on the stock market. Public accountability to shareholders and vulnerability to takeover would be inherent in this option. Also, trade practices legislation — which does not apply to the present grain handling authorities — could be used to deter monopolistic practices, such as extracting monopoly profits by setting prices too high, which result in a misallocation of resources.

Therefore, if wheat distribution were characterised by natural monopolies, this option of introducing competition and public incorporation would offer an additional advantage over the option of introducing competition only. However, the costs of implementing this option may be higher than for the other two, as it involves the largest changes.

Prior to implementing any major change in the institutional arrangements in the wheat distribution industry, further discussions are required on issues such as: the effect of alternative marketing arrangements on wheat distribution; the

extent of natural monopolies in this market and the effectiveness of current trade practices legislation; whether any of the non-commercial objectives pursued by the statutory authorities have net social benefits; the magnitude of the social costs of road transport; and road cost recovery.

The choice between the proposed changes will need to be based on a comparison of the relative benefits of each change and the costs of implementing them. Also required is an assessment of the implications of each option on the distribution of benefits, the distribution of other grains, and pest control. It has been argued that allowing competition in wheat distribution would result in lower wheat hygiene or higher costs than is the case with the current centralised system. However, in a competitive system, price signals have the potential to provide more accurate information to those making storage and handling decisions than have the regulations of the centralised system. Thus, wheat hygiene may not be a greater problem with competition in the wheat distribution industry.

1. Introduction

1.1 Background

Many of the factors influencing the price growers receive for Australia's wheat are beyond the direct control of the industry or Australian governments. These factors include weather, overseas production and the policies of other wheat exporting countries. However, one key factor affecting returns to Australian wheat growers over which Australia does have some control is the cost of domestic handling, storage and transport. In this paper this group of activities will be referred to as the wheat distribution industry.

The ownership and management of the Australian wheat distribution industry is characterised by statutory authorities, each of which has a high degree of monopoly power over some transport, handling or storage activities. These authorities, established under Commonwealth or state legislation, include the bulk handling authorities and the rail authorities. The reasons for forming these authorities were diverse. However, in almost all cases there was a belief that private operations would be unsatisfactory for these purposes.

It was considered that private entrepreneurs either would be unwilling or unable to raise the necessary capital for such ventures or, if they did so, would extract monopoly profits from growers (see Grain Elevators Board of New South Wales 1972; Balderstone et al. 1982). It was also believed that regulation of statutory monopolies by government and/or growers would give wheat growers and other affected parties a greater say in the direction and control of the distribution system than would market forces.

The efficiency of the domestic wheat distribution industry has become relatively more important to growers as real returns from wheat growing have declined. Transport, storage and handling costs now

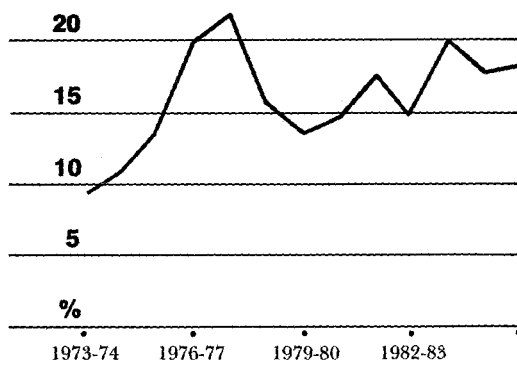
represent a significant proportion of the export value of wheat (see figure A). Since 1973-74 these costs as a proportion of crop value have generally increased, with peaks of around 20 per cent in 1977-78 and 1983-84.

One of the first forums for reviewing off farm costs and efficiency was the 1977-78 inquiry on wheat stabilisation by the Industries Assistance Commission. One proposal made at the inquiry by the Australian Wheat Board (Industries Assistance Commission 1978, p.14) was that storage and handling charges be pooled on a state basis rather than on a national basis. This proposal was adopted beginning with the 1978-79 marketing year. The resulting state charges differed greatly, ranging from about \$7/t in Victoria to \$12/t in New South Wales. The magnitude of these differences raised doubts about the efficiency of some bulk handling authorities and stimulated a closer scrutiny of them.

In 1980, concern intensified following a New South Wales government inquiry into the operations of that state's Grain Elevators Board. The final report, issued in February 1981 (Carmichael, Ducker and

A Distribution charges as a proportion of average wheat export value

BAE chart



Renshaw 1981) identified inefficiencies resulting from poor management.

More recently, the efficiency of the grain distribution industry has been the subject of economic studies in which recommendations for change have been made (see Hussey 1986; Lloyd 1986). In October 1986, a Royal Commission of Inquiry into Grain Storage, Handling and Transport was established. This commission is required to present its recommendations by 31 January 1988.

1.2 Aim of this paper

The aim in this paper is to analyse the economic implications of the current institutional arrangements in the wheat

distribution industry and to discuss options for improving the industry's efficiency.

Almost any change in the institutional structure of the economy or in the operation of existing institutions will result in some gains and some losses. A change is efficient (in the sense that the term is used in this paper) if the sum of the gains is likely to exceed the sum of the losses.

Maximum efficiency requires the use of the least cost method of producing a certain amount of distribution services (internal efficiency). It also requires that the level of distribution services be such that there can be no net gains from changing the output, either of particular firms or of the distribution system as a whole (allocative efficiency).

2. The institutional arrangements

The legislation governing the authorities responsible for wheat marketing, bulk grain handling and transport provides the basis for the institutional framework of the wheat distribution industry.

Commonwealth and state legislation provides for the existence of these authorities and determines the extent to which they are monopolies. The legislation may influence the efficiency of the industry in three general ways — namely, by determining:

- the monopoly powers conferred on the authorities;
- the non-commercial objectives and constraints that are, or may be, imposed on them; and
- their accountability requirements.

Once an authority is established, its operations are facilitated by the commercial and co-ordination arrangements adopted. The most important commercial arrangements include the national Grain Storage and Handling Agreement and the various state rail freight agreements. Co-ordination arrangements between authorities (both between and within states) include joint efforts to overcome some problems in wheat distribution.

2.1 Background

The institutional arrangements for wheat distribution differ between the states, largely due to marked variations in the nature of the wheat distribution task.

These variations are due to differences in factors such as the volume and variability of wheat production, the distances from wheat growing areas to ports, and the amounts of other grains handled.

In all states, the inland transport of wheat is predominantly in the hands of a single rail authority. The most significant movements of wheat by road occur in South Australia and Western Australia. All

railways may operate road haulage for transporting wheat, although the extent to which this occurs differs between the states. The dominance of rail transport is attributable largely to the cost advantage of rail over road transport for long distance haulage of bulk grain. It is also attributable to restrictions on road transport of wheat within states, either through a lack of road receival facilities at ports (as in New South Wales) or through legislative arrangements.

Interstate road transport is not restricted by legislation except for the requirement of the *Interstate Road Transport Act 1985* that interstate operators be licensed. Some growers, particularly those in border areas, find it advantageous to deliver their wheat to the authorised receiver in the adjacent state or (subject to permit) to an interstate stock feed purchaser.

The Australian rail systems, which developed independently, are nearly all operated under state legislation. As a general rule, wheat is not moved interstate by rail, although one exception is specifically legislated in the *Commonwealth Border Railways Act 1922*. This act permitted Victoria to construct broad gauge lines to Balranald, Deniliquin and Oaklands in New South Wales. These lines are operated by the State Transport Authority of Victoria, and the Victorian Grain Elevators Board operates silos at various points along them.

2.2 Bulk handling authorities

The legislative and commercial arrangements relating to bulk handling authorities are outlined briefly in the following sections.

Legislative arrangements

Three key aspects of the legislative arrangements are discussed — economic

powers, non-commercial objectives and accountability.

Economic powers

Wheat marketing in Australia is governed by provisions of the Commonwealth *Wheat Marketing Act 1984* and complementary acts in each state.

These acts establish the Australian Wheat Board as a statutory marketing authority for wheat, with sole responsibility for marketing all wheat except for the following exempt categories:

- wheat for use on the grower's own farm or an associated farm;
- wheat sold by authorised growers directly to buyers; and
- wheat purchased (by permit) for stock feed.

A person wishing to obtain a permit for stock feed must pay a prescribed fee, comprising an administration charge and a state permit fee. The level of the latter fee varies markedly, from no fee in two states to \$2/t in New South Wales and Victoria (see appendix A).

The Wheat Marketing Act gives an authorised receiver in each state sole responsibility for distributing wheat (other than exempt wheat) within the state. Under the relevant state acts, wheat growers are required to deliver all wheat (except for exempt wheat) to an authorised receiver during the season in which it was produced.

The authorised receivers for the Australian Wheat Board are the State Wheat Board in Queensland, the Grain Handling Authority of New South Wales, the Grains Elevators Board in Victoria, South Australian Co-operative Bulk Handling Limited and Co-operative Bulk Handling Limited in Western Australia. The first three of these are themselves statutory public authorities and the other two are grower co-operatives.

In Queensland, the State Wheat Board contracts its storage and handling functions to another statutory authority, Bulk Grains Queensland, which has exclusive rights to store and handle grains at export terminals. Unlike the other handling authorities, Bulk Grains Queensland does not have statutory rights

to store and handle wheat in country areas; it obtains these rights through agreements with the State Wheat Board and other marketing organisations (see appendix B).

Non-commercial objectives

The term 'non-commercial objective' here refers to an objective and/or operating procedure which is imposed on an organisation but which is not strictly related to the commercial operations of that organisation. There are three ways in which non-commercial objectives can be imposed on an authority. First, the authority may be required by the legislation to comply with ministerial directions. Second, the legislation may specify certain non-commercial objectives for the authority. Third, interest groups may be represented on an authority's board and may be able to impose directions which are in their own interests but not necessarily in those of the authority. Such objectives, however they are imposed, may impinge on the efficiency with which the authority operates.

The non-commercial objectives that may be imposed by ministers, often as a result of pressure from various group, vary between the states. The New South Wales legislation gives the Minister for Agriculture unrestricted powers of direction (appendix C). There is less scope for ministerial direction in the other states under current legislation. The operations of the Grain Elevators Board in Victoria are subject to ministerial approval (appendix D). In South Australia and Western Australia the agriculture ministers can direct the co-operative to build new facilities or modify current facilities (appendixes E and F).

There are few non-commercial objectives imposed directly by the legislation. In New South Wales, the Grain Handling Authority is required to provide 'a satisfactory level of service to growers' and 'satisfying and secure employment' for its employees. Both these requirements may imply that the authority has to pursue non-commercial objectives (see appendix C). In Victoria, the Grain Elevators Board is required to provide 'all reasonable proper and equal facilities for the storage

... receipt, forwarding and delivery of grain' under its control (see appendix D). The requirement of equal facilities may be construed as implying a non-commercial objective.

The legislated composition of the boards of directors may also lead to the imposition of non-commercial objectives on the authorised receivers. The boards of South Australian Co-operative Bulk Handling Limited and Co-operative Bulk Handling Limited of Western Australia consist entirely of representatives elected by growers. The boards of the authorities in New South Wales, Queensland and Victoria have, in addition to grower representatives, members from organisations such as government departments, unions and grain marketing authorities, as well as members chosen for their experience in business and management.

To the extent that the interests of some represented groups do not coincide with the commercial interests of the bulk handling authority there is potential for board members to impose non-commercial objectives on the authority. Possible examples are insistence by grower representatives on the pooling of costs across growers and the extension of storage and handling facilities to marginal production areas.

Accountability

Accountability of management is mainly at the discretion of the boards of directors. Only in Victoria does the legislation specifically require that the general manager be accountable to the board. All the authorities are required to submit audited annual financial reports to the minister. Also, the Grain Elevators Board of Victoria is required to provide a rate of return report. In addition, in some states, the legislation specifies areas for which the management is accountable to the relevant minister. The management of the New South Wales Grain Handling Authority may be held accountable to the minister on any matter. In fact the authority has been subjected to a number of management audits and inquiries over the past decade (see section 4.1). In South Australia, the

authority is required to obtain ministerial approval of the design of any new facility. In general, other than in New South Wales, ministers have taken a non-intervening attitude toward these authorities.

Commercial arrangements

There are four commercial arrangements which affect the operations of bulk handling authorities.

Grain storage and handling agreement

In this agreement the Australian Wheat Board and the bulk handling authorities have endeavoured to improve efficiency in the wheat handling and storage system, both by the extensive use of rewards and penalties related to the performance of the bulk handling authorities and by attempting to direct the actual costs of services back to growers (see appendix A). For example, the cost of carrying over wheat from one season to the next is borne initially by the state bulk handling authority, though the agreement provides for the Australian Wheat Board to contribute to this cost. This contribution is designed to cover that part of the carryover which is not attributable to the bulk handling authority (for example, when the Australian Wheat Board does not sell the wheat during that year).

In the agreement, particular freight costs and savings, such as concessions from the use of block trains, are assigned to the bulk handling authority. The agreement also contains clauses relating to the transfer of wheat between bulk handling authorities, incentives for good ship loading performance, and penalties for defective handling of wheat.

Deferred delivery interest scheme

Under this scheme, which currently operates in Victoria and New South Wales, a prescribed date is determined when wheat would normally be available for delivery from each region within a state (see appendix A). Growers who delay delivery of their wheat until between two and fourteen weeks after the prescribed date receive an interest payment on their first advance. The interest is calculated on

the amount of wheat that would have been received had delivery been made on the prescribed date, and applies from that date to the day of actual delivery. The interest payment is intended to reflect part of the interest savings that accrue to the Australian Wheat Board because of delay in its borrowings for late deliveries.

Pricing policies

Bulk handling authorities usually pool their costs and charge an equal rate to all growers within the state. The Grain Storage and Handling Agreement does not prevent bulk handling authorities from using different charges for different grades, receival stations and/or delivery dates, and cost pooling is not required by legislation in all states. To date, there have been only a few attempts at either differential or discriminatory pricing.

Under differential pricing, charges vary to reflect cost differences. This has been attempted on a locational basis by the Victorian Grain Elevators Board at its central receival points (see appendix D) and by the Grain Handling Authority of New South Wales at its West Wyalong subterminal (see appendix C). These attempts at price differentiation have been discontinued, however, because they were ineffective in altering patterns of delivery and/or were opposed by grower representatives (Victorian Farmers and Graziers Association 1986). Price differentiation over time is currently practised, as has already been mentioned, by the Victorian Grain Elevators Board and the Grain Handling Authority of New South Wales under the Deferred Delivery Interest Scheme.

Under discriminatory pricing, charges would vary to reflect differences in competitive pressures. Although a bulk handling authority has monopolistic power in the handling of wheat within a state, there may be competition near state borders. Such competition has led to the introduction of discounts at silos located in border areas of New South Wales and Victoria (see appendix G). In Victoria, the Grain Elevators Board offers discounts to growers who deliver to one of four stations near the South Australian border. The

New South Wales grain handling and rail authorities have both offered concessions to growers along the Victoria–New South Wales border to discourage New South Wales growers from delivering their grain to silos belonging to the Victorian Grain Elevators Board, some of which are located in New South Wales.

Toll systems

Another important commercial arrangement is the system of grower tolls introduced in South Australia and Western Australia (see appendixes E and F) to provide the capital for silo construction. Annual toll charges are eventually repaid to growers.

2.3 Rail authorities

The rail authorities are Queensland Railways, the State Rail Authority of New South Wales, the State Transport Authority of Victoria (V/Line), the Australian National Railways Commission (which operates in South Australia) and the Western Australian Government Railways Commission (Westrail). All are statutory public authorities and are responsible to the relevant transport minister.

As for bulk handling authorities, these rail authorities are subject to both legislative and commercial arrangements.

Legislative arrangements

There are three key aspects of legislative arrangements applying to rail authorities.

Economic powers

Except for Westrail, each rail authority is the only legal rail carrier of grain in its state. The Western Australian Government Railways Act does not prohibit the establishment of private railways. However, Westrail has a monopoly on wheat transport by rail by virtue of an agreement with Co-operative Bulk Handling Limited.

There are restrictions on road carriers of grain in Queensland, Victoria and Western Australia. In Queensland, wheat moved more than 120 km must travel by rail (see appendix B). In Victoria, the commercial

road transport of bulk wheat is limited to 60 km (see appendix D). Farmers are exempt from this provision if their vehicles are used solely in connection with their work as primary producers.

In Western Australia, provisions contained in the state Transport Act are used to prohibit road transport of wheat in 'rail-designated regions' (see appendix F). Road transport of wheat from silos in non-designated areas is permitted, but is assigned by tender to a single road haulier on each route. Farmers are, however, allowed to transport wheat direct to port, provided they do it themselves.

All rail authorities are permitted to organise the transport of grain by road, either through ownership of trucks or through contracts with road haulage firms. Westrail, however, is permitted to arrange road transport only to or from rail based silos.

Non-commercial objectives

Each rail authority is required to comply with directions from the responsible transport minister on any matter concerning the operations of the railway. However, the Commonwealth Minister for Transport, upon giving directions to Australian National Railways, is required within seven days to present to parliament the particulars and the reasons for the directions. Also, Australian National Railways must be reimbursed for any financial loss suffered as a result of complying with ministerial directions (see appendix E).

In some of the state acts, specific ministerial powers are listed. The rail authorities operating in Queensland, South Australia and Western Australia all require ministerial approval before lines can be closed. In all states except South Australia, ministerial approval is required for any increase in charges. In Victoria, the rail authority is required 'to operate within Government policy and other parameters determined by the Victorian Transport Directorate' (see appendix D).

Another non-commercial objective imposed on the rail authorities in New South Wales and Western Australia is common carrier status. As common

carriers these rail authorities have to provide a transport service to every customer. Although Westrail is obliged to be a common carrier, it can charge any rate for the carriage of any goods; thus, it can charge high freight rates to discourage the transport of small or uneconomic loads. This is not the case in New South Wales.

Accountability

The management of each rail authority is accountable to a railway commission which in turn is accountable to the relevant transport minister. Only in Victoria and South Australia does the legislation contain specific accountability requirements concerning internal efficiency. In Victoria, the minister is required to determine quantitative targets (after consultation with the State Transport Authority — see appendix D). Further, the state's Transport Act sets out 23 objectives which the authority is required to pursue. The authority must include in its annual report an indication of the extent to which each of these objectives has been achieved and the quantitative targets have been attained during the year.

The Australian National Railways Commission must report to the Minister for Transport at least once a year on its objectives, strategies and policies. Also, before the start of each financial year, the commission must propose a financial target, which is subject to the approval of the minister (see appendix E).

Commercial arrangements

The main commercial arrangements implemented by the rail authorities deal with intrastate movement of wheat and freight pricing. In Queensland, South Australia and Western Australia, commercial arrangements are formalised in written agreements between the rail authority, the bulk handling authority and grower organisations. There are as yet no written agreements in the other two states: instead, commercial arrangements are determined by the relevant minister or through informal negotiations between the relevant bodies.

A stipulation in the Queensland rail

freight agreement is that all grain delivered to Bulk Grains Queensland which is to be moved more than 120 km must go by rail unless the railway is unable to meet demand. In return, the railway offers concessional freight rates for grain delivered to Bulk Grains Queensland. Rebates are offered to Bulk Grains Queensland for unit train loads, and penalties are applied to grain discharged at intermediate depots on direct haulage routes (see appendix B).

Under the South Australian rail freight agreement, rates vary with road distance to port (rather than with rail distance, as in Queensland for example). Surcharges are imposed on any wheat delivered to local markets from rail based silos by road (see appendix E). There is an explicit provision for Australian National Railways to organise road shipments from rail based silos but to still charge the rail rates (which, though based on road distance, differ from commercial road rates). Australian National Railways pays a rebate to growers if they deliver more than 80 per cent of their total wheat delivery to inland rail based silos. Finally, special rates are to apply at eleven inland silos when certain cost saving operations have been introduced.

In Western Australia, all grain delivered to scheduled receival points (see appendix F) must be transported to port by Westrail, which is also permitted to tender for transporting grain from non-scheduled receival points. As part of the rail freight agreement, Westrail has agreed that by 1988-89 its freight charges for grain will be competitive with road freight rates. Freight rates are based on radial distance from the nearest port. Farmers pay less for freight if they deliver more than 90 per cent of their total wheat delivery to receival points served by rail.

Freight charges in New South Wales are determined by the Minister for Transport on the basis of recommendations by the State Rail Authority. Freight charges consist of a basic distance charge plus charges levied for services such as shunting and stopovers. Various options for reducing freight rates, combined with closures of non-economic branch lines, are

now being considered (see appendix C).

In 1986-87 the basis of setting freight rates within Victoria was changed from rail distance to radial distance (see appendix D).

2.4 Co-ordination arrangements

A major effort at co-ordination within a state has occurred in Victoria. The system of central receival points was established with the co-operation of the State Transport Authority and the Grain Elevators Board. These two statutory authorities are within the same ministry, unlike the situation elsewhere. In other states, co-ordination is being facilitated by joint planning committees, working parties and study groups, some of which have been established only recently.

Co-ordination between states is limited. Commercial arrangements governing the interstate transport of wheat have been developed for trade across the New South Wales-Victorian border and the South Australian-Victorian border. In January 1985, as a result of large stocks in New South Wales after the record 1983-84 crop, a commercial agreement was negotiated between the Australian Wheat Board and the relevant bulk handling authorities to move substantial quantities of New South Wales wheat through ports in Victoria and Queensland. This has become an ongoing arrangement (see appendix G).

In the Working Party Report (1983), titled 'Grain handling and transportation for south east Australia', it was suggested that savings could be made by transporting grain to Port Adelaide from north-western Victoria and to Portland from south-eastern South Australia. Soon after the report was released, the relevant authorities agreed to use these interstate transport routes for grain (see appendix G).

Both rail authorities offer discount rates for moving grain from the other state to their own state's port. However, the amount of grain moved interstate is limited by an agreement that the interstate movements must not affect the revenues of either rail line. That is, the revenue

forgone by both the Victorian State Transport Authority and Australian National Railways on grain sent interstate must be matched by the revenue obtained by them on the grain coming from interstate. Because of higher freight rates in Victoria, this requirement for offsetting

revenue has meant that only a fraction of the Victorian grain which could be transported more cheaply to Port Adelaide is in fact sent there. In addition, if a drought occurs in one of the two regions, this requirement will inhibit interstate transport out of the other region.

3. Economic implications of the institutional arrangements

3.1 Reasons for regulation

As the previous sections have shown, a critical aspect of the institutional arrangements in the wheat distribution industry is the domination of the industry in each state by authorities which have significant monopoly powers. In each state there is a single authorised receiver of wheat (the bulk handling authority) and a single statutory rail authority. The monopoly power of the rail authorities is reinforced by arrangements which prevent or at least deter the transport of wheat by road hauliers.

Part of the original pressure for establishing monopoly handling authorities came from growers who thought that an unregulated market for bulk handling services would be unsatisfactory. It has been argued that the use of statutory monopolies in wheat distribution is justified either: where a natural monopoly would exist in the industry and, in the absence of regulation, would extract excessive profits (termed monopoly rents); or where significant economic externalities arise from the provision of wheat distribution services.

Natural monopolies

An economic activity characterised by decreasing unit costs of production over the range of output demanded in the market is termed a natural monopoly; that is, consumers *could* be served at least cost by a single firm.

A natural monopoly can be either contestable or non-contestable (Panzar and Willig 1977; Baumol, Panzar and Willig 1982). A natural monopoly is contestable if the incumbent firm becomes vulnerable to competition if it tries to extract monopoly profits by raising prices. For this to be so, potential entrants to the market must be able to use the same technology as the incumbent firm, must be perceived as

producing the same product and must not face high entry costs unless those costs can easily be retrieved on departure from the industry. Given these conditions a competitor could extract some of the monopoly profits being earned by the incumbent firm. The latter would lose market share as well as profits with the entry of another firm. It is this potential threat of entry that induces a natural monopoly to set prices at a level where it is not earning monopoly profits.

Thus, there are no losses in efficiency associated with a contestable natural monopoly: such a firm is likely to be operating at the most economically efficient point of production (given the market size). Regulations to restrain the operations of the incumbent firm are unnecessary and could even create inefficiencies, and regulations to restrict entry of other firms would be likely to do so.

However, the strict conditions required for a natural monopoly to be contestable may not be satisfied. When the incumbent firm is not potentially subject to competition (perhaps because of the high entry costs that firms would face on entering the industry and would be unlikely to retrieve on exit — for example, the provision of a rail network) it is able to capture monopoly profits. In these circumstances there may be a net social benefit from using pricing or trade practices legislation to correct or avoid any consequent misallocation of resources.

Externalities

Externalities are effects whose costs or benefits are not transmitted by the market price mechanism to the producers or consumers whose actions give rise to them. They become important when the social benefits of a firm's decisions differ from the private (that is, market) net benefits. An example is provided by pollution: the private net costs of the polluting activity

are less than its social net costs. Conversely, an economic activity having a high social value would not occur in a competitive environment if its net private benefits were negative: if, that is, no entrepreneur could expect sufficient gains from the activity to make it worthwhile. The granting of a legal monopoly is one way to bring about such an activity, if it sufficiently increases the potential for private gains.

In a sense, the non-commercial objectives imposed on the statutory authorities in wheat distribution are similar to externalities, in that these objectives would not be fulfilled in a competitive environment. Two non-commercial objectives commonly required of statutory monopolies are:

- *to provide a particular service at equal cost to all users regardless of location or time.*

The statutory monopoly can achieve this objective by internal cross subsidisation, but only if it is protected from competition. If competition were allowed, competitors would provide only those services from which profits could be made, and these would be just the services on which the existing firm depended for the excess profits needed to cover losses elsewhere.

- *to stand ready and able to serve all customers on demand.*

The requirement to be able to meet the possible demands of all users would put the statutory monopoly at a disadvantage relative to any competitors that do not do so. The statutory monopoly would incur extra costs in building and maintaining excess capacity to provide backup facilities in the event of any breakdown, whether of its own or a competitor's service.

Regulations are therefore used to restrict entry in order to maintain the necessary revenue, as well as to impose the non-commercial objectives themselves. But it is not clear that there are net social benefits from fulfilling non-commercial objectives in wheat distribution.

3.2 Potential economic inefficiencies

Even if the existence of natural monopolies or significant externalities were demonstrated in the wheat

distribution industry, this would not in itself justify the establishment of statutory monopolies. Economic costs arising from inefficiencies due to the institutional arrangements of such organisations may be greater than the economic benefits these organisations confer.

Internal inefficiency

Internal inefficiencies arise chiefly when the personal objectives of managers diverge from the commercial interests of the firm. Personal objectives may include growth of the firm, an easier life and avoidance of risk. Pressures of price competition limit the possibilities for such objectives to be realised. The scope for internal inefficiencies from this source is thus greatest when there is no competition. As the bulk handling and rail authorities face minimal competition by other suppliers of wheat distribution services, in many circumstances there may be few effective restrictions on either prices or costs. Therefore, there is no direct restraint on the internal inefficiencies that result from unnecessary cost inflation.

Some incentives for internal efficiency have been provided by the use of written agreements. The Grain Storage and Handling Agreement contains provisions designed to improve the efficiency of the wheat storage and handling system. This is done by the extensive use of rewards and penalties related to performance and by procedures whereby charges to growers are made to reflect the actual costs of service.

With respect to carryover, inland transport, outturn, shipping and care of wheat, the present grain handling agreement is an attempt to delineate the responsibilities of the bulk handling authority and the Australian Wheat Board more clearly than did the previous agreement. There are now penalties and rewards for the bulk handling authorities in all these areas. In addition, the attempt to apportion responsibility provides a focus for comparison among bulk handling authorities and, together with political pressure, may provide an incentive for some bulk handling authorities to improve their performance.

One approach to discouraging the managers of statutory monopolies from pursuing policies that lead to internal inefficiencies is to make them accountable on economic performance. Accountability requirements can be imposed on statutory monopolies either through legislation or through direction by a regulatory body. Audited annual reports are not necessarily sufficient; although these provide financial accounts they do not necessarily give a good indication of the economic efficiency of the organisation.

Managerial accountability of the bulk handling authorities has been largely left to the boards of directors, which generally consist of representatives of interest groups. In none of the legislation governing the operations of the bulk handling authorities are there any specific requirements for accountability on efficiency aspects (such as quantitative targets). However, the Grain Elevators Board of Victoria is required, under more general government legislation, to report on a rate of return basis.

In New South Wales and Victoria, the bulk handling authorities are subject to the control of the relevant minister, but such control has not generally been exercised. The New South Wales Grain Handling Authority has voluntarily introduced a performance review program which is reviewed by the minister.

The management of each rail authority is accountable to a commissioner or commission, which is in turn accountable to the transport minister. Although the commissions in New South Wales and Victoria include employee representatives, most of these commissioners are government appointees.

Only in Victoria and South Australia does the legislation explicitly provide specific measures to ensure accountability on efficiency of railway management. In Victoria the minister determines quantitative targets and the State Transport Authority is directed to attain these targets 'as far as is practicable'. However, the legislation provides no penalties or rewards to encourage the achievement of the targets. In South Australia, the legislation goes further. A

financial target is determined by the minister on the basis of a proposal put forward by the commission. The commission is directed to pursue a policy designed to achieve this target, and is also directed to propose measures, other than through government appropriations, to meet any shortfall.

Boards of directors, commissioners or ministerial representatives are likely to encounter many difficulties in enforcing adequate accountability. They may not be experts in every aspect of the industries they administer, yet they are expected to make critical decisions concerning rates, investment and levels of service. In attempting to carry out their work, these people develop close working relationships with management, on whom they come to rely for the very information needed to monitor management performance. They may not have any way of knowing whether the information provided by the managers is correct.

Commissioners or ministerial representatives may also experience 'the principal-agent problem' (Scherer 1980). The principal-agent relationship in this case involves the owners of wheat distribution firms (the principals) contracting with the commissioners or ministerial representatives (the agents) to ensure the efficient operation of the authorities. The agents' rewards should be related to their effectiveness and efficiency. However, the complex nature of a statutory monopoly makes it difficult to determine whether or not the agents are performing their assigned tasks effectively and efficiently. This obscurity allows the agents to pursue interests which do not necessarily coincide with those of society.

A further internal problem may arise when technological innovations are made less frequently than is efficient. In the case of statutory monopolies the necessary incentives may be lacking for at least two reasons.

First, an innovation may be attended by difficulties: it may destroy the value of existing technology which has not been fully depreciated, or may result in labour disputes (if it requires less labour or greater skills). A firm in a competitive

environment may have no alternative but to innovate, accepting any capital loss and dealing with any labour dispute that might occur; whereas the monopolist has the alternative of delaying or perhaps even preventing the innovation by withdrawing support for it. A monopoly may have an added incentive to delay or prevent an innovation if it is seen to threaten its monopoly status (perhaps by favouring small scale installations).

Second, decision makers in statutory monopolies may face a pattern of incentives that fails to reward successful initiatives adequately but penalises unsuccessful ones (for example, through the threat of political intervention).

Internal inefficiency is difficult to measure. It is a problem of degree. Most firms have some internal slack, but it is likely to be greater in monopolistic firms. The lack of adequate accountability requirements and the difficulty in enforcing suitable accountability measures means that internal inefficiency could be a problem in the statutory authorities in the wheat distribution industry.

Inefficient co-ordination

Co-ordination of the commercial activities of different entities is desirable when commercial decisions taken by one firm result in significant commercial gains or losses to another. An example is the construction of better outloading facilities to rail at a country silo. Without co-ordination, most of the costs would accrue to the bulk handling authority, while most of the gains would accrue to the rail authority. From a social point of view, such an investment may be desirable because the overall gains outweigh the costs. However, such investment would not take place without co-ordination. Co-ordination would require that the party which reaps the gains compensates the party which incurs the costs in such a way that both parties are better off.

In a competitive environment there are profit incentives for co-ordination. A statutory monopoly, lacking adequate incentives to maximise profits or minimise costs, may have only limited incentive to co-ordinate activities with other firms. This

does not mean that co-ordination has not taken place among wheat distribution firms (see section 2.4). In particular, political pressure appears to have been an important stimulus to co-ordination in some states.

Written agreements can be particularly helpful in improving co-ordination between organisations. In a well functioning unregulated market, vertical co-ordination between firms may occur through the price mechanism. Prices continually vary to indicate buyers' preference for a particular bundle of services compared with other bundles of services. In the case of vertically linked statutory monopolies there is no mechanism of freely fluctuating prices and so preferences must be conveyed by explicit rewards and penalties.

Written agreements appear to provide scope for specifying rewards and penalties, and hence may contribute to a more efficient system overall. Of course, written agreements are also used in unregulated markets, but in the absence of a price mechanism they become more important. The existence of a written agreement does not make improved vertical co-ordination inevitable: the outcome still depends on whether the statutory monopolies face strong incentives to achieve such an objective.

A few incentives for improved co-ordination are contained in the written rail freight agreements. In Queensland, rebates are offered for unit train loads and surcharges are imposed for stopovers. In South Australia, special rates are to be applied with the introduction of certain cost saving operations.

Another area requiring co-ordination is interstate wheat transport. In a report to the 1981 Australian Grain Industry Conference it was argued that 'grain transport should not be determined by state boundaries but rather by the most economic route to the nearest port' (Bulk Handling Sub-Committee 1981, p.17). There was considerable resistance to this idea, due to the state based institutional arrangements governing bulk handling and transport. The existence of state based institutions does not, of course, preclude

interstate transport but there are, in general, insufficient incentives for co-ordination across states. Three exceptions were discussed in section 2.4.

Allocative inefficiency

Allocative inefficiency occurs in the wheat distribution industry because of three types of arrangements: those which protect the statutory monopolies from competition by other suppliers of distribution services; the non-commercial objectives; and price and cost policies adopted by the statutory monopolies.

Except in the case of natural monopolies, allocative inefficiency occurs when the price obtainable for a service differs from the cost of producing the last (or marginal) unit. If the value to society of the marginal unit of the service (its price) is below the firm's cost of producing that unit (the marginal cost), society would be better off if less resources were used in this way. Conversely, if a firm is able to obtain a price which is above the marginal cost, society would be better off if more were produced. In each case, there is a misallocation of resources, and from a social point of view there is allocative inefficiency.

Consider the case of a statutory monopoly which is instructed to achieve full cost recovery. It will set price equal to average cost. If average cost is below marginal cost, price will also be below marginal cost; hence from a social viewpoint too much of the service is being provided. If average cost is higher than marginal cost, too little of the service is being provided from a social point of view.

It is possible for the prices charged by a monopoly to be regulated so that allocative inefficiencies are minimised. In the case of a statutory monopoly these inefficiencies can, in principle, be eliminated by requiring the monopoly to set price equal to marginal cost and to adjust its output to the resultant demand.

In the case of a natural monopoly this solution is not feasible because marginal cost is always below average cost and so, under this rule, the natural monopolist would be forced to operate at a loss. This situation is shown in figure B, where the

marginal cost curve (*MC*) is below the average cost curve (*AC*), and both decline as output increases. The demands of consumers at various prices are represented by curve *D*. If price were to be set equal to marginal cost (at p_1), consumers would demand quantity q_1 . At this price and quantity, the monopolist would incur a loss equal to the shaded area p_2abp_1 .

Allocative inefficiency in a natural monopoly may be minimised by setting price equal to average cost, to just achieve full cost recovery. The quantity at which this price equals the price consumers are willing to pay is q^* . The corresponding price, p^* , is known as the 'Ramsey price'. This type of pricing is an attempt to maximise consumer welfare given that the costs of production are covered (Baumol and Bradford 1970; Breautigam 1979; Baumol, Panzar and Willig 1982).

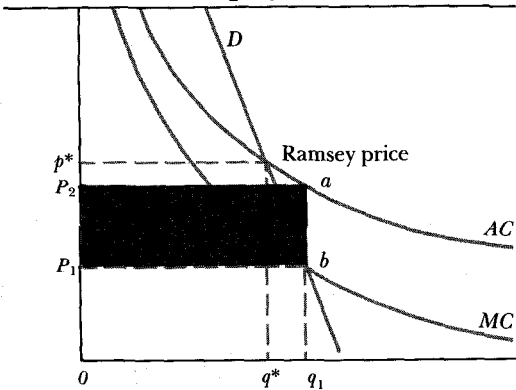
Although regulation can, in principle, minimise allocative inefficiency, it may not succeed in practice because of the practical difficulty in determining marginal cost in the statutory monopoly. This leads regulators to focus instead on average costs — that is, on setting price to achieve full cost recovery — even though the monopoly may not be a natural one.

Protection from competition

Allocative inefficiency in wheat distribution can be brought about by the reinforcement of the monopoly powers of

B Loss from marginal cost pricing in a natural monopoly

BAE chart



bulk handling and rail authorities in written agreements. All rail freight agreements, for example, contain clauses which attempt to restrict competition. In Queensland, the agreement requires that all grain delivered to Bulk Grains Queensland be transported by rail if it is to be moved more than 120 km. This is an extension of the legislative requirement which applies only to certain specific grains.

In South Australia and Western Australia, a rebate is offered to growers who deliver a specified proportion of their grain to rail based silos. This is intended to help the rail authorities maintain their market shares. This rebate differs from a volume discount, which may be economically justifiable because of economies of scale; it is not related to the absolute volume of grain delivered to a rail based silo but only to the proportion of any grower's crop thus delivered. The scheme is administratively cumbersome and may be subject to abuse. It distorts the pattern of resource use because it discourages the use of road transport when it is the lower cost option.

Only in South Australia are there no restrictions on road transport. The presence of road competition is a stimulus for the rail authority to seek ways to maintain its market share. It may do this by achieving greater internal efficiency and hence lower prices, or (if this is possible) by the use of market power. The former approach is economically desirable; the latter is not.

Under the present rail arrangements, both in South Australia and in other states, the use of market power is made possible by the lack of competition in rail services. Because road transport tends to be relatively more competitive over short hauls and relatively less competitive over long hauls (see chapter 4, and Koo and Uhm 1984), the rail authority has an incentive to lower charges for short hauls and raise charges for long hauls. Such price discrimination is possible in the absence of competition from other rail services. The distributional implications are that short hauls, if priced in this way, will contribute proportionally less than

long hauls to fixed costs. Although the rail authority may seek some refuge from the effects of road competition by such discriminatory pricing, such competition is nevertheless desirable because the road rates provide a price ceiling, and this may stimulate internal efficiency in the rail authority.

Australian National Railways has attempted to maintain its market share in the face of this competition through the use of a surcharge (validated through the South Australian rail freight agreement) on all grain moved by road from rail based silos. From an economic viewpoint this surcharge creates distortions, discouraging the use of road transport when it is the less costly option. There may be a case for compensating Australian National Railways for the use of the rail based silos, as the owner of the land on which they are situated. However, it would be preferable if this compensation were in some non-distortionary form, such as an annual licence fee for using the land, as is currently paid by South Australian Co-operative Bulk Handling Ltd.

An attempt to prevent competition in the provision of wheat storage and handling services is the fee charged per tonne by the bulk handling authorities in New South Wales, Queensland and Victoria on all sales of permit wheat (which these authorities do not handle). This payment, imposed solely by virtue of the monopoly position enjoyed by these bulk handling authorities, has the effect of raising the price of permit wheat, thereby discouraging economically justified permit sales. This leads to more wheat being received by these authorities than would otherwise be the case.

Non-commercial objectives

An additional source of allocative, as well as internal, inefficiency in a statutory monopoly may be requirements that it pursue non-commercial objectives (see chapter 2). Although ministers have not tended to impose non-commercial objectives on the bulk handling authorities, it does appear that their boards of directors have attempted to impose such objectives (see section 2.2). One example is the

continued operation of storage and handling facilities at uneconomic locations. This is particularly likely to occur where the board consists of regional grower representatives, who have an obvious incentive to base decisions about silo construction and modification on the expressed needs of their constituents rather than on economic criteria.

Transport ministers have used their powers of direction in at least three areas relevant to wheat transport:

- the setting of rail freight rates for grain (for example, the limiting of proposed increases, in recent years, by ministers in Queensland, Victoria and Western Australia);
- the operation of uneconomic branch lines (required in all states; recently the closure of some uneconomic branch lines in New South Wales and Victoria has been proposed — see appendixes C and D); and
- the provision of subsidised transport services (for example, country passenger services).

The deficits incurred by the rail authorities indicate that they subsidise transport services. For example, in the corporate plan of V/Line in Victoria, an aim is to achieve full cost recovery for freight services (by 1988-89) but only 50 per cent cost recovery for passenger services. The mandatory provision of subsidised passenger services by state rail authorities represents a non-commercial objective. This could result in cross subsidisation by freight services because, in general, legislation governing rail authorities does not separate the funds for passenger and freight services. Where the funds are separated, as in New South Wales, there is explicit provision in the legislation for switching money from one fund to the other and thus for cross subsidisation.

Inefficiencies will result from the imposition on rail authorities of the non-commercial objectives listed above, all of which distort the true cost of transport services and thus remove incentives for growers and bulk handling authorities to use the cheapest mode of wheat transport. For instance, grain from silos located along

uneconomic branch lines can often be transported more cheaply by road than by rail (CANAC Consultants 1984). Also, revenue from rail transport of grain can be used to subsidise other rail transport services, if grain transport charges are above the cost of providing this transport. In any case, if rail freight rates diverge from the average cost of rail transport (in the case of a natural monopoly — or marginal cost in other cases), then misallocation of resources will occur.

Price and cost policies

Another source of allocative inefficiency is price discrimination by some statutory monopolies — that is, the varying of charges among users to take account of differing competitive conditions. The aim is generally to maximise throughput.

Discriminatory pricing by some bulk handling authorities and some rail authorities has been applied principally in the areas near state borders, to discourage growers from delivering interstate where they might take advantage of lower handling and transport charges (see chapter 2). To the extent that this competition drives the price down toward marginal costs, the state with the lower marginal costs can expect to attract the grain. This competition may encourage the use of the least cost transport route, whether these cross state borders or not. However, these regional price discounts may be achieved by a cross subsidy of the border growers by those in other regions of the same state where competition by other suppliers of these services is non-existent. Hence, such price discrimination will encourage wheat production in border areas and discourage production elsewhere. That is, there will be a misallocation of resources between wheat growing regions.

In the Western Australian rail freight agreement the aim is to achieve freight rates competitive with road transport by 1988-89, though Westrail will retain its monopoly for wheat transport. These rates are to be calculated on the basis of a formula (see appendix F) but may be amended from time to time with the agreement of all parties. (The agreement

provides for a committee of review to be set up to propose amendments. If the parties fail to agree on a proposed amendment or any alternative, the whole rail freight agreement is terminated without recourse to arbitration.) This approach could be expected to succeed only if Westrail decision makers behaved as if Westrail were in a competitive market for its services. Even if the decision makers are resolved to behave in this way, they are likely to be constrained in pricing competitively by a lack of information on how their hypothetical competitors would behave.

Generally, attempts at using formulas or committees to establish prices at approximately competitive levels are fraught with difficulty. A good example is the continuing attempt to devise a formula to approximate a market price for home consumption wheat. The only sure way to achieve competitive prices is to introduce competition.

One significant feature of the South Australian wheat distribution system is that rail charges are set according to road distance rather than rail distance. This facilitates price discrimination in that state. In the Western Australian agreement, the basis for pricing is radial distance from a port, which is similar to road distance and is likewise a response to competition from road transport. (However, such competition does not exist in Western Australia to anywhere near the same degree as in South Australia. The only road competition comes from growers who choose to deliver directly to port in the 'rail-designated region', and from commercial road operators working near the fringes of this region.)

Another potential source of allocative inefficiency is the system of grower tolls operated by the grower co-operative bulk handling authorities in South Australia and Western Australia. The tolls have provided interest-free funds from growers for capital development, but it is doubtful whether this system can be justified in today's well developed capital market. One potential drawback of the toll system is that, by avoiding conventional financing, it may hide the true cost of finance from

those who make the investment decisions in the co-operatives, thus resulting in overinvestment.

One issue that is not addressed in the national Grain Storage and Handling Agreement is the interest cost associated with carryover. The interest cost incurred by the Australian Wheat Board in financing the first advance to growers becomes greater the longer the wheat remains unsold. Currently, this interest cost is pooled nationally. Because growers are paid on delivery, not on sale, they have an incentive to deliver as early as possible. Two problems result: that of excessive peak loads at country silos and that of financing early payments. The Deferred Delivery Interest Scheme was designed to ameliorate this situation by giving growers some incentive to delay delivery. However, the true cost of early delivery does not reach growers because of national pooling. Moving away from pooling would be beneficial. Directing the cost of finance as well as the cost of carryover back to its source would provide an added incentive for more economic use of the distribution system.

Allocative inefficiency also arises when bulk handling authorities and rail authorities are prevented from undertaking activities designed to reduce their costs. An example is road transport of grain by rail authorities. All rail authorities except Westrail can arrange to transport grain by road, without restrictions. Westrail is generally permitted to arrange road transport only to rail based silos. From an efficiency viewpoint there seems to be no sound reason for restraining a rail authority from engaging in road transport of grain. Though it is conceivable that the rail authority might engage in predatory price cutting to eliminate the competition, this is not very likely because entry costs into the road transport industry are relatively low.

Cost pooling is a feature common to the pricing policies of all bulk handling authorities. The charges for bulk handling services are the same for all growers within the state, despite the dependence of costs of bulk handling services on location and time. The price of bulk handling services

will therefore in some instances be above the marginal cost of providing them, and in others below.

Unless the authority is allowed to adapt the quality of service to the charge, cost pooling will necessarily result in allocative inefficiency. Insufficient resources will be allocated to those locations or periods at which the marginal cost is below the charge, and excessive resources to locations or periods at which it is above. Some degree of cost pooling between activities is common within most commercial enterprises. But in a competitive environment, costs will be pooled only when it is too expensive to allocate them separately.

Extensive cost pooling results in resources being wasted both by the bulk handling authorities and by growers (see appendix I). Consider the following hypothetical example. A bulk handling authority operates two silos: one is a low cost facility, the other a high cost facility. If wheat were delivered to the low cost facility, the extra (operating) cost to the bulk handling authority — that part of the silo's costs which would be saved if the load were not delivered to it — would be \$1/t. If wheat were delivered to the high cost facility, the extra cost would be \$4/t. The freight charge associated with deliveries to either silo is assumed to be the same. Now suppose that a grower located midway between the two silos had just harvested wheat. Under cost pooling the grower would be indifferent between the two silos, whereas the bulk handling authority (and the growers, in aggregate) would waste resources to the extent of \$3/t if the grower chose the latter silo.

In some states the bulk handling authorities have attempted to depart from cost pooling, on a limited scale, using either differential pricing or discriminatory pricing. With price differentiation, charges vary to take account of differing costs, leading to a more efficient allocation of resources. Differential pricing policies, both between locations and over time, have been tried by the bulk handling authorities in Victoria and New South Wales (see 'Pricing policies', page 11).

Rent seeking

Rent seeking is the wasteful use of scarce resources by firms or individuals attempting to maximise their economic rents (Buchanan, Tollison and Tullock 1980). Economic rent is the extra payment for resources above what these resources could earn in any alternative use. In a perfectly competitive market, economic rents are dissipated in the long run. With other institutional arrangements, economic rents earned by firms may be maintained in the long run.

Government regulations can create economic rents. For instance, economic rents are created by regulations preventing the entry of other firms into an industry. Firms favoured by the regulations will frequently lobby governments to defend existing arrangements. Further, owners of resources used in the industry may compete with each other to gain some of the economic rents. Waste occurs because resources devoted to maintaining current regulations and to transferring rents from one group to another are not being used in productive pursuits of net benefit to society.

Resource waste through rent seeking may occur under current institutional arrangements in the wheat distribution industry. Grower members on the boards of bulk handling authorities may devote resources to ensuring that new silos are built in the regions they represent, even though it would be more efficient to build the facilities elsewhere. Charges for direct grower to buyer sales and permit wheat sales by the bulk handling authorities maintain economic rents earned by virtue of the monopoly powers of these organisations. Labour unions may also devote resources to obtaining a transfer of economic rent from others by pursuing improved pay and working conditions without commensurate productivity improvements (see section 4.1).

4. Evidence of inefficiency

In this chapter, evidence is presented to support the argument developed in chapter 3 that bulk handling and rail authorities, as statutory monopolies, are likely to be more inefficient than if competition by other suppliers were allowed. The evidence is intended only to demonstrate that inefficiency is a problem, and not to estimate a total cost to Australia of the current institutional arrangements or to imply judgments on the relative performance of particular authorities.

Simple comparisons between regions cannot provide unambiguous evidence of economic inefficiency, for two main reasons. First, a lack of difference in charges does not prove efficiency; it is possible that all firms are performing below their potential.

Second, differences in charges or costs do not prove inefficiency; they may be for reasons such as differences in services provided, variations in input costs or geographic and climatic differences. For example, the cold winters of Canada and the northern United States provide natural protection against infestation of grain by insects; in Australia the amount and cost of insecticides is greater than in Canada for this reason. To be valid, interregional comparisons need to take account of all such differences, which is inevitably a complex task (Millward, Parker, Rosenthal, Summer and Topham 1983).

Notwithstanding these qualifications the interregional comparisons in appendix H do suggest inefficiencies in the Australian wheat distribution system. For example, over the decade to 1984-85 Australia had much larger increases in marketing charges than Canada or the United States. Also, the large range in charges (both in levels and in increases over time) across states is unlikely to be wholly attributable to differences in such aspects as services, input costs, climate and location.

4.1 In handling and storage

Two methods are used to identify inefficiencies in handling and storage. The first, which is used to identify internal inefficiencies, is objective management audits. The second is to compare the charges of the statutory monopolies with those of private storage firms.

Objective management audits

The evidence presented here is assembled from the only available information of this kind: the numerous management audits performed on the New South Wales bulk handling authority. As the performance of statutory authorities is a consequence of the incentives provided by the institutional arrangements and because these are similar between the states, it is possible that the other bulk handling and rail authorities have had problems similar to those of the Grain Handling Authority of New South Wales, although these other authorities have not had such a history of public inquiries.

In 1975 the New South Wales Public Service Board published a management audit on what was then called the Grain Elevators Board (Public Service Board of New South Wales 1975). This was critical of the management of the Grain Elevators Board and suggested that rationalisation of the system was needed. The conclusions were based both on specific instances of ineffective management and on measurements of storage utilisation and throughput. In 1977 the New South Wales Department of Agriculture attempted to measure managerial performance by analysing costs (Standen 1977). In the final report (New South Wales Department of Agriculture 1979) it was recommended that the Grain Elevators Board implement an effective cost accounting system.

Subsequently a system was set up which is still in use.

The change from national to state pooling of storage and handling charges, in 1978-79, resulted in New South Wales growers being faced with the highest charges of any state. Although these partly reflected the geographic characteristics and history of the industry in New South Wales (past locational decisions, for example), they led to an escalation in complaints about managerial performance in the Grain Elevators Board. As a result, in April 1980 the state government commissioned an inquiry into the New South Wales grain handling and transport system. The inquiry was, in effect, a management audit and two reports were produced.

The first report (Carmichael, Ducker and Renshaw 1980) followed preliminary investigations which revealed severe deficiencies in the Grain Elevators Board's control and senior management. The report highlighted:

- a lack of industrial relations expertise and general business experience on the part of the majority of board members;
- a preoccupation among grower members of the board, and consequently among senior management, with country operations to the detriment of terminal operations, financial controls and industrial relations;
- a failure by the board to differentiate between the responsibilities of the chairman and the general manager; and
- serious internal disputes at a senior management level.

Consequently, in November 1980, legislation was passed to restructure the board to improve managerial accountability and to include members with special business skills. The seven-member Grain Elevators Board was replaced by the Grain Handling Authority, which comprises eleven voting directors and five non-voting associate directors. The makeup of the authority was influenced by government policy, with a grower majority and union representation.

The second (and final) report of the inquiry (Carmichael et al. 1981) was wide

ranging and highly critical of the Grain Elevators Board, identifying the following faults:

- failure to solve blockages at seaboard terminals;
- lack of the most elementary budgeting and cost information, with excessive spending on both operating and capital items attributable to an inadequate understanding of the cost structure;
- out of date accounts, with annual reports running three years behind;
- failure to plan on the basis of objective criteria;
- lack of expertise in public funding;
- absence of effective industrial relations policies;
- failure to achieve productivity improvements when granting improved pay and working conditions;
- directors interfering with management and issuing personal directives purporting to be board policy; and
- inadequate communication with growers.

Not all statutory monopolies would at all times receive such a low rating in a management audit. In fact, the good export performance of the New South Wales Grain Handling Authority in 1986 suggests that this authority has been able to improve its efficiency. Also, the authority has solved many of the above problems (Grain Handling Authority of New South Wales 1987c). Such improved performance can be expected, for at least two reasons. First, a manager may encourage efficiencies regardless of the institutional arrangements. Second, political pressure may temporarily encourage internal efficiency. In the long run, however, arrangements which do not permit competition cannot be expected to maintain good performance.

Comparison with private operators' charges

A method that may yield evidence of inefficiency in a statutory authority is to compare its charges with those of competitive firms which provide similar services. If the statutory authority's charges are higher for the same service than those of the competitive firms, its

customers are paying the cost of inefficiencies.

Because there is very little competition by private grain storage firms in other states, this analysis is confined to New South Wales.

The Bureau previously conducted a study to compare the handling and storage charges, for 1982-83, of the bulk handling authority and private operators in New South Wales (see appendix D of BAE 1983), concluding that there was scope for cost savings in the Grain Handling Authority's system. The objective of the present analysis, similarly, is to compare the 1985-86 charges of private storage companies with those of the Grain Handling Authority for a similar service.

A census was conducted of all private grain merchants in New South Wales with more than 500 t of storage capacity for hire. Each merchant was asked the current charges, per tonne, for handling and six months' storage of each grain type, including oilseeds; and the services provided for these charges.

The six-month storage period was specified because this is the average length of time that wheat would be stored by the Grain Handling Authority if it did not have a carryover problem. Information on services was requested so that any differences in the services provided by the Grain Handling Authority and by private firms could be taken into account.

The census comprised 27 private storage and handling firms with the required amount of storage. Only two could not be contacted, and one other did not reply. Four responded with only very general information. Thus, twenty firms were included in the analysis. These firms accounted for a total hireable storage capacity of about 0.3 Mt (wheat equivalent) out of the state total of 12 Mt.

From discussions with the respondents, it became obvious that a number of supply and demand factors can influence the charges which are set by a firm, but that not every factor influences the charges of every firm. Factors mentioned were volume of grain, type of grain, length of storage time, type of storage (aerated storage usually costing \$1/t more than

non-aerated storage), whether or not insect control was included, and package deals with complementary business activities.

Many firms vary charges according to the density of the grain or oilseed, because the higher the density, the less space is taken up per tonne. Table 1 gives the densities of a number of grains and oilseeds, both in tonnes per cubic metre and as a percentage of the density of wheat.

Private storage and handling firms are scattered around the state, the highest concentration being in the central zone around Dubbo, Parkes and Forbes. The analysis was conducted on nine firms from the north of the state, seven from the centre and four from the south. Since there was no noticeable variation in charges with location, the results presented in table 2 are averages for the whole state. The comparable Grain Handling Authority charges are also presented in table 2.

The charges in table 2 are for six months' aerated storage with insect control. The following is an example, for barley, of the adjustment procedure used. Barley is exceptional only in that, for all other grains, the firms decide their own charges. The New South Wales Barley Marketing Board pays all private firms, who must be licensed receivers, the same fee for storage and handling. For the 1985-86 season this was \$9.50/t for aerated storage and \$8.50/t for non-aerated

1 Relative densities of grains and oilseeds

| Grain | Equivalent | Density | Relative density |
|-----------------------|---------------------|------------------|------------------|
| | volume ^a | | |
| | \$ bus | t/m ³ | % |
| Wheat | 36.74 | 0.7485 | 100.0 |
| Sorghum | 36.74 | 0.7485 | 100.0 |
| Barley | 44.09 | 0.6237 | 83.3 |
| Oilseeds ^b | 52.31 | 0.5257 | 70.2 |
| Oats | 55.12 | 0.4989 | 66.7 |
| Sunflower | 66.81 | 0.4116 | 55.0 |

^a BAE (1986b); International Wheat Council (1985); New South Wales Oilseeds Marketing Board. ^b The equivalent volume of oilseeds as a group was calculated as an average of those of the different types weighted by their contributions to total five-year oilseed production.

storage, plus 50c/t a month after 1 April. These charges do not include the cost of chemicals. Thus, for aerated storage, a six-month fee would have been \$11/t, assuming that the barley was harvested in November and that chemicals cost \$1/t. If the silo was filled to its 'nominated capacity', and more grain was moved in after it was partially emptied, this 'overflow' grain would have attracted a total fee of \$4/t. In 1985-86, the New South Wales Grain Handling Authority charged the Barley Marketing Board \$11.80/t for country storage and handling. Of this amount, \$3.20/t was a facility charge for space reserved, which had to be paid whether this space was used or not.

For every commodity included in the analysis, the Grain Handling Authority's charge was higher than the average charge of private firms, the difference ranging from 80c/t for barley to \$5.59/t for oilseeds. However, except for oilseeds, the authority charges were not substantially greater than the average private charge. (It may be noted that if the charges of different private firms are normally distributed then two-thirds of them will be within one standard deviation of the average.)

The effective private charge for storage and handling of wheat (all of which is permit wheat) is very close to the Grain Handling Authority's charge when the \$2/t compulsory fee on all permit wheat sales is added to the private charge. This similarity could be due to the dominance of the authority in the wheat storage and

handling market, and the relative thinness of the private market for storing permit wheat. That is, the private companies may be guided by the authority's charge.

Additional comparisons can be obtained by deriving 'wheat equivalent' charges from the private coarse grains and oilseeds charges. The assumption is made that storage and handling costs are determined by grain volume rather than weight. It follows that, given the charge per tonne for any grain, an equivalent charge for wheat can be derived by adjusting for the density of the grain. For oats, oilseeds and sunflower the derived wheat equivalent charges are more than \$3/t below the Grain Handling Authority's wheat charge, and about \$2/t below the average private charge for wheat. These differences suggest that the private charge for wheat would be lower in an unregulated market than it now is.

One estimate of the potential annual saving to wheat growers if private operators were allowed to handle the crop is \$4.9m. This is the product of the 4.3 Mt annual average receipt of wheat by the Grain Handling Authority over the five years to 1984-85 (Grain Handling Authority 1986) and the average difference between the actual wheat charges of the authority and private operators (\$1.14/t). If, instead, an average of the derived wheat equivalent private charges were used, the potential cost saving would be about \$12m.

There is one qualification to these

2 Country handling and storage charges of the Grain Handling Authority and private operators in New South Wales in 1985-86

| Item | Wheat | Sorghum | Barley | Oilseeds | Oats | Sunflower |
|--|-------|---------|--------|----------|-------|-----------|
| | \$/t | \$/t | \$/t | \$/t | \$/t | \$/t |
| Private charge | | | | | | |
| Average | 10.16 | 10.28 | 11.00 | 11.31 | 11.30 | 13.08 |
| Standard deviation | 2.5 | 3.24 | na | 3.53 | 3.81 | 6.06 |
| Authority charge a | 11.30 | 11.90 | 11.80 | 16.90 | 14.05 | 16.90 |
| Difference between averages | 2.47 | 1.62 | 0.80 | 5.59 | 2.75 | 3.82 |
| Derived equivalent private charges for wheat b | 10.16 | 10.28 | 9.16 | 7.94 | 7.54 | 7.19 |

a Estimate for wheat from Grain Handling Authority of New South Wales (1987a,b). The charge for sorghum and oilseeds are 1984-85 charges (1985-86 not available); private charges have generally not changed for two to three years. b The wheat charges expected on the basis of the private charges for the other grains and their densities relative to wheat. na Not applicable.

results. If there are substantial economies of size in wheat storage and handling, the charges by the larger Grain Handling Authority would be expected to be lower than the charges of the smaller private operators. Also, private operators might not retain their current charges if the handling and storage industry were deregulated. Many private operators stressed that throughput and volume are important determinants of their charges, and that charges would decline if they could handle and store more wheat.

4.2 In rail transport

Road and rail transport are not perfect substitutes. They have intrinsic technological and operational differences which circumscribe their ranges of service quality and their cost structures. Road haulage is more flexible and is best suited to relatively fast services over short distances. Rail transport has a cost advantage for moving heavy bulk solids over medium and long distances. For a discussion of substitutability between road and rail transport, see May, Mills and Scully (1984) and Koo and Uhm (1984).

Both modes of transport could, therefore, be expected to have a role to play in grain distribution. So regulations limiting road transport are likely to impose economic costs on grain growers. In this section the aim is to estimate the cost of the restriction of road transport of wheat and the pooling of rail costs. Victoria is used as a case study as it is the only state for which the required data are available. In Victoria, commercial road operators are not allowed to move grain beyond 60 km.

Method and data

Estimating the costs of regulations in wheat transport is complicated by the fact that there are two causes of inefficiency: the prohibition of road transport and the pooling of rail freight rates. As is explained in appendix J, these two causes result in inefficiencies both in the transport sector and on the farm. The total costs of cost pooling and road regulation could be measured only if all transport and farm costs were known. The estimates in this

section measure only the direct costs of transporting the present wheat production by needlessly costly means, and do not capture the costs of allocative inefficiency from an inappropriate level of production of wheat and rail services.

The data required to measure these costs are: average deliveries at each silo; the cost of grain transport by rail from each silo; and imputed road rates from each silo.

Average deliveries of grain to each silo, for the seven years to and including 1984-85, were obtained from the Grain Elevators Board. Those silos which the State Transport Authority (V/Line) clears by road were omitted from the analysis, leaving 245 silos.

Rail costs are difficult to determine for particular commodities and branch lines because of the complexity of interrelationships of different parts of the business. A range of valid alternative assumptions may be used, giving widely differing results. In this study the data of CANAC Consultants (1984) were used to derive unit costs. CANAC Consultants used different costs according to the type of rail line and whether the line was used for traffic other than grain.

In Victoria there are 25 rail lines used specifically for grain transport. According to CANAC Consultants, fifteen of these have light tracks which can be traversed only by the old four-axle wagons; the other lines have heavy track. Estimates of total variable cost and fixed track maintenance cost were derived for each track type, based on data from the CANAC Consultants study. The estimates of variable cost used in this study, however, take account of two important developments that have occurred since the CANAC Consultants study: the introduction of two-man crewing and the discontinued use of brake vans. On the light track lines the total operating cost was estimated to consist of a variable cost of 8c/t.km and a fixed track maintenance cost of \$4300/km a year; for the heavy track lines the estimates were 2c/t.km and \$6300/km, respectively.

The rest of the Grain Elevators Board silos are located along lines also used for other traffic. CANAC Consultants

assumed that these lines were principally used for the other traffic (which was mainly passenger traffic), and did not allocate any of the fixed cost of track maintenance of these lines to grain traffic. This assumption was also used in this analysis. Wheat moving along a main line only, therefore, incurred a 2c/t.km operating cost.

Road rates were difficult to obtain. V/Line invites tenders for road clearance of some silos, and was able to supply contract rates. Similarly, road cartage contracts are arranged by the South Australian Co-operative Bulk Handling and the Western Australian Department of Transport (see table 3). Early in 1985, the Victorian Farmers and Graziers Association employed a consultancy firm to determine average rates for road transport to 139 silos in the Grain Elevators Board's northern region. These data (averaged across distance ranges) and, for comparative purposes, road costs derived from CANAC Consultants (1984) are also included in table 3.

From table 3 it can be seen that there is substantial variation between sources for comparable distances and in patterns of variation with distance. In a study by Transmark (1981), a similar lack of consistency was attributed to wide differences in conditions of carriage facing hauliers. Factors which can vary between and within firms include truck size, amounts of freight offered by customers

relative to truck capacity, potential for backloading, running speeds and turnaround times. May et al. (1984) noted that spot rates paid to operators (by forwarders) may change appreciably from day to day, if not hourly, depending on fluctuations in the demand for and supply of operators at particular locations.

Costs of private road transport are very close to rates charged and sometimes above them. This reflects the very competitive nature of road freighting (May et al. 1984), and accords with Transmark's (1980) finding that quotations all fell well below the cost related charges Transmark had formulated. Transmark reasoned that backloading, which they had ignored, must provide potential for cost reductions.

The extent to which backloading could be used to reduce charges for road transport of wheat if road restrictions were removed is unclear. A major fertiliser company which operates near Geelong and Portland is lobbying for road transport deregulation on the basis that backloading could provide sufficient savings on fertiliser transport to decrease significantly the cost of fertiliser to farmers. CANAC Consultants, in their analysis of the cost of road transport of grain, assumed no backloading because 'the nature of the commodity, the routes on which it travels, and the pressure to move large quantities quickly, especially during harvest, severely restrict the opportunity to find suitable backloads' (p.120).

3 Road rates and costs in various states in 1984-85

| Distance km | V/Line contract rates c/t.km | Victorian road hauliers quotes c/t.km | Victorian road costs ^a c/t.km | South Australian contract rates c/t.km | Western Australian contract rates c/t.km |
|----------------|---------------------------------------|---|---|--|--|
| 0- 50 | 7.7 | na | 9.4 | 7.0 | 7.6 |
| 51-100 | 7.6 | 6.2 | 7.4 | 6.3 | 6.4 |
| 101-150 | 7.6 | 5.5 | 7.1 | 5.7 | 6.6 |
| 151-200 | 7.5 | 5.3 | 6.9 | 5.5 | 6.6 |
| 201-250 | 7.4 | 5.1 | 6.8 | 5.9 | 6.5 |
| 251-300 | 7.0 | 5.0 | 6.7 | na | 5.7 |
| 301-350 | 6.9 | 4.8 | 6.7 | na | 5.5 |

^a CANAC Consultants (1984). na Not available.

Another problem in evaluating road transport is that the private costs of road hauliers may be only part of the total cost: additional social costs arise from road damage, pollution, congestion and accidents. Bayley and Kinder (1984) concluded that any increased grain transport by road brought about by the branch line closures recommended by CANAC Consultants would result in some road wear and tear, ranging from less than 1 per cent to almost 16 per cent above current road expenditure (for different locations and road transport proposals). However, the Road Construction Authority (1985) estimated that the average additional annual costs arising from transfer of traffic to road for all lines recommended for abandonment would be \$1m, which was double the average estimated by Bayley and Kinder.

Such variation in estimates of road costs suggests that the measurement problems are not easily resolved. The National Road Freight Industry Inquiry (May et al. 1984, p.215) found that road costs 'are greatly exceeded by the aggregate amount paid in taxes and charges by road users as a whole, and hence such users make significant contributions to general tax revenue'. However, this inquiry found that, within these aggregates, articulated road freight vehicles and (to some extent) heavy rigid trucks are paying less than could reasonably be required. It was recommended that the 'user pays' principle should be applied, adjusting vehicle registration fees and fuel taxes accordingly.

The Inter-State Commission (Everett, Kolsen and Butcher 1986) found that for all interstate trucks and heavy buses, road costs exceeded tax revenues. However, for intrastate road transport, the commission agreed with the Road Freight Inquiry's finding that revenue collected from road users was significantly greater than road expenditure.

Road cost recovery is a complex matter, because roads possess both public good and private good characteristics. For this reason, road pricing may be used to pursue various objectives, of which cost recovery is only one; others include equity and

economic efficiency (Ingham, Luck and Shaw 1985). Road pricing methods in Australia are in a state of flux at present. One of the terms of reference of the Industries Assistance Commission inquiry into certain petroleum products in 1986 was to review the rationale for the taxation of these products. In its final report (1986) the commission, noting the complexity of road cost recovery issues, suggested that general revenue raising be adopted as the sole rationale.

However, the fuel excise tax creates distortions whether the basis of the tax is road cost recovery or general revenue raising. Fuel use and costs of road use are not closely related (BAE 1985). A fuel tax is therefore not an effective or equitable 'user pays' tax. A tax on fuel, which is an input to production, will result in greater distortions to relative prices than will an equivalent tax on final goods (BAE 1985; Industries Assistance Commission 1986).

The present policy of restricting the road transport of certain commodities (such as, in Victoria, grain, superphosphate and petroleum products) has the effect of a prohibitive tax on the road transport of some goods and a zero tax on the transport of other (unregulated) goods. It is inequitable because the costs are borne by the consumers and producers of only a selected group of commodities. Resources are misallocated, in that the policy encourages the production of non-regulated commodities and discourages the production of regulated commodities.

A matter of even greater complexity is the problem of externalities (see section 3.1) which arises when the social cost of an activity is greater than the private cost of that activity. Trucks can cause pollution, congestion and accidents. The questions of whether it is appropriate, for the purposes of analysis, to add a social cost component to road rates, and of the magnitude of this component, have been the subject of much debate. The costs of these externalities are difficult to estimate. Researchers have used various techniques. For example, Kerin (1985) assumed that registration and insurance charges reflect the social costs of road use and accidents. Lay (1984) put a figure of 0.3c/t.km on the cost of accidents

associated with large road vehicles. In the present analysis a social cost component was not included due to the difficulty of obtaining an estimate of these social costs.

On the basis of the above considerations and the data in table 3, a range of road rates of 6–7c/t.km was used in the analysis.

Discussion of results

In table 4, the value forgone is the freight cost that would have been saved in Victoria in 1984–85 if grain had been transported by road where this was cheaper than the rail costs. Note that the calculation uses rail costs (calculated as described above), not the pooled rail charges which at present apply. Thus, the value forgone shown in table 4 is attributable partly to restriction of road transport and partly to rail cost pooling (see also appendix J).

4 Value forgone by not using the cheapest transport option in Victoria in 1984–85

| Road rate | Value forgone | Value forgone per tonne of state grain crop |
|-----------|---------------|---|
| c/t.km | \$'000 | \$/t |
| 7.0 | 28 347 | 9.63 |
| 6.5 | 30 085 | 10.22 |
| 6.0 | 32 049 | 10.88 |

It is seen that the value forgone increases appreciably as the assumed road rate declines. Even at 7c/t.km, the amount of grain which would be advantaged by road freight is around 30 per cent of total average deliveries in Victoria. One result of removing the restriction would be the closure of grain-only branch lines (that grain being transported by road), and hence a reduction in the total expenses of V/Line. This saving, due to rail cost pooling, would be distributed over the total grain receipts of the Grain Elevators Board. The value forgone is approximately \$10/t of total average grain receipts.

However, these estimates will overstate the cost savings from road transport to the extent of the social costs caused by the additional road transport of wheat. On the

other hand, road transport may also have non-price benefits, in that the service provided is generally more flexible than rail (Transmark 1981). In certain cases, this factor may give road transport a competitive edge where prices are similar.

As is shown in appendix J, the value forgone due to road restrictions and cost pooling will be greater than these estimates. The estimates of value forgone do not include the on farm costs due to the misallocation of resources caused by inappropriate prices for transport. In addition, as shown in appendix J, if road restrictions were removed, the practice of cost pooling would be likely to be reduced. The extent of this reduction would depend on the extent to which rail subsidies were coming from regions where the cost of transporting wheat by road was less than that by rail.

Expanding direct road deliveries to ports to the extent suggested here would involve some additional costs at those ports. In order to make the change, some expansion of port reception facilities would be necessary. Expansion of port storage capacity or rescheduling of other inloading and outloading activities would also be necessary. Such costs have not been taken into account. The important point is that the gross savings are substantial. Removing the existing regulation would allow delivery and infrastructure decision to be made on the basis of benefits and costs.

In conclusion, it is possible to make a case for allowing unrestricted use of road transport on the basis of potential cost savings to growers and increased efficiency in wheat distribution. However, the issues of road cost recovery and of the social costs associated with road transport of wheat would need to be considered, and appropriate taxes designed for all road users, to ensure that the increased efficiency from wheat being transported by road would not impose net costs on society.

5. Policy options

The basic shortcoming of the current wheat distribution system is the lack of adequate incentives to encourage efficiency. As was argued in chapter 3, the current institutional arrangements are likely to result in larger inefficiencies than if competition by other suppliers were allowed. And evidence is presented in chapter 4 that inefficiencies are in fact a problem in the wheat distribution industry. This does not mean that a particular bulk handling authority, at a particular time, is necessarily internally inefficient. Managers can encourage internal efficiency.

Currently, low wheat prices and the establishment of the Royal Commission of Inquiry into Grain Storage, Handling and Transport have increased pressure on statutory authorities in the wheat distribution industry to improve their internal efficiency. However, the problem is that under the current institutional arrangements the incentives for management are not as strong or as consistent through time as when competition is present. In the long run, one would expect to find that managers respond to the incentives, or lack of incentives, of the job with which they are faced.

To achieve the most efficient system of wheat distribution, changes to the institutional arrangements are required. There are numerous ways of encouraging improvements in efficiency in wheat distribution. The purpose in this chapter is to present three broad options for changing the institutional arrangements to make the wheat distribution industry less prone to inefficiency. These options are:

- improving the incentives facing the present statutory authorities;
- introducing competition; and
- introducing competition, combined with public incorporation.

The discussion of these options is based on the assumption that the Australian

Wheat Board retains control over the sale of the wheat crop. However, the Australian Wheat Board's dealings with the wheat distribution industry would need to be altered, as outlined below, to obtain the improvements in efficiency offered by these options.

5.1 Improving incentives

The option entailing least change to the current institutional arrangements is to improve the incentives facing the statutory authorities. This option involves the explicit use of incentives to address the various types of inefficiency and the removal of non-commercial objectives. The incentives should be designed to encourage the authorities to achieve good management and to explore possibilities for differential pricing and improved co-ordination.

If the basic institution of statutory authorities which have monopoly powers were retained, this option would result in the continuation of some inefficiencies. The incentives available are necessarily based mainly on penalties rather than rewards (relying, for example, on accountability and political pressure). Penalties can be expected to produce only mediocre results, whereas rewards may encourage excellent performance. Therefore, although some improvement in efficiency is likely to result from this option, it is likely that some inefficiencies will remain in the wheat distribution system.

The proposed changes are categorised into legislative, commercial and co-ordinative changes, reflecting the three categories of institutional arrangements discussed in chapter 2.

Legislative changes

The changes required to improve the efficiency of statutory authorities are the

removal of non-commercial obligations and the implementation of additional requirements for accountability.

Non-commercial obligations

Present legislation subjects the bulk handling authorities and rail authorities to non-commercial objectives from three sources: directly from the legislation, as a result of the composition of their boards of directors and from the responsible minister.

Requirements for authorities to pursue non-commercial objectives will often preclude the achievement of efficiency. (An example is the requirement for the New South Wales rail authority to be a common carrier.) Such requirements should be removed from legislation.

The potential for the imposition of non-commercial objectives by boards of directors is of particular importance for the bulk handling authorities. This potential arises from the inclusion of representatives of outside interest groups whose interests may conflict with the commercial interests of the authority. The legislation should therefore be amended where necessary to remove the principle of board members representing outside interests. It should require instead that the directors have special qualifications relevant to the business of the bulk handling authority (including previous business experience); and that they be given a mandate to direct the authority as a commercial venture.

The selection of board members should be on the basis of merit, using objective selection procedures. These proposals are similar to the changes to primary industry statutory marketing authorities enacted by the Commonwealth Government since 1985.

Further improvements in the performance of the boards could be encouraged by paying board members according to their authorities' performance.

In general, ministers have not exercised their powers of direction over the bulk handling authorities. Transport ministers, however, have often intervened to direct rail authorities in at least three areas: the

setting of freight rates, the provision of subsidised transport services and the operation of unviable branch lines.

A non-commercial objective should be pursued under specific policies after allowing for public review and only if it confers a net social benefit. The gains from the non-commercial objective need to be weighed against the consequent losses in efficiency. It has not been demonstrated that any of the non-commercial objectives imposed on the bulk handling authorities and rail authorities has a net social benefit.

Accountability

Accountability on internal efficiency can be and has been used to discourage poor performance in a statutory monopoly. However, little attention is paid to it in either the bulk handling legislation or the rail legislation. Only the legislation in Victoria and for Australian National Railways provides specific measures of accountability on internal efficiency. In Victoria, statutory authorities are required to provide a rate of return report, and financial targets are set for V/Line. In addition to specified financial targets, Australian National Railways is required by legislation to propose measures to meet any financial shortfall.

It is suggested that formal requirements be imposed for regular, adequate monitoring of the authorities, with specified economic and other management targets.

Changes to commercial arrangements

As with any monopoly, if the authorities direct the use of resources in their own commercial interests, a misallocation of resources may result. This might happen, for example, if the authorities chose to cut back services or raise charges to obtain monopoly profits. However, the scope for this inefficiency will be limited because the authorities in the wheat distribution industry face a single buyer, the Australian Wheat Board. If both parties are commercially oriented, negotiation between them may, by itself, provide the incentive to achieve efficiency.

The use of written agreements facilitates the development of explicit performance incentives (penalties and rewards) and thereby encourages efficiency. There are now written commercial agreements for the handling and storage of all Australian Wheat Board wheat and for the rail transport of wheat in Queensland, South Australia and Western Australia. There are no written rail freight agreements in New South Wales or Victoria, and efforts should be continued to remedy this situation.

Some current agreements, with both bulk handling authorities and rail authorities, include terms to protect the authorities from competition. Every bulk handling authority levies a charge on direct grower to buyer sales, and the state owned bulk handling authorities levy charges on permit wheat sales, though in neither case do the bulk handling authorities provide any service. These charges can be imposed only because of the monopoly position of the bulk handling authorities, and have the effect of deterring sales which bypass them. It would assist in improving efficiency in wheat distribution if such payment arrangements were not permitted.

All three written rail freight agreements contain clauses designed to protect the rail authorities. The agreements provide for concessional rates or rebates if a certain market share or proportion of a grower's crop is carried by rail. In addition, in South Australia, surcharges are imposed on grain moved from rail based silos by road. The effect of these concessions is to inhibit competition rather than to reflect cost savings which may arise with large volumes. Improvements in efficiency would result from replacing these concessions with discounts based on the cost savings from carrying higher volumes.

Public accountability could be used to discourage the inclusion in commercial agreements of conditions which impede efficiency. There is no economic objection to volume concessions, or other concessions which are related to specific cost savings. For example, the rebates for unit train loads in Queensland, and the special rates at selected lower cost silos in

South Australia, are designed to improve efficiency and should be encouraged.

One commercial arrangement common among bulk handling authorities and rail authorities is cost pooling. This necessarily results in a misallocation of resources (as discussed in appendix I). It may result in the maintenance of uneconomic silos and branch lines, the encouragement of production in marginal areas, and overinvestment in country handling and storage facilities and railway facilities to service the peak load at harvest.

That cost pooling has contributed to inefficiency in wheat distribution is illustrated in appendix I. Some bulk handling authorities and rail authorities have moved away from cost pooling, but this change has often been opposed by growers and other user groups. (For example, discounts at low cost silos in Victoria and New South Wales have been opposed by some growers.) The removal of non-commercial objectives on the authorities should make cost pooling less attractive, and may encourage them to extend the useful practice of differential pricing — that is, variation of charges to reflect cost differences.

Changes to co-ordination arrangements

More generally, co-ordination between the various agencies in the wheat distribution industry should be encouraged. In particular, joint long run planning of investment and rationalisation have value in catalysing co-ordination.

One institutional arrangement which may impede co-ordination exists in Queensland. There, unlike the other states, a State Wheat Board is interposed between the bulk handling authority and the Australian Wheat Board. It is the authorised receiver of wheat for the Australian Wheat Board and uses Bulk Grains Queensland as its agent. At present there is an overlap of personnel between the State Wheat Board and Bulk Grains Queensland. If, in the future, these two bodies began to deal 'at arm's length' (as is implied by the suggestion made above for a change in the makeup of the boards of

the bulk handling authorities) then the co-ordination between the Australian Wheat Board and Bulk Grains Queensland may suffer. More efficient co-ordination would be possible if the State Wheat Board's role as intermediary between the Australian Wheat Board and Bulk Grains Queensland were brought to an end.

In recent years, there has been increased interest in moving grain to port by the least cost path, regardless of state boundaries which have posed an obstacle to national co-ordination of grain movements. One option is to encourage commercial agreements between state authorities to use the cheapest route. The threat of competition from interstate road hauliers has already stimulated some agreements between statutory authorities to use the least cost routes to deliver some wheat across state borders.

5.2 Introducing competition

In addition to the changes under the first option, allowing competition in the supply of distribution services is an effective way of improving efficiency in the wheat distribution industry, because competition provides rewards and penalties through the price mechanism that may be expected to encourage improvements in efficiency.

There have been a number of studies of the effects of 'deregulation', in the sense of the introduction of competition, in various industries. Crandall (1983) noted evidence of greater economic efficiency in trucking, airlines, railways and communications in the United States following deregulation. Joy (1964) showed that, on deregulation of the Australian trucking industry, the service generally improved, while charges were either unchanged or reduced. Johnson (1981) concluded that deregulation of the US transport system was beneficial to agriculture as it promoted transmission of clear market signals. Koran (1983), assessing the effects of airline deregulation, found that consumers were generally better off, while airline profits overall remained unchanged. In a recent survey, Domberger and Piggott (1986) found evidence which 'strongly suggests

that the opening up of a market to competition is crucial in promoting improved economic efficiency' in public authorities.

If a statutory monopoly provides a non-commercial service or remedies an externality, removing its protection from competition would be likely to result in the loss of that service or remedy. Road transport, as was discussed in section 4.2, gives rise to social costs through pollution, congestion and accidents. Introduction of competition in wheat distribution would entail ending restrictions on road transport and thus might result in an increase in these social costs. To ensure that the introduction of competition would not impose net costs on society, appropriate taxes would need to be designed and levied on all road users.

In wheat distribution, it is not clear that the loss of the non-commercial objectives imposed on the statutory authorities would result in a loss to society. As noted in section 5.1, it has not been shown that these objectives have a net social benefit. Cost pooling is one non-commercial objective that would be unlikely to be continued after the introduction of competition. There is disagreement among farmers about whether there is a net social benefit from cost pooling; for example, the Victorian Farmers Federation supports cost pooling but the New South Wales Farmers' Association does not. As is shown in appendix I, cost pooling does result in inefficiency.

One problem in removing protection from competition is that a redistribution of benefits could result, with losses to some individuals and gains to others. For example, the bulk handling and rail authorities would no longer be able to pass on to customers by cross subsidy the costs of unviable services. Those farm owners who would no longer be cross subsidised could expect to incur capital losses. However, the loss to these farmers of the cross subsidy may be offset by other effects of competition. For example, where the cost of road transport was no more than the pooled rail charge, the farmer would not lose from the introduction of competition.

Pooling of storage and handling charges subsidises users of the older facilities with high operating costs. If competition were allowed, these facilities would be replaced in the longer term by lower cost facilities more suited to the needs of the region. Thus it is not clear that those who are currently subsidised through cost pooling would necessarily lose from the introduction of competition. Not only would the gains outweigh the losses from a change to a competitive environment, but it is possible that all users would gain.

The success of introducing competition may depend on whether wheat distribution, or some part thereof, is characterised by natural monopolies (see section 3.1), and on the extent to which the resultant monopoly power can be controlled. If a public authority has a natural monopoly which is contestable — that is, if other firms are capable of entering the market if the authority tries to extract monopoly profits — the removal of protection from competition will not adversely affect the benefits the authority provides. On the contrary, the potential for competition from possible entrants provides an incentive for the natural monopolist to operate efficiently. Competitors will not emerge provided that the monopoly minimises its prices, thus making the economies of size available for the benefit of society.

The removal of protection from competition has the additional advantage that when an activity ceases to be a natural monopoly due to changes in its cost structure (for example through technological change: Scherer 1980) there is no impediment to the change in industrial structure required for economic efficiency.

However, if an authority has a natural monopoly which is not completely contestable, some means of restraining the use of monopoly powers is required. Possible measures include using pricing and accountability regulations, or contracting out the services by open tender.

In bulk handling

A bulk handling authority performs three functions: terminal operations, country

silo operations and co-ordination of grain transport. The appropriate method of introducing competition in bulk handling varies between these three functions.

In country silo operations, competition could be introduced by eliminating the restriction to a single licenced receiver of wheat per state and allowing unrestricted entry to the market. The Australian Wheat Board could offer contracts for the country silo service on the basis of competitive tenders from the existing bulk handling authorities and other existing or potential storage companies.

The existence of a number of firms providing country silo services for grains that are not marketed by a statutory authority (see section 4.1) indicates that the market for this service would be competitive. However, if there are substantial economies of size in silo operations this could result in localised monopolies. The extent of localised monopolies is difficult to predict, but in any case their monopoly power would be limited by competition from companies in adjoining regions.

In terminal operations there is likely to be only limited competition, because of the small number of terminals. Competition could be fostered by requiring a different company to operate at each port, either leasing terminal facilities or contracting terminal services. At each terminal, operations would probably still be undertaken by a monopolistic firm. However, if the terminal facilities were operated by different companies, the Australian Wheat Board would be able to impose some competitive pressure through its ability to direct grain to particular ports and by publicly tendering the business.

Leasing facilities or contracting terminal services may offer greater scope for competition than allowing each facility to be owned by a particular company. It would then be possible that, in addition to the limited competition between ports, competitive pressure could be applied if a lease or contract were offered through competitive tendering for a limited time.

The main difference between leasing and contracting is that the owners typically

have less influence over decision making under a lease arrangement than under a contractual arrangement. Where the state owns the facilities, it may therefore prefer contracting to leasing. However, contracting may be less preferable from an efficiency perspective, for two reasons. First, the state may use its power to impose non-commercial objectives. Second, since the state will be interposed between the client (the Australian Wheat Board) and the provider of services, it may hinder co-ordination between the two.

A bulk handling authority's function of organising wheat movements from the country to port could be provided competitively. There already exist many freight forwarders who organise transport of various commodities. Competition could be achieved by requiring the Australian Wheat Board to contract this function on the basis of competitive tenders. Entry to the tendering process should be open to existing freight forwarders, present statutory authorities and new entrants. Such an approach would also allow any economically worthwhile vertical integration between the various operations of country silos, terminals and wheat movements.

In inland wheat transport

Competition could be introduced in wheat transport by removing protection of the monopoly status of the rail authority in each state and revoking all restrictions on the road transport of wheat.

As was illustrated in chapters 3 and 4, the restriction of intrastate wheat transport to a single rail authority in most states has created barriers to interstate rail transport of wheat. One exception which is specifically covered by legislation is the operation of V/Line routes in southern New South Wales.

Rather than legislating exceptions, it would be more efficient simply to remove the rail authorities' protection from competition. As the provision of a rail network is a natural monopoly (though components such as rolling stock may not be), this would not be expected to result in any major changes to the rail network. Indeed, where competition is not banned

— for example, in Western Australia — there exist only a few minor private rail lines for specific purposes. More importantly, the removal of protection from competition might end the state orientation of the rail networks along border areas. V/Line operations in southern New South Wales are an example of an interstate rail line offering a lower cost route to port than intrastate rail.

Rail competition is relevant to the recent announcements of proposed closures of some uneconomic branch lines by some rail authorities. The authority could offer the branch line for sale. In border areas the branch line might be purchased by the neighbouring rail authority to link with the interstate network. Such changes could increase transport efficiency by reducing impediments to interstate transport.

The introduction of competition would also require that road transport of wheat by firms which are independent of the rail authority be allowed. Currently, commercial road transport of wheat is restricted by legislation in Victoria, Western Australia and Queensland, and by a lack of road receival facilities at ports in New South Wales. These restrictions have resulted in economic losses (see section 4.2).

Road and rail are not perfect substitutes. Road transport generally costs less than rail when wheat is to be moved in smaller lots or over shorter distances, whereas on long distance hauls road transport may provide only limited competition to rail. In states with relatively short distances between wheat production areas and ports, such as South Australia, road is likely to provide adequate competition. However, it is unclear at what distance road becomes uncompetitive with rail and whether this distance is exceeded in some states.

5.3 Competition and incorporation

The final option is to remove protection from competition and incorporate the bulk handling authorities as public companies. This option has all the advantages of the second option and overcomes some shortcomings of that option, as follows.

Typically, statutory monopolies' charges

cover both operating costs and the capital costs of any investment projects in hand. The option of incorporation breaks this nexus. A public company can separate the two costs by raising the capital for future installations through the stock market, so that charges at any time are required to cover only the costs of the service being provided plus a return on capital.

Under this option, efficiency is encouraged not only through competition but also by unrestricted trading in the company's shares on the stock market, by the threat of takeover and by public accountability to shareholders. These influences apply whether the company is in a competitive environment or is a monopoly, with or without potential competition.

The only inefficiencies to which this institutional arrangement would be susceptible would be those due to monopolistic practices, such as restriction of output or excessive pricing. As was argued above, monopolies are likely to occur only on a localised basis, and monopolistic power would be limited to some degree by interregional competition. Nevertheless, it would be worthwhile to consider the effectiveness of current trade practices legislation in discouraging any inefficiencies which might arise if monopoly power did emerge. In this connection, studies of the cost structures of the various functions in wheat distribution may be required to determine the extent to which monopolies are likely to occur.

This option, like that of introducing competition, may result in some redistribution of benefits and the loss of non-commercial objectives. However, as discussed in section 5.2, the benefits from improved efficiency from the introduction of competition may outweigh the costs and hence a net social benefit could result. Also, although there will be losers in the short term from the loss of certain non-commercial objectives, at least some of these losers will gain from cost reductions resulting from the introduction of competition. Prior to implementing any such changes to the wheat distribution industry these issues should be resolved.

This option of introducing competition

and incorporating the bulk handling authorities has the potential to give the highest practicable level of efficiency in wheat distribution. However, this option may have higher implementation costs as it involves the largest changes. And there is the question whether taxpayers or growers own the current statutory authorities.

The decision among the three options will require government and industry to consider other issues not covered in this paper. It has been argued, for example by the Australian Wheat Board (1987), that a less centralised storage and handling system would involve either realisation of lower grain hygiene or higher costs to maintain existing hygiene. It does seem likely that testing and other quality assurance costs would increase to some extent with an increase in the number of individuals or organisations sharing responsibility for a particular parcel of grain. Any movement to greater storage on farm could also involve extra risks and direct insect control costs, at least in the initial period, as farmers gained experience in effective storage procedures. However, it should be recognised that reliance on price signals in a decentralised system, as against regulation in a centralised system, has the potential to provide more accurate information to those making storage and handling decisions. So the net result of adopting a less centralised, competitive system would not necessarily be higher quality control costs.

Among the issues to be considered before any change to the wheat distribution system is implemented are: whether the benefits from changing the institutional arrangements are greater than the costs of implementing them; the external (social) costs of increased road transport, and the implementation of appropriate taxes to ensure that net costs are not imposed on society; the recovery of road costs from road users; the social costs and benefits of the non-commercial objectives currently imposed in the wheat distribution industry; the effect of alternative marketing systems on the wheat distribution system; and the implications of proposed changes for the distribution of other grains and oilseeds.

Appendix A National institutional arrangements

A.1 Legislative arrangements

Although the handling and internal transport of wheat are governed by state legislation, wheat marketing is governed by national legislation, supported by complementary state legislation. The national legislation is the Wheat Marketing Act (Commonwealth of Australia 1984).

The current national Wheat Marketing Act is valid for a period of five years beginning July 1984. Section 5(2) of the act defines the Australian Wheat Board (established in 1939 to market all Australian wheat) as a statutory marketing authority whose major function is to control interstate movement and export marketing. One of a number of additional functions is 'to co-operate, consult and enter into agreements with ... authorised receivers'.

Under sections 3 and 10 of the act, the authorised receivers of wheat are the State Wheat Board in Queensland, the Grain Handling Authority of New South Wales, the Grain Elevators Board in Victoria, South Australian Co-operative Bulk Handling Limited and Co-operative Bulk Handling Limited in Western Australia. Sections 18 and 19 require wheat growers to deliver all wheat, with some exemptions, to an authorised receiver during the season in which it was produced. Hence, except for exempt wheat and wheat sent interstate, the authorised receivers have monopolies in the handling of wheat in their respective states. The exemptions are: wheat for use on the grower's own farm or on an associated farm; wheat sold by authorised growers directly to buyers; and wheat purchased by permit under section 22 of the act, whereby the Australian Wheat Board can authorise an applicant, on payment of a fee, to purchase wheat from growers for stock feed.

The permit fee comprises an Australian

Wheat Board administration charge (except in Queensland) and, in general, a state fee (Australian Wheat Board 1985a). The administration charge is \$20 per permit plus 20c/t for permits over 100 t. State permit fees vary markedly. In Queensland an administrative charge and a bulk handling charge (of \$1.50/t each in 1985-86) are applied under the State Wheat Pool Act. New South Wales and Victoria include a bulk handling authority charge (\$2/t). There are no additional charges in Western Australia or South Australia. In addition, wheat sales, including 'permit sales', incur charges for the Tasmanian freight levy (\$1.30/t), the national wheat research levy (35c/t), a wheat research levy (35c/t) in South Australia and a hail levy (\$1.50/t) in Queensland.

A.2 Commercial arrangements

The main commercial arrangement between the Australian Wheat Board and the state bulk handling authorities is the Grain Storage and Handling Agreement. It came into operation in October 1985, for four years. A second commercial arrangement, between the Australian Wheat Board and some bulk handling authorities, is the Deferred Delivery Interest Scheme.

Grain storage and handling agreement

This agreement contains details of the services to be performed for the Australian Wheat Board by the authorities and of the payment for those services.

Remuneration

The main service performed by the bulk handling authorities for the Australian Wheat Board is the receipt, handling and

storage of wheat. To receive remuneration for this service, each bulk handling authority notifies the Australian Wheat Board at the start of the service year (1 October) of its handling and storage charge per tonne, known as the aggregate fee. On receipt of the wheat, the Australian Wheat Board pays the bulk handling authority 40 per cent of the aggregate fee. For each month of the service year the bulk handling authority receives one-twelfth of a further 40 per cent of the aggregate fee. The remaining 20 per cent, known as the outturn fee, is paid when the wheat is outturned on the domestic market or on to ships for export. The outturn fee on carryover wheat is paid at the end of the service year, except for that proportion of the carryover estimated to have been caused by the bulk handling authority, payment for which is delayed until the wheat is outturned.

By way of illustration, suppose that a bulk handling authority's aggregate fee is \$15/t; that its proportion of responsibility for carryover is 0.4; and that the carryover tonnage for a given shipping year is 0.5 Mt, outturned in December, January and February at levels of 0.2 Mt, 0.2 Mt and 0.1 Mt, respectively. The bulk handling authority's September account would be credited \$0.9m ($20 \text{ per cent} \times 15 \times 0.5 \times 0.6$) for carryover attributed to the Australian Wheat Board. For outturning 0.2 Mt of the carryover in December, the bulk handling authority's account for that month would be credited \$0.24m ($20 \text{ per cent} \times 15 \times 0.2 \times 0.4$). By analogous calculations, the amounts credited for outturning carryover in the subsequent two months would be \$0.24m and \$0.12m, respectively. In practice the carryover wheat and proportion of responsibility cannot be known with certainty until the end of the shipping year. If this is so, then the September credit will be only an estimate subject to later adjustment.

Carryover

The bulk handling authority agrees to store carryover wheat until it can be outturned, and in the first instance bears the cost of that carryover. The Australian

Wheat Board compensates the bulk handling authority for the costs of that carryover wheat which is not attributable to the performance of the bulk handling authority. The compensation rate for 1985-86 was set at \$5/t for carryover up to 0.5 Mt plus 20c/100 kt up to a maximum of \$10/t (for a carryover of 3 Mt or more). Provision is made for annual indexing of these compensation rates.

The bulk handling authority is liable for the cost of carryover to the extent that its shipping capacity nominated at the start of the shipping year (less shipments it requested to be diverted to other states) falls short of the target capacity. The bulk handling authority's liability for carryover cannot exceed the target capacity. The target capacity is intended to indicate the amount of grain the bulk handling authorities should be planning to handle and is 120 per cent of the average of the three highest wheat receipts minus domestic sales in the state over the past five years.

Interstate transfer

A proposal for interstate transfer may be made by a bulk handling authority or the Australian Wheat Board. If the proposal is accepted by the other two parties, the Australian Wheat Board negotiates with the sending authority for a contribution to freight and other costs of the transfer, and negotiates with the receiving authority on a fee for its service. No guidelines are given on how large the contribution or fee should be, but it seems likely that the sending authority would at least contribute to the extent of its outturn fee and the receiving authority would at least demand a fee that covered the outturn fee. In any case, no outturn fee would be payable to the sending authority until the end of the service year.

Inland transport

The agreement specifies certain freight service costs and savings that are for the account of the bulk handling authority. Thus, the bulk handling authority pays deadfreight, overload penalties, shunting and stopover charges and (generally) rail wagon demurrage, and receives any

concessions from the use of block trains. The agreement also provides that where a bulk handling authority makes an 'extraordinary movement' of wheat on its own initiative, it incurs any excess costs or savings.

Shipping

The agreement provides the bulk handling authorities with incentives for good ship loading performance. The Australian Wheat Board is responsible for providing an orderly flow of vessels for loading, and would pay some demurrage costs if vessels were bunched. The agreement specifies rates of loading, which are designed to be competitive with international rates. If the rate of loading is slower than specified, the bulk handling authority pays the penalty. Conversely, if the loading rate is faster than specified, the bulk handling authority receives a bonus.

Other relevant shipping costs are those associated with two-port loading and port surcharges. Two-port loading is required when a port is physically unable to complete the loading of a ship, due to draught, length or other limitations. Port surcharges are such items as wharfage and harbour dues. The agreement states that these other shipping costs may be included in the deductions made from growers in the relevant state.

Care of wheat

The agreement provides for specific penalties to be paid by the bulk handling authority for defective outturn. For defective outturn, other than that due to insect infestation, the liability of the bulk handling authority is limited to 10 per cent of the value of the shipment at guaranteed minimum price. In the case of insect infestation, the bulk handling authority liability ranges from zero to 80 per cent, depending on the number of rejections per shipment.

For shortages in outturn, the bulk handling authority is liable for the guaranteed minimum price value of the difference between the outturn and receival tonnage. Conversely, the Australian Wheat Board pays the bulk handling authority on the same basis if the

outturn exceeds the receival tonnage minus 0.5 per cent, or some lower percentage nominated by the authority.

Other

The agreement includes a number of other clauses in addition to the service and remuneration clauses.

There is a provision for dealing with disputes through conciliation and, where required, binding arbitration; and an arrangement for the extensive exchange of information. Under the latter, the Australian Wheat Board is to provide all bulk handling authorities with information on each bulk handling authority's potential shipping program, nominated capacity, aggregate fee, outturn fee, carryover and extraordinary payments receivable from the Australian Wheat Board, monthly export sales and shipments and tonnages of wheat loaded on to vessels.

There is also a provision for the Australian Wheat Board to pay any permit charges to the bulk handling authorities; and a 'force majeure' clause. This clause states that neither the bulk handling authority nor the Australian Wheat Board shall be liable for any delay or failure in performing obligations under the agreement caused by a force majeure. A force majeure may be a state of emergency (such as war, riot or blockade of ports), a strike or lockout of an essential class of worker, or damage which could not reasonably have been prevented by the bulk handling authority. This clause provides for the parties to consult and agree on modifications to the agreement deemed desirable because of the force majeure.

Deferred delivery interest scheme

The idea for this scheme, designed to smooth the flow of grain at harvest, came from Victoria. Provision for the scheme was made under section 26(15) of the Commonwealth *Wheat Marketing Act* 1984, and it was introduced into Victoria for the 1984-85 marketing year. The scheme was extended to New South Wales the following year.

For each region in a state, a 'prescribed date' is determined when wheat would normally be available for delivery. Growers who delay delivery of their wheat until a 'prescribed 12 week period', which begins fourteen days after the prescribed date, receive an interest payment on their interim first advance. The interest is

calculated on the amount which would have been received had delivery been made on the prescribed date, and applies from that date to the day of actual delivery. The interest payment is intended to reflect part of the interest savings that accrue to the Australian Wheat Board because it can delay its borrowings.

Appendix B Institutional arrangements in Queensland

B.1 Background

The storage, handling and transport of wheat produced in Queensland is co-ordinated by three statutory bodies: the State Wheat Board, the Queensland Grain Handling Authority (which trades as Bulk Grains Queensland) and Queensland Railways.

Wheat is grown in two distinct regions: southern Queensland and central Queensland. Export wheat from southern Queensland generally moves through the port of Brisbane, while that from central Queensland usually moves through the ports of Gladstone and Mackay. Wheat accounts for about 45 per cent of total grain production (based on five-year averages to 1984-85). Thus, it does not dominate to the same extent as in some other states. The importance of summer as well as winter crops to the delivery system has led to a system characterised by a continuous movement of grain from the country to ports throughout the year. Compared with the other states, there is therefore a high annual use of capacity, both at the country depots and at the port terminals, and less of a peak load problem.

Bulk Grains Queensland's permanent storage capacity at the end of 1985 was 1.8 Mt (wheat equivalent), composed of 1.5 Mt at country depots and 265 kt in silos at the five port terminals (Fisherman Island, Gladstone, Mackay and Pinkenba 1 and 2). Only New South Wales has a lower proportion of total storage capacity at the ports. The Queensland system has been designed to maximise storage in country areas.

B.2 Legislative arrangements

The legislative arrangements applying to the three statutory bodies are outlined below.

State Wheat Board

The State Wheat Board was initially established as a statutory corporate body for the compulsory acquisition of the Queensland wheat crop, the handling and the marketing of the crop, and other complementary functions. In 1939, when the Australian Wheat Board was constituted, the State Wheat Board relinquished its active role in marketing but continued to be responsible for the handling and storage of wheat and some other grains.

In November 1983, with the passage of the Queensland Grain Handling Act (Queensland Government 1983), the responsibility for handling and storing grains passed from the State Wheat Board to the newly formed Bulk Grains Queensland. Since that time, the State Wheat Board has operated as an intermediary between the Australian Wheat Board and Bulk Grains Queensland by virtue of the Wheat Pool Act (Queensland Government 1985e). Under the act it also engages in some minor commercial activities, including seed wheat sales and the administration of a hail insurance scheme and a quality premium fund.

Under section 43 of the Wheat Marketing Act (Queensland Government 1984) the State Wheat Board represents the interests of wheat growers in Queensland in any matter relating to the delivery, handling and marketing of their wheat. This includes negotiations with Queensland Railways and Bulk Grains Queensland over rail and storage charges.

The State Wheat Board is appointed by Queensland's Minister for Primary Industries. Under section 4 of the Wheat Pool Act the composition of this board is flexible and the minister may appoint as many representatives of wheat growers and other persons as he or she deems

'proper'. Currently, the board consists of five grower members, a person from the Queensland Department of Primary Industries, and a chairman. Three of the grower members are elected, one from each of three districts.

Economic powers

Under section 5 of the Wheat Pool Act, the State Wheat Board 'may sell or arrange for the sale of wheat, and do all acts, matters, and things necessary or expedient in that behalf', though this power to market the crop is not exercised. Section 10 of the state's Wheat Marketing Act makes it clear that the State Wheat Board is the sole authorised receiver for the Australian Wheat Board in Queensland.

Under section 5 of the Wheat Pool Act the organisation has the power to carry out all the functions of an authorised receiver, including the storage and handling of wheat received; alternatively, it may hire any agent approved by the Australian Wheat Board to carry out those functions. Using this arrangement, the State Wheat Board has appointed Bulk Grains Queensland as the storage and handling agent for the wheat it receives. The State Wheat Board has a commercial agreement with Bulk Grains Queensland under which it pays the latter a storage and handling fee, and another agreement with the Australian Wheat Board under which it is remunerated for its services as an authorised receiver.

Non-commercial objectives and accountability

Other than the requirement of the state Financial Administration and Audit Act that the State Wheat Board must publish its accounts in a manner directed by the Minister for Primary Industries, there are no specific provisions in the legislation for direction by the minister. However, non-commercial objectives may be pursued by directors who are grower representatives.

Bulk Grains Queensland

Bulk Grains Queensland commenced operations in November 1983, with the passing of the Queensland Grain Handling

Act, following a recommendation of the Queensland Planning Committee on Future Grain and Oilseed Handling, Storage and Transport (McKechnie 1981). This recommendation reflected a perception that as oilseeds and grains other than wheat constituted about half the throughput of the State Wheat Board, it was inappropriate that their handling and storage should be under the control of an organisation represented at board level only by wheat growers. As a result, Queensland has the unique feature of a grain handling body separated by a (wheat) intermediary from the national wheat marketing body.

There are, under the legislation, thirteen members on the board of Bulk Grains Queensland. Five of these are members of the State Wheat Board. The Queensland Barley Marketing Board and the Central Queensland Grain Sorghum Marketing Board each elects a representative, as does the Queensland Graingrowers Association. Other board members include three elected by growers of coarse grains, a representative of the Queensland Department of Primary Industries and a chairman appointed by the Minister for Primary Industries (after consultation with the abovementioned marketing bodies).

Economic powers

Under the Grain Handling Act, Bulk Grains Queensland has the power to handle and store wheat and other grains and oilseeds which are marketed by statutory authorities in Queensland. (There are some grains not marketed thus, notably sorghum from the south of the state.) It may also handle other grains for private firms.

Section 26 of the act provides Bulk Grains Queensland with exclusive rights to the storage and handling of export grain shipped from Queensland. The purpose of this provision was to provide Bulk Grains Queensland with some protection to enable it to recover the capital costs of constructing the new port facilities at Fisherman Island and at Gladstone. On the other hand, section 26 also prohibits Bulk Grains Queensland from refusing to

accept delivery of any export grain at its port facilities.

The act does not give Bulk Grains Queensland the exclusive right to store and handle grains in country areas. However, in the case of wheat and other grains marketed by statutory authorities, Bulk Grains Queensland obtains such rights by a combination of other legislation and commercial agreements. The exclusive right to handle wheat (other than exempt wheat) is by commercial agreement with the State Wheat Board, which is the sole authorised receiver under the federal and state Wheat Marketing Acts. For other grains, such as sorghum and permit wheat, private firms may establish their own storage facilities in country areas in competition with Bulk Grains Queensland, and have done so. However, because of Bulk Grains Queensland's exclusive rights over export facilities, it still exerts some influence over the handling of all grains destined for export markets.

Non-commercial objectives and accountability

There are no specific provisions in the legislation for accountability on efficiency aspects or for direction by the minister. However, non-commercial objectives may be pursued by the directors, who represent various groups.

Queensland Railways

Queensland Railways was constituted as a statutory public authority under the Railways Act 1914–1985 (Queensland Government 1985a).

Economic powers

The Railways Act provides Queensland Railways with monopoly rights in rail transport. Under section 40 of the State Transport Act (Queensland Government 1981) the Commissioner for Transport may specify 'restricted goods' which cannot be moved by road. The legislation on restricted goods effectively restricts to rail their transport over distances greater than 120 km. With minor exceptions, wheat and other grains which are marketed by statutory authorities are treated as restricted. Other grains, including permit

wheat, may be moved by either road or rail, subject to a permit from the Department of Transport.

In 1985, amendments to the Railways Act permitted Queensland Railways to transport grain by road without restrictions. Previously, Queensland Railways was permitted to use road vehicles only for transport to or from a railway.

Non-commercial objectives

The Railways Act provides for the imposition of non-commercial objectives on Queensland Railways. Section 6 states that the Commissioner of the Railways 'shall be subject to the direction of the Minister [for Transport] given in relation to such matters as the Minister may in his discretion determine'. Under section 75A, line closures may be authorised only by 'the Governor in Council', which means that they may be based on political (social) considerations and not only on commercial considerations.

A 1985 amendment to the Railways Act made it clear that freight charges were generally at the discretion of the Commissioner of the Railways. However, they may still be subject to political influence, because section 6 of the Railways Act continues to require that the commissioner be subject to the direction of the minister. For example, although Queensland Railways negotiates rail freight agreements with Bulk Grains Queensland independently of the state government, the latter froze rail charges for grain in 1985–86 at 1984–85 levels as a means of improving the returns to growers in the face of low world grain prices.

Accountability

PA Management Consultants (PA Australia 1983) suggested that it was the responsibility of the Minister for Transport to monitor the performance of the railway's management and to ensure that the railways operate efficiently. The minister, they noted, relied on Queensland Railways to provide the information required to carry out this monitoring role. PA Management Consultants counselled against such dependence and

recommended that a policy unit be formed within the Department of Transport with, among other roles, that of assessing the performance and plans of Queensland Railways. Such a policy unit was formed in 1983.

B.3 Commercial arrangements

The main commercial arrangements applying to Bulk Grains Queensland and Queensland Railways, including the interactions with the State Wheat Board, are outlined below.

Bulk Grains Queensland

Charges for services performed in the handling of wheat are set before the commencement of each season in an agreement between Bulk Grains Queensland and the State Wheat Board. Bulk Grains Queensland has similar agreements with other marketing bodies. Under section 39 of the Grain Handling Act the terms of these agreements are confidential.

In addition to this agreement with Bulk Grains Queensland, the State Wheat Board is also a party to the national Grain Storage and Handling Agreement. Under this agreement, the State Wheat Board is remunerated for its services as an authorised receiver. For example, in 1984-85 the State Wheat Board received \$20/t, of which \$19/t was passed on to Bulk Grains Queensland. The balance was for the wheat-specific parts of costs such as insecticides and fumigation, harbour dues, wharfage and administration (State Wheat Board 1986).

Queensland Railways

The transport of wheat by rail is subject to the Rail Freight Agreement reached between the Commissioner of Queensland Railways and Bulk Grains Queensland. Various marketing agencies which use Bulk Grains Queensland's services are also signatories to the agreement: the Australian Wheat Board, the State Wheat Board, the Barley Marketing Board and the Central Queensland Grain Sorghum Marketing Board. The most recent

agreement was signed in 1984 and covers the years 1984-85 to 1986-87. The main points of the agreement are as follows.

- All Bulk Grains Queensland grain which is to be moved more than 120 km must go by rail unless the railway is unable to meet the demand. This extends the legislative requirement, which applies only to grain marketed by statutory authorities. In return the railway offers concessional freight rates on all grains delivered to Bulk Grains Queensland.
- The agreement allows for annual rate increases of 6 per cent. However, the Queensland Government froze rail charges for 1985-86 at 1984-85 levels. The charge per tonne is the same for all grain types, varying with rail distance up to 570 km and constant beyond that point.
- A unit train load rebate of \$1/t is deducted if gross tonnage is at least 90 per cent of the maximum possible for a single locomotive, or 85 per cent in the case of multiple locomotives. The rebate is paid only to Bulk Grains Queensland and is pooled into a fund for use in improving the rail siding facilities at country depots (Bulk Grains Queensland 1985).
- There is a \$2/t stopover charge where grain is discharged at an intermediate depot on a direct haulage route.

Despite its monopoly over the inland transport of wheat and other grains handled by Bulk Grains Queensland, the railway still faces some competitive pressure from road transport of other grains within the state and of grains in general from interstate. In particular, Queensland Railways does not have exclusive rights to transport sorghum grown in southern Queensland, which is not handled by Bulk Grains Queensland. Of sorghum delivered to export terminals from southern Queensland in 1984, over 74 per cent was delivered by road.

B.4 Co-ordination arrangements

In 1980, the Queensland Planning Committee on Future Grain and Oilseed Handling, Storage and Transport was formed 'to study and report on all aspects of the planning necessary for the effective

handling, storage and transport of grain and oilseeds in Queensland to the year 2000 through an integrated approach by composite organisations'. The report of the committee (McKechnie 1981) was favourably received by the Queensland grain distribution industry and was seen to provide a good basis for co-ordinated investment planning.

The report proposed the following investment policies for the State Wheat Board (subsequently for Bulk Grains Queensland) and Queensland Railways. The emphasis in any capital program for the State Wheat Board should be to build adequate storage at country locations, while storage at ports should be sufficient to ensure an efficient throughput of grain to meet the export shipping program. The investment policy for Queensland Railways

should be to upgrade rail lines that could not accommodate high tonnage unit trains, to improve rail productivity and to replace old rail wagons with bottom discharge grain wagons.

These proposals were based on the storage and transport requirements expected for grain production in the year 2000, and might be criticised as not employing economic criteria. Be that as it may, the Planning Committee exercise has led to an improved attitude of co-operation between the State Wheat Board, Bulk Grains Queensland and Queensland Railways. There have been monthly meetings between Bulk Grains Queensland and representatives of Queensland Railways on operational issues, forward planning and long term investment policy.

Appendix C Institutional arrangements in New South Wales

C.1 Background

The storage, handling and transport of wheat produced in New South Wales is undertaken by two statutory bodies: the Grain Handling Authority of New South Wales and the State Rail Authority.

New South Wales has two port terminals, at Sydney and Newcastle. The country bulk handling system consists of 270 country stations, five of which are designated as subterminals, distinguished by extensive inloading of grain from smaller country storages and relatively high capacity inloading and outloading facilities.

At the end of 1985 there was 12 Mt (wheat equivalent) of storage capacity in country areas, including 6 Mt of permanent storage, and 308 kt of storage capacity at ports. The mix of country and port storage has come under criticism (Carmichael et al. 1981). Effective storage space at the port terminals is extremely tight, while total country storage is more than twice the average New South Wales grain harvest. Such a system places a heavy burden on the rail system and is very vulnerable to rail stoppages. In an attempt to alleviate this situation, construction of a third port terminal, at Port Kembla, began in 1985 and is expected to be completed by 1988.

New South Wales is the state with the highest average transport costs, due mainly to the relatively long distances that wheat must travel to the export terminals. Virtually all wheat is transported by rail, the State Rail Authority maintaining many branch lines principally for wheat. Although there is no legislation to prevent road transport of wheat, the rail authority has an effective monopoly on wheat transport because there are no road receival facilities at the ports. The rail authority lobbied against the provision of these facilities at Port Kembla, and a

compromise was reached with a maximum of 200 kt of wheat a year to be received by road. Also, in January 1986 the Grain Handling Authority approved in principle the construction of a road receival facility at Newcastle.

C.2 Legislative arrangements

The legislative arrangements affecting the grain storage, handling and transport system in New South Wales are outlined below.

Grain Handling Authority

The New South Wales Grain Handling Act, and state and Commonwealth Wheat Marketing Acts are the main acts governing the operations of the authority.

Economic powers

The Grain Handling Authority is empowered as an authorised receiver for wheat on behalf of the Australian Wheat Board through complementary state and Commonwealth wheat marketing legislation.

Non-commercial objectives

Under section 7(2) of the New South Wales Grain Handling Act (New South Wales Government 1980) the Minister for Agriculture may impose non-commercial objectives on the Grain Handling Authority. The act requires that the authority 'shall, in the exercise of its functions ... be subject to the control and direction of the Minister'. In practice, it does not appear that successive ministers have sought to impose direction on the Grain Handling Authority.

In section 12(2) of the act, the Grain Handling Authority is directed 'to operate at minimum cost consistent with a satisfactory level of service to growers and purchasers, and the provision of satisfying

and secure employment for the servants of the Authority'. 'Satisfying and secure employment' and (depending on interpretation) 'a satisfactory level of service' may be construed as non-commercial objectives if these objectives are pursued to the detriment of efficiency.

Non-commercial objectives may also be imposed by the board members who are representatives of outside interests (growers and unions). The Grain Handling Authority's board consists of eleven voting and five non-voting members. The voting members include the authority's managing director, six grower representatives (of whom three are nominated by the minister and three elected by growers on a zone basis), one elected representative each from the Public Service Association and the Australian Workers Union and two members, nominated by the minister, with experience in business management, industrial relations or finance. The five non-voting members include the authority's deputy managing director and director of operations, and one representative each from the Australian Wheat Board, the State Rail Authority and the state Treasury.

Accountability

As mentioned above, the authority is subject to the control of the minister under section 7(2). There are no specific provisions in the legislation for accountability on efficiency aspects. In practice, ministers have traditionally taken a non-intervening approach. In recent years, however, ministers have intervened in response to wide and sustained public criticism of the operation of the authority (see section 4.1).

State Rail Authority

The Government Railways Act and the Transport Authorities Act are the principal acts governing the operations of the authority.

Economic powers

The Government Railways Act (New South Wales Government 1982a) gives the State Rail Authority a multimodal charter which assists it in dealing with

competition from other forms of transport. Under section 16, the State Rail Authority has the right 'to use or maintain ... motor or other road vehicles ... in addition to, or in substitution for, any railway service operating between any places'. Under section 24(4) the authority also has the right to enter into contracts with any person to convey goods at special rates 'where competition with the railways by any other form of transport exists'.

Non-commercial objectives

Under section 11 of the Transport Authorities Act (New South Wales Government 1982b) there is a requirement that the State Rail Authority 'shall, in the exercise of its functions ... be subject to the control and direction of the Minister'. Furthermore, section 71(4) gives the minister specific powers in setting rail charges by requiring the authority to seek the minister's approval, at least once a year, for any proposed adjustments to charges. These proposals must take account of movements in relevant wages and price indexes, and of the authority's existing pricing policies and structures as approved by the minister. This clearly implies that the minister may impose non-commercial objectives on the authority.

Under section 33 of the Government Railways Act the State Rail Authority shall 'maintain the railways and all works in connection therewith in a state of efficiency, and shall carry persons, animals, and goods without negligence or delay; and in respect of the carriage of persons, animals, and goods, the [State Rail Authority] ... shall be common carriers'. The requirement to maintain the railways in a 'state of efficiency' may involve a non-commercial objective if the requirement refers to physical efficiency rather than economic efficiency. The common carrier obligation was designed to guard against possible 'monopolistic excesses which the management might practice' (Hirst 1965, p.94): it means that the State Rail Authority is obliged to transport all passengers or goods offered for that purpose. New South Wales is effectively the only state in which the common carrier obligation still operates.

Although other transport modes have rendered it an outdated concept, recent moves to have it abolished in New South Wales have not been successful.

Part V of the Transport Authorities Act contains all the relevant regulations regarding finance. Under section 56, separate funds are set up for the State Rail Authority and the Urban Transit Authority (which controls state transport other than rail). Normally, money received by each authority is paid into its own fund, and amounts required to meet expenditure are paid out of that fund. However, sections 57 and 58 allow the minister to redirect money between funds.

Accountability

Under section 11 of the Transport Authorities Act the State Rail Authority is generally subject to the control of the Minister for Transport.

One other way in which the authority might perhaps be made accountable is through the Committee of Review which is provided for under section 64. The committee consists of the Auditor-General (or representative), the Under-Secretary of the Treasury (or representative), and a representative of the State Rail Authority. The committee has the power to vary the capital of the State Rail Authority. However, there is no indication in the legislation whether the committee has a role in accountability on efficiency aspects.

C.3 Commercial arrangements

The main commercial arrangements deal with the charges set by the two authorities.

Grain Handling Authority

Arrangements for the setting and remuneration of handling and storage charges are contained in the national Grain Handling and Storage Agreement. Although costs are generally pooled across growers in the state, the Grain Handling Authority has experimented with both discriminatory and differential pricing.

Discriminatory pricing was introduced between 1982-83 and 1984-85 in the form of a handling discount to growers in

southern New South Wales (see appendix G, section G.3), with the objective of discouraging interstate deliveries.

Differential pricing was attempted in the same period, with the trial establishment of a bulk receipt centre at Wyalong. This centre offered a faster turnaround of growers' vehicles, together with handling and rail freight discounts, as incentives for growers to deliver to Wyalong rather than to their local silos. The discount was negotiated on a 50:50 share basis with the State Rail Authority. The scheme was discontinued, apparently because it was ineffective in changing patterns of delivery; some growers were suspicious of it, regarding it as a forerunner to silo closures.

In 1985-86 the Grain Handling Authority co-operated with the Australian Wheat Board to introduce the Deferred Delivery Interest Scheme under which growers are given an incentive to deliver their crop after the normal peak harvest period (see appendix A).

State Rail Authority

There is currently no written rail freight agreement in New South Wales. The basic charges are determined by the Minister for Transport on the basis of recommendations by the State Rail Authority in accordance with section 71(4) of the Transport Authorities Act.

The schedule of 'basic charges', which the minister announces just before harvest is based on rail distance. In addition to the basic charge there are charges for services such as shunting and stopovers (intermediate stops for unloading). These charges are agreed between the State Rail Authority and the Grain Handling Authority, and change from year to year at the same rate as the basic charge. The way in which the service charges are set has recently been criticised, and in 1985 negotiations began in an attempt to achieve, for the first time, a freight services contract.

Negotiations were under way to achieve freight rate reductions between growers and the rail authority in late 1986. A prerequisite for any reduction in charges is the suspension of rail services on low

volume branch lines. Silos on these lines would be cleared by private road hauliers to a main rail line silo (Livestock and Grain Producers' Association of New South Wales 1986).

C.4 Co-ordination

For investment planning and policy, the only formal element of co-ordination

between the Grain Handling Authority and the State Rail Authority is the inclusion of the deputy chief executive of the State Rail Authority as an associate director of the Grain Handling Authority. There is also a joint operations committee which meets monthly to consider co-ordination of grain handling and transport.

Appendix D Institutional arrangements in Victoria

D.1 Background

The state Grain Elevators Board is the only organisation storing and handling wheat in Victoria. The State Transport Authority is responsible for transporting wheat by rail within Victoria.

The country storage capacity is 4.5 Mt (wheat equivalent). The storage and receival system has been the subject of criticism in recent years, particularly regarding the locational pattern of silos (Read and Watson 1982). Since then, there has been a co-ordinated effort between the Grain Elevators Board and the State Transport Authority to rationalise the wheat distribution system by means of central receival points and catchment areas.

The Grain Elevators Board operates two terminals, at Portland and North Geelong. Geelong is the outlet for approximately 70 per cent of Victoria's export grain shipments. Portland's principal asset is its relatively deep water, which permits vessels of 60 kt to be loaded, compared with about 35 kt at Geelong. At Portland, storage capacity (wheat equivalent) is 161 kt, whereas the Geelong terminal has a capacity of approximately 845 kt. Farmers may deliver to road receival facilities at both ports; however, local growers are given preferred access to these facilities during the harvest peak.

D.2 Legislative arrangements

In 1983, responsibility for the Grain Elevators Board was transferred from the Minister of Agriculture to the Minister of Transport; Victoria is unique in this respect. Before 1983, the Grain Elevators Board borrowed funds in its own right, subject to provisions of the Grain Elevators Act (Victorian Government 1983a). Since the move, it has been subject to the

Transport (Borrowing Agency) Act (Victorian Government 1983d). The Grain Elevators Board now obtains funds through Vicfin, a government agency operating on behalf of statutory authorities.

During the 1983-84 financial year the Grain Elevators Board was brought within the ambit of the Public Authorities (Dividends) Act (Victorian Government 1983b). It is now required to pay an annual dividend to the state government, based on the value of public equity within the organisation. The objective, as stated in the act, is 'to ensure that the people of Victoria receive a reasonable rate of return on their equity'. The dividend paid in the 1983-84 financial year was about \$4m. The government has also placed a requirement on the Grain Elevators Board to earn a specified target rate of return on the value of its assets (Grain Elevators Board 1986).

The legislation relating to the transport of wheat underwent major revision with the Transport Act (Victorian Government 1983c). The act abolished seven transport authorities and created four new ones. One of the new authorities is the State Transport Authority which trades as V/Line. V/Line is responsible for all rail services, both freight and passenger, outside the Melbourne metropolitan area.

Grain Elevators Board

The Grain Elevators Board consists of six voting members and a non-voting member representing the state Treasurer. The voting members include: three growers appointed by the Minister of Transport after a panel has considered nominees of grower organisations; an officer of the Department of Agriculture nominated by its minister; one other person nominated by the Minister of Transport; and one person with business training and experience but not an officer of the public service or railway service.

Economic powers

Under section 10(2) of the Grain Elevators Act (Victorian Government 1983a) the Grain Elevators Board has the exclusive right to handle grains in the state. Despite this, the Grain Elevators Board (1986) has argued that it is not a monopoly because Victorian growers may deliver to any authorised receiver. This argument is largely spurious because it is the only authorised receiver in Victoria and is effectively a monopoly for growers other than those in border areas.

Non-commercial objectives

There is little in the current legislation to suggest the imposition of non-commercial objectives. However, under section 20 of the Grain Elevators Act, the Grain Elevators Board is directed to 'afford all reasonable proper and equal facilities for the storage of grain in elevators under its control and for the receiving, forwarding and delivery of grain so stored'. The requirement of 'equal facilities' could be construed as implying a non-commercial objective.

Pooling of storage and handling charges across all growers in the state was formerly deemed to be mandated in section 21, which required that 'the Board shall not afford or give any preference or advantage in charges ... to any person or subject any person to any detriment discrimination or disadvantage in charges' This section was repealed in 1977. Although the same basic charge is applied to all wheat deliveries, there are discounts for deferred delivery and in border areas, and an overtime surcharge for deliveries on weekends and public holidays. Also, there have been some differential pricing experiments at central receipt points.

Accountability

Section 7(6) of the Grain Elevators Act specifies that the general manager is accountable to the Grain Elevators Board. Section 51 requires the Grain Elevators Board to report to the Minister (of Transport, since 1983) on any matters relating to the handling of grain in bulk 'as and when the Minister directs'. Under section 100 of the act the operations of the

Grain Elevators Board are subject to ministerial approval. Also, investment contracts require the minister's sanction. In addition to audited annual financial reports the Grain Elevators Board is required to provide a rate of return report.

State Transport Authority

A major thrust of the 1983 Transport Act was to reorganise the transport authorities along modern corporate lines and to establish formal corporate planning. The V/Line Corporate Planning and Development Division (1985) has released a draft corporate plan for discussion. It is V/Line's first such plan and is intended to 'bring Government policies and statutory objectives together to form a cohesive plan for action over the next five years'. From the point of view of the wheat industry, the most important features of the plan relate to the government requirement that V/Line move toward full cost recovery. The aim is to achieve, by 1988-89, full cost recovery in freight services and 50 per cent cost recovery in passenger services. In 1983-84, freight and passenger services covered only 55 per cent and 25 per cent, respectively, of their total costs.

Section 13(2) of the act provides for the board of the State Transport Authority to include a representative of the Victorian Farmers Federation (formerly the Victorian Farmers and Graziers Association).

Economic powers

Although the State Transport Authority was formed mainly out of the previous Victorian Rail Board, its charter under the 1983 Transport Act is for the development and marketing of integrated multimodal transport services. Thus it has a mandate to move wheat either by rail or by road. In addition, the act preserves the previous rail authority's monopoly on the inland transport of Victorian wheat. Section 188 restricts the mode of transport of certain goods. Bulk wheat, barley and oats are not to be carried by private road hauliers beyond a 60 km radius of the place of consignment unless the vehicle owner has been granted a permit by the State Transport Authority. Primary producers

are exempt from this restriction if their vehicles are used solely in connection with their business as primary producers.

Non-commercial objectives

Under section 31 of the Transport Act the State Transport Authority is 'subject to the general direction and control of the Minister and to any specific directions given by him in relation to a matter or class of matters specified in the directions'. In addition, under section 14(4) the authority is expected 'to operate within Government policy and other parameters determined by the Victorian Transport Directorate'. Both of these statements may require the State Transport Authority to pursue non-commercial objectives with regard to grain transport.

Under section 51 of the act 'the State Transport Authority ... may not at any time increase the charges demanded by it in respect of a passenger service except with the concurrence of the Minister'. This statement may be a way of imposing a specific non-commercial objective on the authority. Since the legislation does not require separate funds for passenger and freight services (section 66), any non-commercial objectives on passenger traffic may impinge on freight traffic.

Accountability

In addition to annual audited financial reports, V/Line is required to provide a rate of return report.

Under section 58 of the Transport Act, the minister determines quantitative financial targets after consultation with the State Transport Authority. The authority is directed to attain these targets 'as far as is practicable'.

In exercising its functions under the Transport Act, V/Line is required to observe 23 objectives, most of which take the form of exhortations to good management performance. Examples are:

- 'to improve productivity';
- 'to manage and operate freight services at a profit so as to phase out freight subsidies and to provide funds for capital works';
- 'to provide a competitive and efficient public freight and passenger transport

- alternative to private transport';
- 'to achieve an efficient and dynamic organisation by implementing appropriate technological and other changes through a process of consultation beginning at the contemplative stage';
- 'to maintain harmonious relations between management, staff and employee organisations through processes of effective consultation and participation in decision making'; and
- 'to facilitate accountability at all levels within the Authority by maintaining suitable information and reporting systems'.

Under section 67(7), the State Transport Authority must include in its annual report an indication of the extent to which the objectives and quantitative targets have been achieved in the past year.

D.3 Commercial arrangements

These arrangements deal mainly with setting charges for services provided. Storage and handling charges are influenced by the provisions of formal agreements. No such agreement governs the setting of rail freight rates.

Grain Elevators Board

Arrangements for setting handling and storage charges are contained in the national Grain Handling and Storage Agreement. The Grain Elevators Board has also attempted to influence delivery patterns by price discrimination. It offers a discount of 50c/t to growers who deliver to any of four stations near the South Australian border.

Since 1984-85 the Grain Elevators Board has practiced differential pricing through participation in the Deferred Delivery Interest Scheme. This scheme, actually instigated by the Grain Elevators Board, is discussed in appendix A. The Grain Elevators Board has supplemented this scheme with its own plan to encourage growers to delay deliveries until after the harvest peak. For the 1985-86 season, the Grain Elevators Board offered growers a discount of \$1.50/t to deliver to nominated

stations during a nominated period (1 February to 15 March). In the past, the Grain Elevators Board also attempted to encourage deliveries to central receival points and seaport terminals by offering discounts (in 1984-85, 50c/t); these have now been discontinued.

State Transport Authority

The setting of rail charges in Victoria has long been contentious. In 1979 a London consulting group, Transmark, was appointed by the Minister of Transport to examine the costs of transporting wheat by rail in comparison with the charges set. Transmark (1980, 1981) found that the Rail Board did not recoup all costs incurred in transporting grain, and recommended that freight rates be increased to at least cover the avoidable costs of the task. The Rail Board had already begun to move in this direction with a 15 per cent increase in freight rates for 1978-79, which was followed in the subsequent three years with further increases of 14-18 per cent. The 1983 Transport Act has intensified the move toward full cost recovery.

Until 1983, the Rail Board set the rail charges without formal negotiations with the grains industry. However, following the 1983 overhaul of the transport legislation, the Minister of Transport initiated formal negotiation procedures. The negotiations involved the Victorian Farmers and Graziers Association, the Australian Wheat Board, the Australian Barley Board, the Victorian Oat Pool, the Grain Elevators Board, the Ministry of Transport and V/Line.

There has been considerable discussion in recent years on the need for some form of contract between the railways and the grains industry. This dates back to one of the main recommendations of the Victorian transport study (Lonie 1980), which was for long term contractual arrangements 'designed to ensure that freight rates ... will be on fully commercial terms covering total absorption of costs involved'. In June 1984, the abovementioned freight negotiators discussed the idea of a multiyear rail freight agreement to coincide with the

Wheat Marketing Act. However, no such agreement could be reached, possibly because V/Line had little to gain; its market share was already such that an agreement was not likely to increase it. Consequently, rates were negotiated for that year only.

In 1985 there was a renewed attempt to achieve an agreement. The proposal was that such an agreement would involve penalties for the grains industry if V/Line did not receive an agreed percentage of the Victorian crop, and for V/Line if it failed to move the grain. The renewed interest by V/Line suggests that it sees the contract as a way of protecting its existing market share, which is likely to come under challenge in coming years. V/Line appears to be interested in abandoning its uneconomic branch lines and using its multimodal charter to cart grain by truck from some of the fill-and-close silos (partially manned silos which are no longer available when filled once — see following section). This will increase pressure from independent truck operators to remove the 60 km restriction on commercial road transport.

A proposal to discount prices at central receival points was put forward by V/Line during the 1983 freight rate negotiations. However, it was rejected by the Victorian Farmers and Graziers Association because, in its view, the benefits of central receival points should be distributed to all growers. (A central receival point is defined as a high capacity, strategically located site, served by block trains which move the grain directly to port — see below.) In 1986-87 the basis of freight rates was changed from rail distance to radial distance from Geelong or Portland.

D.4 Co-ordination arrangements

Until 1983, the only provision for formal co-ordination of planning and investment activities was the existence of interlocking boards. There was one member of the Grain Elevators Board who was also a member of the Victorian Railways Board. The restructuring of ministerial responsibilities in 1983, with the Grain

Elevators Board responsible to the Minister of Transport, was in part an attempt to improve such co-ordination.

Perhaps the most significant boost to the co-ordination of investment activities has been the introduction of central receival points. Following the study for the Victorian Farmers and Graziers' Association (Read and Watson 1982), V/Line and the Grain Elevators Board introduced a trial central receival point system in the Western District for the 1982-83 and 1983-84 harvests. Once any local silo was full it was closed, and growers were required to haul their later deliveries to central receival points.

In early 1983, CANAC Consultants Ltd was appointed to advise on the most cost effective method of moving the Victorian grain harvest from farm to ship's hold and domestic users. Included in the terms of reference was a request for an evaluation of the central receival point trial. If it was judged successful, CANAC Consultants was to estimate the total cost effects of introducing the system in the remainder of the state. CANAC Consultants (1984)

recommended that central receival points be extended over five years to 29 sites and then progressively to cover the whole of the state.

In 1985, a Grain Handling Review Group was formed to advise the Minister of Transport on which recommendations of CANAC Consultants should be implemented, and when. The Grain Handling Review Group (1985) recommended adoption of the block train and central receival point approach to grain handling and transport, and, after a review of customer requirements and existing storage distribution, advocated a network of some 50 central receival points. It mentioned that 21 sites had already been equipped for operation as central receival points and that a further 29 sites were being developed for this purpose. The group also supported the CANAC Consultants (1984) recommendation to close 594 km of light branch lines which were found to be unviable. Subsequently, in December 1986, the minister announced the intention to close these lines.

Appendix E Institutional arrangements in South Australia

E.1 Background

The storage and handling of wheat in South Australia is undertaken by South Australian Co-operative Bulk Handling Limited. This is a grower owned co-operative and is the sole grain handling company in the state.

The storage and handling system consists of 110 country silos and seven port terminals. About half the total storage capacity is at the port terminals. This is high relative to the other states, reflecting the state's geography, with the grain growing areas close to a long coastline. In 1985, total storage capacity was nearly 4.8 Mt (wheat equivalent) including 2.4 Mt of country storage, 1.9 Mt of permanent storage at the ports and 0.5 Mt of bunker storage at the ports. This storage capacity is required not only for wheat but also for barley, which in South Australia (unlike the other states) sometimes accounts for a larger share of storage than wheat.

Wheat is produced in two distinct regions separated by the Spencer Gulf. The western region, on Eyre Peninsula, is served by two export terminals: Thevenard and Port Lincoln. Port Lincoln is the state's only deep water terminal and is used as a 'top-up' port for large vessels partly filled elsewhere. The eastern region is served by five export terminals: Port Pirie, Wallaroo, Port Giles, Ardrossan and Port Adelaide. There are road receival facilities at all ports, and rail facilities at all ports except Port Giles and Ardrossan.

Inland transport of wheat is primarily the responsibility of the Australian National Railways Commission, which has been the rail carrier of wheat in South Australia since 1975. South Australia is the only state in which grain is transported by a Commonwealth rather than a state corporation. The western region is served by a narrow gauge railway, while in the eastern region there are three rail systems:

narrow and standard gauge in areas north of Adelaide, and broad gauge around Adelaide and to the east and south-east of the city.

There are no prohibitions on the transport of grain by road, and about one-third of all grain is delivered by road by growers to the rail based terminals. In addition some wheat is transported to the two non-rail export terminals by road.

E.2 Legislative arrangements

The legislation governing the operations of South Australian Co-operative Bulk Handling Limited is contained in the state's Bulk Handling of Grains Act (South Australian Government 1977) and Wheat Marketing Act (South Australian Government 1984).

Being a Commonwealth instrumentality, Australian National Railways operates under the Australian National Railways Commission Act (Commonwealth of Australia 1983).

South Australian Co-operative Bulk Handling Limited

Under section 5 of the Bulk Handling of Grains Act, the co-operative's board comprises eight elected grower directors, five elected on a zone basis and three from the whole state.

Economic powers

Under sections 8 and 11 of the state Wheat Marketing Act, South Australian Co-operative Bulk Handling Limited is the sole authorised South Australian receiver of wheat for the Australian Wheat Board. The Bulk Handling of Grains Act goes further: under section 12(1), the co-operative has the exclusive franchise (subject to minor exceptions) to receive, store, handle and contract for the

transport and delivery of bulk grains in the state. The exceptions are millers and maltsters, who may store grain for their own use.

Non-commercial objectives

South Australian Co-operative Bulk Handling Limited is subject to direction from the Minister of Agriculture under two specific sections of the Bulk Handling of Grains Act. Section 18 directs that:

'Whenever, in the opinion of the Minister, any bulk handling facilities provided by the company are inadequate for the needs of the district which they serve, or are defective, or ought to be enlarged so as to meet the requirements of a larger district, the Minister may, by notice in writing, direct the company to make such alterations or additions to those facilities as the Minister deems necessary, and the company shall obey such direction.'

In addition, under section 34(3) the minister may recommend regulations to protect any class of people. These sections appear to give the minister power to impose non-commercial objectives on the co-operative. In practice, however, such power has not been exercised.

The directors, all of whom are elected by members of the company (that is, grain growers), may require the company to follow non-commercial objectives.

Accountability

Management is accountable to the board of directors, which is in turn accountable to its grower constituency. The only reference in the Bulk Handling of Grains Act to directoral or managerial accountability to government is contained in section 14(3), which requires either general or special ministerial approval for the design and materials of a country or terminal bin. Successive ministers have in fact given general, not special, approval, with the effect that in this as well as other respects they have refrained from interfering with South Australian Co-operative Bulk Handling Limited, trusting the grower elected board to ensure that the company is operating effectively and efficiently.

Australian National Railways Commission

Under the Australian National Railways Commission Act, the commission consists of seven members, all appointed by the Governor-General of Australia. One of the members, other than the chairman, may be the general manager.

Economic powers

Unlike the rail authorities in some other states, Australian National Railways is not protected by legislation from competition by road carriers. However, Australian National Railways itself is not excluded from carrying or arranging the carriage of grain by road, either interstate or intrastate.

Non-commercial objectives

According to section 19(2) of the 1983 act: 'Where the [Commonwealth Transport] Minister is satisfied that it is desirable in the public interest to do so, he may ... give directions to the Commission with respect to the performance of its functions or duties or the exercise of its powers.' However, where such directions are given the minister must present the particulars and the reasons to parliament within seven days.

Moreover, according to section 20(1): 'Where the Commission satisfies the Minister that it has ... suffered financial detriment as a result of complying with a direction ... the Commission is entitled to be reimbursed by the Commonwealth the amount that the Minister determines ... to be the amount of the financial detriment'

In addition the minister may, on the recommendation of the commission, authorise the commission to close any railway it operates (section 68). Presumably, however, if the minister declines to authorise a recommended line closure the commission would be entitled to reimbursement under section 20(1).

Accountability

Under section 21 of the act, the principles developed by the commission for determining charges are subject to

approval by the minister. The commission may set charges only in accordance with these approved principles.

Under section 22, the commission must report to the minister at least once a year on its 'objectives, strategies and policies'.

Under sections 55 and 56, the commission is accountable for its financial performance relative to a specified financial target. Before the start of the financial year, the commission must propose a financial target, which is subject to approval and perhaps alteration by the minister. If there is a financial shortfall the commission is required to propose specific measures to meet it; such measures may not include the appropriation of money by parliament.

E.3 Commercial arrangements

There are two commercial arrangements of significance between South Australian Co-operative Bulk Handling Limited and the wheat growers of South Australia: the national Grain Storage and Handling Agreement (discussed in appendix A) and the system of grower tolls. In South Australia, unlike New South Wales and Victoria, there is a written agreement on the rail transport of grain.

Co-operative Bulk Handling Limited

The toll system, introduced in 1955 to provide the necessary capital for silo construction, is a revolving finance plan. Annual tolls are levied on growers on a tonnage basis. After a certain number of years of membership, members are repaid their contributions over a number of years, but without interest. There are separate tolls for wheat and barley. For wheat, the tolls have been 73.5c/t since 1973, and in 1978 the repayment period was reduced to four years. In the past, the toll system has provided the company with interest-free funds for the construction program. At present, however, toll income is roughly offset by repayments, and capital funding is now derived from handling and storage charges.

Australian National Railway Commission

The first rail transport agreement (for 1982-83 to 1984-85) between Australian National Railways and its clients in the grains industry was reached in 1982. The grains industry was represented by the United Farmers and Stockowners of South Australia Incorporated, South Australian Co-operative Bulk Handling Limited, the Australian Wheat Board and the Australian Barley Board.

This agreement had the following main features.

- Grain freight rates were to be based on road distances rather than rail distances, except for movements between terminal ports. The road distances were to be calculated using the most practical and direct main road system.
- The freight rates were established initially for 1982-83, with an escalation formula for 1983-84 and 1984-85. This formula allowed for increases in line with average Australia-wide cost increases for labour, materials and fuel. It also included a factor to allow for increased labour productivity. The escalation formula was contingent on specified increases in receipts to rail served silos.
- Surcharges were to be applied on wheat moved by road out of rail based silos (other than for stock feed). The surcharge was \$2.18/t, except for wheat for local consumption, in which case the surcharge was only 41c/t.

For 1984-85, the agreement was renegotiated because the volume increase required in the 1983-84 season for the escalation clause to apply was not attained.

In 1985 a new three-year freight rate agreement was negotiated, employing the same three concepts as before, though with some important additions. The schedule of freight rates is still generally based on road distances (the rates for 1985-86 being 7 per cent above the 1984-85 levels). However, the escalation clause no longer depends on volume increases. The surcharges are raised to \$2.50/t and 47c/t, respectively.

The additions to the earlier agreement are as follows.

- Australian National Railways is explicitly

given the right to organise road transport from rail based silos. The charge is the same as the rail charge, and any surplus thus generated is to be invested in upgrading rail operations for the grain industry.

- A rebate will be paid by Australian National Railways to growers on any grain delivered to inland rail based silos in excess of 80 per cent of a grower's total deliveries to South Australian Co-operative Bulk Handling Limited.

- Special rates are to apply at eleven inland silos, subject to the introduction of certain cost saving operations designed to increase the volumes of grain loaded on a regular basis and to enable rapid turnaround.

E.4 Co-ordination arrangements

Co-ordination between South Australian Co-operative Bulk Handling Limited and Australian National Railways is now on a formal basis, with regular meetings of a joint working party. This working party has recently agreed to an arrangement for extensive use of block trains.

There is some co-ordination between South Australian Co-operative Bulk Handling Limited, Australian National Railways, and the Victorian Grain Elevators Board and State Transport Authority with respect to interstate movements of grain (see appendix G).

Appendix F Institutional arrangements in Western Australia

F.1 Background

The storage and handling of wheat produced in Western Australia is undertaken by Co-operative Bulk Handling Limited. Like South Australian Co-operative Bulk Handling Limited, this is a grower owned co-operative and is the sole grain handling company in the state.

At the end of 1984, the co-operative had 193 country storage facilities with a total permanent capacity of around 5.4 Mt (wheat equivalent). The storage operated by the co-operative at the five ports (Kwinana, Geraldton, Albany, Esperance and Bunbury) was then 2.2 Mt. There are rail receival facilities at all ports, and road receival facilities at all except Kwinana (though there are road receival facilities at Fremantle, a receival and storage depot used in conjunction with Kwinana).

Both road and rail are used for transporting wheat from primary receival points to ports or domestic customers. Rail transport is by far the more important: around two-thirds of the grain received by Co-operative Bulk Handling Limited in 1983-84 was transported by rail. The Western Australian Government Railways Commission (Westrail) is the agency responsible for transporting wheat by rail in Western Australia. Like the other state railways, it generates large deficits. Westrail does not have a multimodal charter, though it may use road transport to carry goods to or from a railway and to haul goods where there are no alternative private road hauliers providing a similar service.

The rail system consists of both narrow and standard gauge tracks. Most of the country receival points with rail sidings are serviced by narrow gauge, while Kwinana (which is the largest grain terminal in Australia) is serviced by both standard and narrow gauge tracks. Thus some grain from country silos destined for Kwinana

has to be delivered by narrow gauge trains to transfer depots, to be loaded on to standard gauge wagons for delivery to the port. As Westrail improves rolling stock, more grain will bypass these transfer depots, reducing some of the double-handling costs incurred in this process.

About two-thirds of the grain is produced in what is called the rail designated region. In this region, most though not all receival points are rail based, and the remainder are outloaded by road to the nearest rail based receival points which in turn are outloaded by rail. In the region which is not rail designated, receival points are outloaded by road to port using commercial road hauliers. This region comprises areas north and north-east of Geraldton, east and north-east of Albany, and east of the existing narrow gauge system to Esperance. The commercial road hauliers operate under multiyear contracts arranged by the Department of Transport by competitive tendering.

F.2 Legislative arrangements

The legislative arrangements affecting wheat storage, handling and transport in Western Australia are outlined below.

Co-operative Bulk Handling Limited

Co-operative Bulk Handling Limited is registered under the Companies (Co-operatives) Act (Western Australian Government 1984b). Under this act the co-operative was required to adopt and comply with a memorandum and articles of association rather than being subject only to special legislation as are most bulk handling authorities. The articles and memorandum may be amended only by majority vote at a general meeting of

shareholders and after approval by the Governor of Western Australia. They complement the Bulk Handling Act (Western Australian Government 1984a) in controlling the operations of the co-operative. Under section 84 of the articles of association there are ten directors, each representing shareholders in a different zone. The directors must be shareholders and must have their principal wheat growing interests within the zones they represent.

Economic powers

Under sections 8 and 11 of the state's Wheat Marketing Act (Western Australian Government 1984d), Co-operative Bulk Handling Limited is the sole authorised receiver of wheat for the Australian Wheat Board; it is not able to trade or market any type of grain. The Bulk Handling Act extends the co-operative's monopoly power to barley. Co-operative Bulk Handling Limited may receive, handle, transport and deliver in bulk all grains and oilseeds, other than oats, as approved by the Minister for Agriculture. Its present exclusive rights to handle and store these other grains and oilseeds derive not from legislation but from an agreement with the Grain Pool of Western Australia, which is the sole marketer of all grains and oilseeds, except wheat and oats, grown in Western Australia.

Non-commercial objectives

Co-operative Bulk Handling Limited is subject to direction by the Minister for Agriculture under two specific sections of the Bulk Handling Act. Section 21 allows the minister to direct the co-operative to install a bulk bin at any location over 40 km from an existing bin, where the minister expects the average annual receipt of grain to exceed 5.5 kt for at least five years. Under section 23 the minister may require the co-operative to make alterations or additions to a bin or associated equipment if the minister considers the present equipment inadequate. Both sections appear to give the minister power to impose non-commercial objectives. To date, however, this power has rarely been used.

The co-operative may be required to follow non-commercial objectives by resolution of a majority of shareholders.

Accountability

Management is accountable to the board of directors, who in turn are accountable to their grower constituencies.

Westrail and non-rail transport

The inland transport of wheat is affected by two acts: the West Australian Government Railways Act (Western Australian Government 1982) and the State Transport Act (Western Australian Government 1985). These acts cover both road and rail transport of wheat. Some discussion of legislative control over road transport of wheat is necessary, because many of Co-operative Bulk Handling Limited's receipt points are not serviced by rail. The Department of Transport issues contracts to private road hauliers for the transport of grain from those receipt points designated as 'non-rail-served'.

Economic powers

The West Australian Government Railways Act gives the state rail authority, trading as Westrail, responsibility for managing, operating and maintaining all government railways, subject to the provisions of the act. The act does not prohibit the establishment of private railway firms, although such firms operate only in mining areas. Under provisions of the State Transport Act, Westrail has been assigned sole rights to transport grain from rail served receipt points.

Section 36 of the act requires road hauliers to apply to the Department of Transport for licences for the inland transport of goods. This provision was initially introduced in 1933 under the *State Transport Co-ordination Act 1933*. Its purpose was to overcome the problems then being experienced by road hauliers as a result of competition, poor roads and inadequate safety procedures. According to the Centre for Applied Business Research (1983) this provision has also been used to safeguard railway revenues in

the face of competition from road hauliers, by restricting entry of new road operators. This is possible because the Commissioner for Transport, in determining whether or not to grant a licence, must take into account 'the existing service for the carriage of goods upon the routes, or within the area, proposed to be served in relation to its present adequacy and possibilities for improvement to meet all reasonable public demands, and the effect upon the existing service of the service proposed to be provided'. This guideline has been used to regulate the transport of grain from both rail based and non-rail-based silos. Licences are not granted to road hauliers to transport grain from rail based silos, on the ground that a transport service already exists. With respect to non-rail-based silos, licences are granted only to those road hauliers who win the exclusive tenders for the various routes.

Westrail does not have a complete monopoly on the transport of wheat in areas with rail based receival points. Growers who wish to transport their wheat from the farm direct to port are exempted from obtaining a licence, provided that the growers do this themselves.

Non-commercial objectives

Under section 13 of the Railways Act, the general managers of Westrail are subject to the direction of the commissioner, who under section 6 of the same act is subject to the direction of the Minister for Transport. Therefore, Westrail may be required to pursue non-commercial objectives, and in fact has been. The Centre for Applied Business Research (1983) stated that Westrail 'was in part used [by successive governments] to fulfil an historically established role in implementing, in the interest of various social and economic policies, a wide variety of ad hoc and largely non-explicit subsidies'.

Ministers have used the broad power of direction in setting rail charges. For example, the charges remained static from 1966 to 1973 even though the cost index rose by 56 per cent over the same period (see South West Australian Transport Study Team 1977).

One area where the act specifically allows for government direction is that of line closure. Under section 75: 'If the Governor in Council is satisfied that it is no longer necessary to continue maintaining a railway ... to meet the convenience and requirements of the public ... the Governor in Council may authorise the Commissioner to cease maintaining that railway.' The criteria for closure ('the convenience and requirements of the public') appear to be sociopolitical rather than economic and hence likely to result in imposing non-commercial objectives (for example, in track maintenance).

Under section 37 of the Railways Act, Westrail is deemed to be a common carrier. However, this has very little effect as a source of non-commercial objectives, being countered by sections 26 and 22. Under section 26, Westrail 'may from time to time make special contracts with any person in relation to fares, charges, and conditions'. Under section 22, Westrail 'may from time to time fix special scales of charges to be paid in lieu of the ordinary charges upon special occasions, or for such times and in respect of such railways or parts of a railway as it thinks fit'. This freedom to vary charges appears to leave only the obligation that 'if Westrail carries a particular commodity between two places for one client, it must hold itself ready to do so for other clients' (South West Australian Transport Study Team 1977).

Accountability

There appear to be no specific provisions in the legislation for accountability on efficiency aspects. Management is generally accountable to the commissioner under section 14 of the Railways Act.

As an alternative to legislative accountability, Westrail management has proposed to increase internal incentives for efficiency. This suggestion is part of an initiative to move to a 'more commercial Westrail' free from government intervention. One basic incentive for managerial efficiency is the risk of government intervention if the initiative were seen to fail (see Western Australian Government Railways Commission 1984).

F.3 Commercial arrangements

The commercial arrangements in Western Australia are similar to those operating in South Australia.

Co-operative Bulk Handling Limited

As in South Australia, there are two commercial arrangements of significance between Co-operative Bulk Handling Limited and the state's wheat growers. The first is the national Grain Storage and Handling Agreement (discussed in appendix A) and the second is the system of grower tolls.

The tolls provide interest-free funds for capital expenditure. There are two separate tolls: a foundation toll, used to repay earlier contributions and to finance country storages, and a port equipment toll to finance capital expenditure at the seaboard terminals. In each season, tolls are set at a uniform rate per unit volume, so that on a tonnage basis they differ for each grain according to its density. The maximum toll that can be imposed is, however, specified under the Bulk Handling Act. For wheat, the maximum foundation toll in any season is equivalent to \$2.94/t, and the maximum port equipment toll is \$0.73/t. In 1984-85, the total toll payment for wheat was \$1.84/t. The tolls deducted from growers in each year are repaid over a ten-year cycle.

Westrail

Charges for transporting grain by rail are set in a written agreement between Westrail and the relevant grain industry bodies (Co-operative Bulk Handling Limited, the Australian Wheat Board, the Grain Pool of Western Australia, the Primary Industry Association and the Pastoralists and Graziers Association of Western Australia). The first such agreement came into force in 1981. A new agreement which covers the seasons to 1988-89 was signed in 1984 but was modified in late 1985 in an attempt to overcome certain difficulties, mentioned below.

The terms of this latest agreement are as follows.

- All grain delivered to scheduled receival points in the rail designated region is to be transported to port by Westrail. Where a scheduled receival point does not have rail siding facilities, the cost of transporting grain from there to the nearest rail siding is borne by Westrail. Westrail may also tender for transporting grain from receival points in a region which is not rail designated.
- Westrail agrees that by 1988-89 its freight charges for transporting grain will be competitive with road rates: that is, with the contract rates then offered by road hauliers in tenders for transporting grain from non-scheduled receival points.
- Provisions are made for the co-ordination of grain movements by Westrail and Co-operative Bulk Handling Limited. For instance, Co-operative Bulk Handling Limited is required to provide Westrail with estimates of the amounts of grain that Westrail is likely to be required to haul in each forthcoming season. Further, a review committee has been established, one of whose major duties is to monitor the performance of the transport task.
- Freight rates have been set for carrying grain in the rail designated region. For 1984-85, rates were set according to the radial distance of the receival point from the nearest port facility. For subsequent seasons (to 1988-89), the rates are to be adjusted using a formula containing factors which take into account: increases in general costs to the railway over the previous year; changes in the competitive road haulage rates; and the change in the proportion of the total grain received by Co-operative Bulk Handling Limited that is transported by rail. This last factor initially was designed to increase the proportion of total receivals moved by rail, by offering farmers discounts if the proportion increased. Because of difficulties experienced with this market share provision, it has been replaced. Beginning with the 1985-86 season, farmers who deliver more than 90 per cent of their total grain production to rail served receival points obtain a rate reduction of 25 per cent.

F.4 Co-ordination arrangements

According to some industry observers, there has been inadequate co-ordination between Westrail and Co-operative Bulk Handling Limited with regard to long term planning, investment and rationalisation decisions involving commercial externalities.

For this reason, in 1983 the Primary Industry Association established a Grains Industry Co-ordinating Committee 'to encourage discussion and consultation between grain industry sectors on matters of state importance relating to storage, handling, loading, shipping, marketing and production; and to examine alternative approaches to planning in these

areas with the objective of planning operation and capital expansion within the minimum total cost concept'. The committee included members from all organisations involved in distributing wheat within the state. However, it failed to reach agreement on the one significant issue with which it dealt (in essence, whether the Geraldton port should be upgraded by deepening or whether grain should be diverted thence to Kwinana), and has now been wound up.

In early 1986, in response to political pressure from the Primary Industry Association, the state government approved the establishment of a planning committee to examine problems of co-ordination between Westrail and Co-operative Bulk Handling Limited.

Appendix G Interstate movements of wheat

G.1 Background

Before federation, private companies and the various colonial governments developed independent rail systems in each of the present states (Short 1980), spreading into the interior from the ports. Victoria adopted a broad gauge, New South Wales the standard gauge and Queensland a narrow gauge. In South Australia all three gauges are used, with a broad gauge in the eastern region which adjoins Victoria's broad gauge rail network. As a result some state borders present boundaries to the rail transport of wheat; most wheat transport is by rail and is within the state of origin. Interstate road transport, however, is not restricted.

G.2 Legislative arrangements

One area where interstate rail transport of wheat is specifically covered under legislation (the *Border Railways Act 1922*) is southern New South Wales. This act permitted Victorian Railways to construct broad gauge lines to Balranald, Deniliquin and Oaklands in New South Wales. These lines are now operated by V/Line, and the Victorian Grain Elevators Board has silos at various points along these lines. The grain catchment area around these silos is treated as a part of the Victorian system.

Except for the requirement that interstate operators be licenced (*Interstate Road Transport Act 1985*), there are no regulations restricting interstate road transport. Some growers, particularly in border areas, have delivered their wheat into the adjacent state.

G.3 Commercial and co-ordination arrangements

The existence of different rail authorities in each state has resulted in rail charges

differing across state borders. In addition, the introduction of state accounting in the 1978 Remuneration Agreement has meant that, in general, handling and storage charges also differ between states. These differences provide an incentive for some growers in the eastern states to deliver interstate. However, bulk handling and rail authorities have tried to develop commercial arrangements to deal with this situation.

New South Wales and Victoria

When state pooling of handling charges was introduced in 1978, the largest difference in wheat charges was between New South Wales (\$12/t) and Victoria (\$6.80/t). This difference created the potential for a large movement of grain interstate, especially from southern New South Wales where there was also a freight advantage to Victoria. It also created a basis for political action by growers in the same area to obtain special concessions from the New South Wales grain handling authority.

The Victorian Grain Elevators Board and the then New South Wales Grain Elevators Board (now the Grain Handling Authority), following representations from New South Wales growers and after consultation with the Australian Wheat Board, negotiated a commercial agreement to move grain from southern New South Wales to Victoria from 1978-79 to 1981-82. Those New South Wales silos which the Australian Wheat Board determined had at least a 50c/t freight advantage to Geelong were incorporated in a 'buffer zone'. The main points of this agreement were as follows.

- The buffer zone silos were operated by the New South Wales Grain Elevators Board on behalf of the Victorian Grain Elevators Board. The handling charge at these sites was set between the Victorian and New South Wales charges, and 75 per

cent of this charge was reimbursed to the New South Wales Grain Elevators Board as owner and operator of the silos. For example, in 1979-80 the wheat handling charges in Victoria and New South Wales were \$7/t and \$12/t, respectively. For wheat delivered in the buffer zone the Victorian Grain Elevators Board received \$9/t, of which it paid \$6.75/t to the New South Wales Grain Elevators Board.

- The Victorian Grain Elevators Board also agreed to reimburse the New South Wales Grain Elevators Board 50c/t for wheat received from areas of New South Wales outside the buffer zone and outside the area it already operated under the Border Railways Act.

- Where the Australian Wheat Board directed that wheat from areas in New South Wales outside the buffer zone be moved through Victorian ports, the New South Wales Grain Elevators Board agreed to reimburse the Victorian Grain Elevators Board \$2.50/t for its services.

This agreement was economically useful because it contributed to the transport of grain in the least cost direction. However, the New South Wales Grain Handling Authority decided not to renew the agreement for the 1982-83 season. This was in part due to a very poor crop, which resulted in underutilisation of its terminal facilities and consequently a desire to maximise shipments through these terminals. There was also pressure from the New South Wales State Rail Authority to end the agreement because it was losing revenue to grain hauliers in Victoria, and because maintenance of some branch lines in the buffer zone could not be justified in the absence of wheat traffic (Working Party 1983).

Since 1982-83, growers in the buffer zone (renamed 'adjustment area') have received special concessions on handling and rail freight charges to discourage them from delivering interstate. They have received a handling charge discount of \$2/t from the New South Wales Grain Handling Authority, and a concession from the New South Wales State Rail Authority which lowers freight rates to the same level as the freight charge to Geelong. The Grain Handling Authority

discount was temporarily removed for 1985-86 because of heavy wheat stocks in the area.

Stock levels in New South Wales have in fact been high since the record crop of 1983. For this reason, in January 1985 a commercial agreement was negotiated between the Australian Wheat Board and the Grain Handling Authority to move substantial quantities of New South Wales wheat through ports in other states. The Grain Handling Authority contributes \$6/t for the handling of up to 1 Mt of New South Wales wheat through ports outside New South Wales.

In the first year of the agreement approximately 300 kt of wheat was shipped through Geelong in Victoria.

Recently, the Grain Handling Authority has contracted the transport of grain delivered to its Tocumwal silo to V/Line. Growers pay the equivalent of the V/Line charge for this service.

South Australia and Victoria

According to the Working Party (1983) savings could be made by transporting grain to Port Adelaide from north-western Victoria and to Portland from south-eastern South Australia. The Working Party suggested that Victorian grain from west of Walpeup along the Ouyen-Paninya line is freight advantaged to Port Adelaide, while grain from south of Frances in South Australia is freight advantaged to Portland. The tonnages involved, though small relative to the total crop (about 80 kt in total), are significant. In addition, it was suggested that a co-ordinated road-rail service might be economically worthwhile from points along the Red Cliffs-Meringur line in Victoria to Port Adelaide via the Loxton rail terminal.

Soon after the Working Party report a verbal agreement was reached by representatives of the Australian Wheat Board, the Australian Barley Board, South Australian Co-operative Bulk Handling Limited, Australian National Railways, the Grain Elevators Board of Victoria and V/Line. The Australian Wheat Board and the Australian Barley Board agreed to direct grain west along the Ouyen-Paninya line into South Australia and east from the

Frances–Naracoorte–Millicent area into Victoria.

Australian National Railways and V/Line agreed that the interstate rail movements, which began in 1984, would be limited by a requirement for offsetting revenue. The revenue forgone by V/Line or Australian National Railways on grain going interstate must approximately equal that obtained on the grain coming from interstate. Since the revenue per tonne obtained by V/Line on grain moving east is about half that obtained by Australian National Railways on grain moving west (due both to the distances involved and the rates charged), the quantity of grain moving west is about half that moving east — 20 kt and 40 kt, respectively. The requirement for offsetting revenue has meant that only a fraction of the Victorian grain which could be freighted to Port Adelaide at a cost saving goes to that port.

Australian National Railways and V/Line have provided special reduced freight rates for grain movements to Portland. For example, in 1983-84 the freight discounts from Frances, Naracoorte and Millicent were \$1.48/t, \$3.07/t and \$5.73/t, respectively. Also the rate to Port Adelaide was equated to that to Geelong, which, because of the policy of 'plateau' freight rates along branch lines in western Victoria, was lower than for similar rail distances elsewhere in the state. Plateau pricing (introduced to combat the threat of interstate transport of grain by road) holds the rate per tonne constant beyond a certain point on a rail line. Until 1985-86, plateau freight rates applied on all the grain related branch lines close to South Australia, namely the Meringur, Panitya, Serviceton, Yanac and Carpolac lines.

In 1985-86, plateau freight rates were replaced by rates that decline with distance along these branch lines. This change was an escalation in V/Line's attempt to prevent grain from moving interstate. In 1986-87, V/Line changed to a radial pricing system, with radial bands centred on Portland and Geelong.

Since 1984-85, the Grain Elevators Board has offered additional incentives to growers not to deliver into the South Australian system; border stations now

offer a 50c/t rebate on the handling charge and an extended service.

New South Wales and Queensland

During the mid-1970s, the Australian Wheat Board directed some New South Wales wheat through the port of Brisbane because of an inability of the then Grain Elevators Board to handle some large crops. This practice ended in 1976-77, but was resumed in 1985-86 under the 1985 agreement between the Australian Wheat Board and the present New South Wales Grain Handling Authority. In the first year of this agreement about 100 kt was moved through the port of Brisbane.

In southern Queensland, the grain handling and transport industry recently embarked on a capital works program which should increase the potential for exporting New South Wales grain through Brisbane port. A high throughput grain handling facility is to be constructed at Goondiwindi in the Darling Downs near the New South Wales border, the rail line is to be upgraded to enable high tonnage unit trains to operate between Goondiwindi and Brisbane, and a new deepwater terminal facility has recently been constructed at Fisherman Island, Brisbane. The Grain Handling Authority and Bulk Grains Queensland have agreed to transport grain delivered to some northern New South Wales silos to Goondiwindi for further transport to Brisbane ports by Queensland Railways.

Appendix H International and interstate comparisons of charges and costs

One approach that has been used to investigate the internal efficiency of the Australian grain distribution system is to compare costs and charges (see, for example, Jeffery 1985b; Flugge 1985). In this appendix the relative charges for grain handling and transport are compared first between countries (Australia, Canada and the United States) and then between the five Australian grain producing states. As noted in chapter 4, differences in charges across regions may arise from a variety of causes and not only from differences in efficiency and these are examined in more detail in the next section.

H.1 Differences of circumstances

The structural, geographic, climatic and historical differences between countries and regions are discussed in turn.

Structural

Differences in the provision of grain handling, storage and transport services exist between the regions considered in this analysis. For instance, in Australia, most grain storage is undertaken by the bulk handling authorities, whereas in both the United States and Canada a significant part of total storage capacity is on the farm (Cramer and Heid 1983; Normile 1983). In fact, in the United States in 1978, storage capacity on farms exceeded that off farms by a ratio of 1.5 to 1 (Cramer and Heid 1983). The amount of off farm grain storage in Canada has decreased over the past decade (Canada Grains Council 1986), while in Australia it has increased substantially (Australian Wheat Board 1986).

The distribution system in Canada and the United States are designed principally for throughput, while the distribution system in Australia is designed for storage. Therefore, bulk handling authorities in

Australia are relatively more sensitive to factors affecting storage costs than are the elevator firms of Canada and the United States, which have less responsibility for storage.

A major difference in the types of service provided by grain storage and handling firms in each region is the number of grain types handled. This difference is particularly important across states in Australia. The bulk handling authorities in Western Australia, South Australia and Victoria handle fewer grain types than do the bulk handling authorities in New South Wales and Queensland.

Geographic and climatic

Geographic and climatic variations between the three countries and across the five states have resulted in differences in the technologies used for grain storage, handling and transport and therefore in the costs of producing a given level of output in each region. For example, there are major river networks near the wheat growing regions in the central plains and north-west areas of the United States that allow the transport of wheat to ports by barge. In 1977, 29 per cent of wheat delivered to ports in the United States was transported thus (Leath and Hill 1983). In contrast to rail, barge transport is characterised by low fixed costs, and hence barge rates are generally cheaper than rail for long distance transport to ports (Cramer and Heid 1983; Koo, Thompson and Larson 1984). This cheap mode of transport is not available in either Australia or Canada, where rail or road are the only options.

Another example of geographic variation is in the distances that grain has to be moved to an export outlet. In Canada the average distance that grain is transported by rail to terminal elevators is 1350 km (Jeffery 1985a). Similarly, most grain production in the United States is

1000 km or more from the major export ports (Koo, Thompson and Larson 1984). In Australia, in contrast, the average distance between country silos and port terminals is only about 360 km. There are also differences between states in this respect: from an average of 150 km in South Australia to an average of about 500 km in New South Wales.

Climatic variations between countries and states are also of considerable importance. For example, the cold winters of Canada provide a natural weapon against infestation by grain insects. Within Australia, climatic variations between states may affect handling, storage and transport costs. There are marked differences between states in the variation in annual production, in the required number of grain segregations and in the incidence of a peak load problem at harvest.

Historical

Differences in institutional arrangements between countries and between states may also cause variation in charges, quite apart from any effects on internal efficiency. It is true that variations in institutional arrangements may cause differences in internal efficiency. However, they may also have unavoidable effects on the costs and hence charges of a service. While much of the grain handling and transport task in Canada and the United States is performed by private operators, there are regulations on grain handling and transport in both countries, affecting the costs of the private firms and the rates they charge for grain handling and transport.

For example, for much of the study period chosen for international comparisons (the ten years to 1984-85), rail freight rates in Canada were fixed at 1927 levels under the Crows Nest Pass Rate Agreement (Normile 1983). This restriction was modified in 1984 because the fixed rate did not allow the railways to recover their costs in transporting grain. Rail firms are now allowed to charge rates that repay costs (government and farmers each meeting a proportion of these rates). Rates for interstate transport of grain by rail in the United States were also

regulated until 1980; since then, the Staggers Rail Act has allowed more flexibility in rate setting by restricting the powers of the Interstate Commerce Commission in setting and enforcing standard charges for interstate rail movements.

In all three countries there are uneconomic branch lines which have remained open as a result of government policy. However, abandonment of branch lines in the United States has increased recently as a result of changes to regulations (US Department of Agriculture 1985a), and this is likely to reduce the costs faced by US railways relative to those in Australia and Canada.

Differences in the institutional arrangements across Australian states are documented in appendixes A to G. For example, the costs faced by the bulk handling authorities in South Australia and Western Australia may be reduced because interest-free capital can be raised through grower tolls. As another example, rail charges may differ between states, partly because of differences in the degree of political intervention in the setting of charges.

Variations in input prices between countries or between states will also lead to differences in handling, storage and transport costs. For example, long term interest rates were generally lower in the United States than in Australia, over the ten years to 1984-85, although they increased more in the United States than in Australia over this period (OECD 1986).

In making interregional comparisons of charges it would be convenient to express all charges in terms of a single currency. However, movements in such figures partly reflect changes in macroeconomic conditions between countries (as these affect the exchange rates), and thus could not be taken as measuring real movements in the costs of the services.

In any case, costs and charges for grain distribution in different countries or states cannot be used directly as a measure of economic efficiency, because of the environmental differences referred to above. They may be used to raise efficiency questions, but not to answer them.

H.2 International price comparisons

The environmental differences between the three countries referred to above should be borne in mind when considering the comparisons in this section.

Marketing margins

The first international comparison of costs between Australia, Canada and the United States is of wheat marketing margins: that is, the difference in price from the farm to the point of export. The wheat marketing margins for 1975-76 to 1984-85 presented in table 5 are expressed in 1980-81 dollars in an attempt to remove the effects of differences in macroeconomic events on price movements.

Over this period, the margin increased by 7 per cent in Australia and decreased by 23 per cent in Canada and by 59 per cent in the United States. To enable comparisons to be made of levels as well as of changes, the relevant exchange rates are included in the table. In 1984-85 the Australian, Canadian and US marketing margins were, respectively, \$A26.81/t, \$A29.65/t and \$A23.51/t.

Handling and storage

Handling and storage charges are available only for Australia and Canada. In these countries, charges are set at the beginning of the season to cover expected costs. In the United States, in contrast, where grain distribution is by private firms, the charges vary throughout the year and between regions according to supply and demand, and it has not been possible to obtain useful measures of them. Over the ten-year period to 1984-85, the charges (expressed in 1980-81 dollars) for grain handling and storage increased by 11 per cent in Australia and decreased by 7 per cent in Canada (see table 6). However, by 1984-85 the Canadian charge of \$A15/t was still higher than the charge in Australia, \$A11/t.

Rail freight

It is difficult to obtain representative freight rates for the United States. For example, rail rates vary with distance travelled, shipment size, frequency of shipments, level of competition, and market characteristics at the origin and destination of the grain (Koo and Uhm

5 Wheat marketing margins and exchange rates for Australia, Canada and the United States ^a

| Season | Australia | Canada | United States ^b | Exchange rates | |
|-------------------|--------------------|--------|----------------------------|----------------|-----------|
| | \$A/t | \$C/t | \$US/t | Can\$/ \$A | US\$/ \$A |
| 1975-76 | 24.94 | 39.75 | 45.00 | 1.296 | 1.261 |
| 1976-77 | 26.61 | 31.94 | 35.58 | 1.165 | 1.153 |
| 1977-78 | 28.98 | 31.68 | 36.17 | 1.243 | 1.128 |
| 1978-79 | 26.96 | 33.79 | 36.51 | 1.325 | 1.137 |
| 1979-80 | 25.03 | 35.54 | 37.96 | 1.303 | 1.115 |
| 1980-81 | 23.66 | 36.74 | 31.70 | 1.374 | 1.161 |
| 1981-82 | 25.96 | 31.72 | 26.82 | 1.341 | 1.105 |
| 1982-83 | 23.55 | 28.70 | 24.33 | 1.159 | 0.938 |
| 1983-84 | 25.52 | 29.34 | 19.14 | 1.136 | 0.906 |
| 1984-85 | 26.81 ^c | 30.66 | 18.23 | 1.034 | 0.775 |
| Percentage change | +7 | -23 | -59 | | |

^a Marketing margins in each country are deflated by the consumer price index for that country (base year 1980-81). ^b Weighted average of the marketing margins for soft white wheat grown in the north-west regions and transported via Pacific ports, and hard red winter wheat grown in the central-southern plains region and exported via the Gulf ports. ^c Estimate from BAE (1986a).

Sources: International Wheat Council (1985); US Department of Agriculture (1985b); Australian Wheat Board (1986); Australian Bureau of Statistics (1986); Canada Grains Council (1986); OECD (1986).

1984). Nevertheless, the US rail freight index for the five-year period to 1984-85 provides aggregate data on changes in grain rail freight rates (US Department of Agriculture 1985a). Over this period, the rail rates increased (in constant dollar

terms) in all three countries (see table 6). The increases were 9 per cent in Australia, 3 per cent in Canada and 0.6 per cent in the United States. In 1984-85, the average rail rates in Australia and Canada were \$A12.70/t and \$A13.50/t, respectively.

6 Wheat handling and storage, and transport charges for Australia, Canada and the United States ^a

| Season | Australia | | Canada | | United States |
|--------------------------|----------------------|--------------|----------------------|--------------|---------------------------------|
| | Handling and storage | Rail freight | Handling and storage | Rail freight | Rail freight index ^b |
| | \$A/t | \$A/t | Can\$/t | Can\$/t | 1978 = 100 |
| 1975-76 | 9.92 | 15.41 | 16.68 | 16.05 | |
| 1976-77 | 12.21 | 14.57 | 14.99 | 14.47 | |
| 1977-78 | 15.25 | 13.92 | 14.54 | 13.26 | |
| 1978-79 | 12.72 | 13.78 | 16.75 | 13.19 | |
| 1979-80 | 10.90 | 12.77 | 18.53 | 13.91 | |
| 1980-81 | 10.62 | 11.62 | 19.08 | 13.50 | 137.95 |
| 1981-82 | 11.53 | 13.41 | 17.03 | 12.71 | 142.85 |
| 1982-83 | 10.37 | 11.23 | 15.38 | 12.42 | 140.67 |
| 1983-84 | 11.19 | 13.39 | 15.20 | 12.78 | 139.29 |
| 1984-85 | 10.79 | 12.67 | 15.45 | 13.93 | 138.75 |
| Percentage change | | | | | |
| Ten years | + 11 | -18 | -7 | -13 | |
| Last five years | | + 8 | | + 3 | + 0.6 |

^a Charges in each country are deflated by the consumer price index for that country (base year 1980-81). ^b Deflated by the US consumer price index.

Sources: US Department of Agriculture (1985a); Australian Wheat Board (1986); Australian Bureau of Statistics (1986); Canada Grains Council (1986); OECD (1986).

7 Wheat handling and storage charges, by state ^a

| Season | Queensland | New South Wales ^b | Victoria ^b | South Australia | Western Australia |
|-------------------|------------|------------------------------|-----------------------|-----------------|-------------------|
| | \$/t | \$/t | \$/t | \$/t | \$/t |
| 1978-79 | 8.90 | 12.00 | 6.80 | 7.00 | 11.10 |
| 1979-80 | 10.50 | 12.00 | 7.00 | 7.00 | 11.90 |
| 1980-81 | 16.00 | 12.00 | 8.00 | 10.00 | 12.63 |
| 1981-82 | 16.00 | 14.40 | 10.35 | 11.35 | 11.67 |
| 1982-83 | 16.50 | 14.90 | 12.00 | 11.95 | 12.00 |
| 1983-84 | 21.00 | 16.50 | 12.95 | 12.43 | 12.43 |
| 1984-85 | 20.00 | 17.20 | 13.75 | 12.74 | 13.05 |
| 1985-86 | 19.00 | 17.49 | 13.80 | 12.99 | 13.55 |
| Percentage change | + 113 | + 46 | + 103 | + 86 | + 22 |

^a All figures include wharfage. ^b Figures for Victoria and New South Wales are for basic charges. Other charges were offered for special circumstances in several seasons.

Source: Australian Wheat Board (1986).

H.3 Interstate price comparisons

The environmental differences across states referred to in section H.1 should be kept in mind when considering the following comparisons.

Handling and storage

Because wheat handling and storage in Australia is, with minor exceptions, the province of the state bulk handling authorities, interstate comparison of handling and storage charges is virtually synonymous with comparison between these authorities. The comparison of wheat handling and storage charges across the states is for the years since the introduction of state accounting, that is from 1978-79 to 1985-86 (see table 7). Over this period, the charges increased most in Queensland, followed in turn by Victoria, South Australia, New South Wales and Western Australia. In 1985-86, the highest charge was levied in Queensland, followed by New South Wales, Victoria, Western Australia and South Australia.

A comparison of recent capital and operating costs across the bulk handling

authorities is presented in table 8.

Operating costs are presented as weighted averages for the five-year period to 1983-84, because these costs can vary considerably with grain receipts. The costs are expressed per cubic metre, using average deliveries over this period, because storage and handling costs are more closely related to volume than to weight, and

8 Capital and operating costs of bulk handling authorities

| State | Capital cost ^a | Operating cost ^b |
|-------------------|---------------------------|-----------------------------|
| | \$/m ³ | \$/m ³ |
| Queensland | 2.30 | 7.93 |
| New South Wales | 2.98 | 11.28 |
| Victoria | 2.37 | 6.81 |
| South Australia | 0.96 | 4.82 |
| Western Australia | 2.75 | 6.18 |

^a Costs in the 1983-84 season divided by the average of receipts in the five seasons to 1983-84 inclusive. ^b Operating costs in the seasons 1979-80 to 1983-84 expressed in 1983-84 dollars, summed and averaged by dividing by total receipts in that period.

Sources: Bulk Grains Queensland (1985); Co-operative Bulk Handling Ltd (1986); Grain Elevators Board of Victoria (1986); Grain Handling Authority of New South Wales (1986); South Australian Co-operative Bulk Handling Limited (1986).

9 Grain rail freight rates, by state and distance, 1984-85

| Distance | Queensland | New South Wales | Victoria | South Australia | Western Australia ^a |
|----------|------------|-----------------|----------|-----------------|--------------------------------|
| km | \$/t | \$/t | \$/t | \$/t | \$/t |
| 50 | 4.84 | 5.61 | 10.60 | 5.90 | na |
| 100 | 7.79 | 10.52 | 11.34 | 9.21 | 11.45 |
| 150 | 10.54 | 13.33 | 14.68 | 11.96 | 14.63 |
| 200 | 11.98 | 15.34 | 17.22 | 14.10 | 17.81 |
| 250 | 13.35 | 17.46 | 19.29 | 15.67 | 20.71 |
| 300 | 14.77 | 19.14 | 20.72 | 16.70 | 22.74 |
| 350 | 15.76 | 20.82 | 22.04 | 17.57 | 23.35 |
| 400 | 16.48 | 21.62 | 23.26 | 18.46 | na |
| 450 | 16.97 | 22.72 | 24.11 | 19.32 | na |
| 500 | 17.08 | 23.30 | 24.96 | 20.18 | na |
| 550 | 17.18 | 24.07 | 25.81 | 21.05 | na |
| 600 | 17.25 | 24.78 | 26.50 | 21.91 | na |

^a The figures for some distances are for the closest distance for which rates were available. Rail freight rates in this state vary not only with distance but also with the port of destination; those shown are for the port of Kwinana. Rates can also differ for the same distance and port but for different silos; where this occurred the highest freight rate was chosen. na Not available.

Sources: State and national rail authorities.

because the proportions of each grain type delivered differ between states.

Capital costs, which comprise capital debt costs plus depreciation costs, are highest in New South Wales, followed by Western Australia, Victoria, Queensland and South Australia. The figures for South Australia and Western Australia do not accurately reflect the true capital costs in these states, where much of the capital requirement of the bulk handling authorities is raised through grower tolls — an interest-free source of capital to the authorities and an opportunity cost to the growers. (Investment has been particularly large in Western Australia.) The capital costs in these states would be higher if the

bulk handling authorities had to raise all their capital requirements on the financial markets. The operating costs are highest in New South Wales, followed by Queensland, Victoria, Western Australia and South Australia.

Rail transport

Rail transport is provided by the state and national rail authorities. A comparison of rail freight charges in 1984-85 on a distance basis is presented in table 9. Over most of the distances for which comparison was possible, the highest rates occurred in Western Australia, followed in turn by Victoria, New South Wales, South Australia and Queensland.

Appendix I Economic effects of cost pooling

The potential economic losses caused by pooling the costs of storage, handling and transport of wheat across growers within a state are illustrated in figure C. This shows the relationship between export prices, storage, handling and transport costs and producer returns for wheat in a state with two wheat growing regions.

For simplicity it is assumed that there is a single storage and handling facility in each region and that these two facilities are equidistant from a single export terminal. Wheat delivered to each silo is transported to the export terminal by rail. In this state, a single firm is responsible for storing and handling wheat, while another single firm is responsible for transport. Wheat of the same quality is grown in both regions and is sold by a single marketing authority which is a price taker on the world market. Returns from wheat sales and the costs incurred in marketing, handling and transporting that wheat are pooled across all growers in the state. Such pooling is made possible by the lack of competitors, but it is assumed that this is the only consequence of the monopoly. Each firm charges average costs, with no monopoly profits and with no padding of costs.

The curves S_a and S_b represent the amounts of wheat that farmers in regions A and B, respectively, are willing to supply at any farm gate price for wheat. The curve S_s represents the supply curve for wheat for the state, and is the horizontal sum of S_a and S_b .

The curves D_a and D_b represent the amount of distribution services demanded by growers in each region, at each price for these services. The curve D_s represents the demand for these services on a state basis and is the horizontal sum of D_a and D_b . The demand for distribution services is derived from the amount of wheat a farmer is willing to supply, which in turn depends on the farm gate price for wheat. The farm gate price for wheat ($P_w - P_p$) is

the fob export price net of marketing costs (P_w) minus the cost of storage, handling and inland transport (P_p).

Therefore, the price for distribution services, being one of the determinants of the farm gate price for wheat, will influence the amount of wheat grown and hence the requirement for distribution services. However, the export price for wheat is independent of wheat output as Australia is a price taker on world wheat markets. An increase in the export price of wheat will lead to an outward shift of the demand schedule for wheat distribution services, while an increase in the price of wheat distribution services will lead to a decline in the amount of wheat grown and in the level of wheat distribution services demanded.

For a given expected export price, the farm gate price for wheat and the price for storage, handling and transport services are determined simultaneously. The bulk handling and rail authorities are assumed to recover their total costs, which means that the rates they charge are equal to the average cost of handling the expected wheat crop from both regions. Equilibrium occurs when the average cost of providing a particular level of wheat distribution services equals the price growers are prepared to pay for that level of service. In figure C, equilibrium occurs at service price P_p and quantity Q_{ps} . At that price, Q_{pa} of distribution services is provided in region A and Q_{pb} in region B.

It is assumed in this analysis that, in most seasons, the distribution firms can accurately predict the amount of wheat likely to be produced in the state and are therefore likely to calculate their charges accurately. In practice, however, the bulk handling and rail transport firms do not necessarily predict accurately the farm gate price for wheat or the amount of wheat produced in the state in a given season.

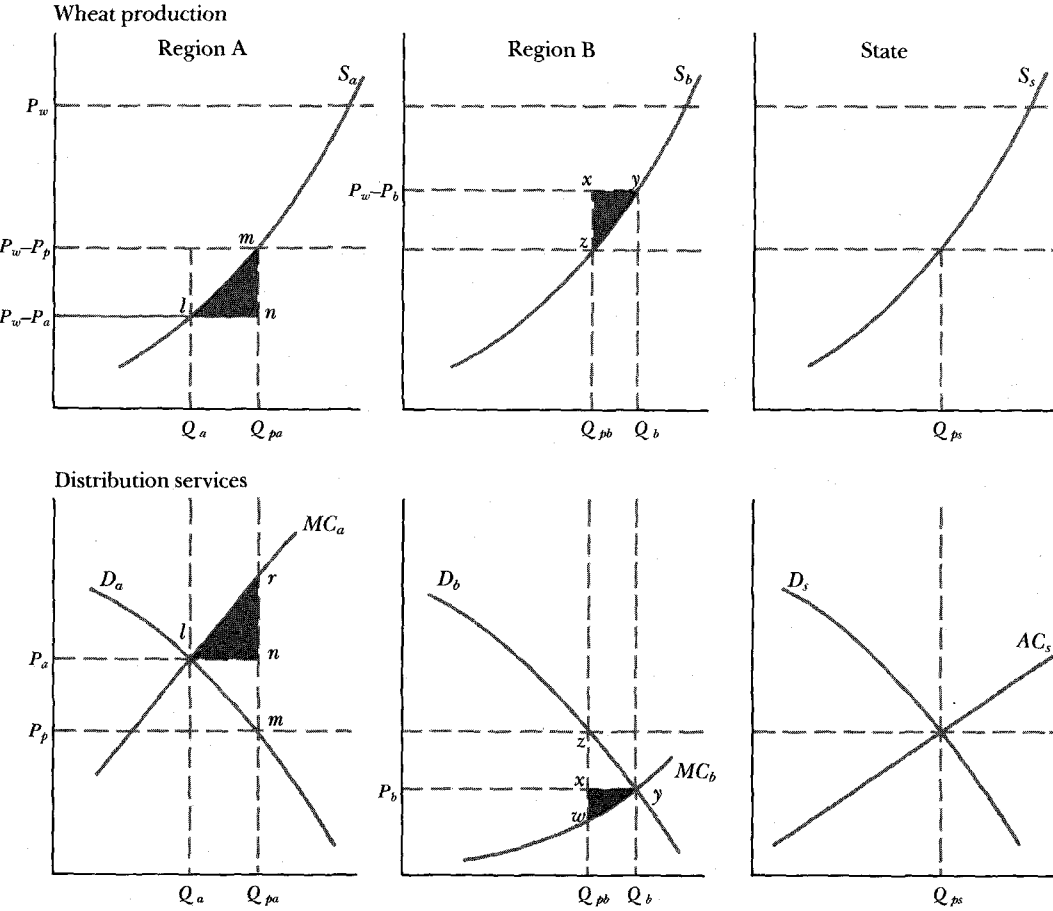
For efficient allocation of resources,

growers should be allowed to use the cheapest method of distribution, and the price charged for distribution should be the opportunity cost, including returns to management and capital. This occurs when the price charged for distributing a certain amount of wheat equals the marginal cost of distributing the wheat. The marginal costs incurred by the wheat distribution firms in regions A and B are represented by the curves MC_a and MC_b , respectively. If these costs represent the cheapest method of distribution, efficient allocation of resources would be achieved by charging P_a and P_b for distribution services in regions A and B, respectively. At these prices, Q_a and Q_b of wheat distribution services would be demanded

in regions A and B, respectively. Figure C depicts a situation in which the cost of wheat distribution services is higher in region A than in region B. With pooling of these costs, farmers in region B are partially subsidising the wheat distribution costs of farmers in region A. Given the assumption of full cost recovery by the grain handling and transport firms, the surplus revenue generated in region B (the area $P_{pz}xP_b$) is equal to the deficit in revenue generated in region A (the area $P_a mnP_p$). There are two forms of economic distortion, and hence welfare loss, created by cost pooling. First, there are the net welfare losses to society from the misallocation of resources on the farms;

C Economic loss from pooling rail costs

BAE chart



these are given by the shaded areas lmn and xyz in the top portion of figure C. The area lmn represents the expenditure loss to society that arises because the total cost of producing $Q_{pa}-Q_a$ of wheat in region A (the area $lmQ_{pa}Q_a$) is greater than the value to society of producing that extra amount of wheat in that region (the area $lnQ_{pa}Q_a$). The area xyz represents the opportunity cost to society from having resources in region B diverted from wheat production to less productive pursuits. In this region, the value to society of producing Q_b-Q_{pb} extra of wheat (the area xyQ_bQ_{pb}) would have been greater than the resource cost to society of producing that extra wheat (the area zyQ_bQ_{pb}).

The second source of welfare losses arises from the misallocation of resources devoted to wheat storage, handling and transport, and is illustrated in the bottom

portion of figure C. In region A, Q_{pa} of distribution services is provided under cost pooling. The optimal level of services would be Q_a , where the marginal cost of providing this level of service is equal to the average revenue obtained. The cost to society of providing $Q_{pa}-Q_a$ extra grain distribution services is given by the shaded area lmn . For region B, less resources are devoted to wheat distribution than is socially optimal, and the corresponding loss to society is given by the area xyw .

It would be difficult to estimate empirically the losses from cost pooling in each state of Australia. The information that would be needed to estimate these losses would include the supply response curves of farmers in each growing region and the marginal cost of providing varying levels of wheat storage, handling and transport services in each region.

Appendix J Economic losses from pooling rail charges and prohibiting road transport

There are several ways in which the combination of rail cost pooling and restriction of road transport can lower the efficiency of grain production, storage, transport and handling. As was pointed out in appendix I, cost pooling can cause losses both on and off the farm. Restriction of road transport can add to those losses.

The excess of total rail costs over road costs, in those areas where road transport would be cheaper, is a direct cost of restriction. In addition, the restriction of road transport can provide greater scope for rail cost pooling, and thus increase both the on and off farm costs of pooling. The estimates presented in section 4.2 are of the combined effects of rail cost pooling and restriction of road transport. There was not sufficient information available to allow separation of those costs directly attributable to each of the two factors and the costs which arise from the joint effects of pooling and regulation.

The logic underlying the estimates in section 4.2 is explained below, by reference to figures D, E and F. The cost and demand curves for transport in these figures have the same meaning as the 'Distribution service' curves of figure C in appendix I. The only change from figure C is the use of two off farm cost curves, one for road transport and one for rail.

Two assumptions have been made in this exposition. First, it is assumed that all the costs involved in transporting wheat by road and rail are taken into account. This would entail making some estimate of the externalities, such as noise pollution and congestion, associated with each mode of transport. In practice, inclusion of externalities in empirical estimations is fraught with difficulties (see section 4.2).

The second assumption is that the total costs incurred by the rail authorities are recovered in the freight rates: hence, surplus revenues from low cost regions exactly offset the deficits incurred in high

cost regions. It is possible to pool costs even if the firm is not required to recover its costs fully. The assumption of full cost recovery is employed in this analysis because it allows the allocative effects of cost pooling to be isolated from those of other institutional arrangements which may cause the rail authorities to operate at a loss.

J.1 The relationships

The relevant cost, in this exercise, is the cost incurred in transporting wheat from a silo in a wheat growing region either to a port terminal or to a domestic end user. The marginal costs of transporting wheat from a country silo to port or domestic end user by rail and road transport are represented by the curves MC_r and MC_t , respectively. The price charged for rail transport under cost pooling arrangements is given by P_p .

Each grain growing region within a state can be classified according to whether the charge for rail services is greater or less than the unit costs of rail transport from that region. To permit cost pooling, there must be regions where rail revenue is less than rail costs (subsidised regions) and regions where rail revenue is greater than rail costs (subsidising regions).

For a subsidised region (where MC_r is greater than P_p), there are three possible rank orders between road and rail costs and the pooled rail charge:

- (a) $P_{pa} < MC_{ra} < MC_{ta}$
- (b) $P_{pa} < MC_{ta} < MC_{ra}$
- (c) $MC_{ta} < P_{pa} < MC_{ra}$

Likewise there are three other possible rank orders for a subsidising region (where MC_r is less than P_p):

- (d) $MC_{tb} < MC_{rb} < P_{pb}$
- (e) $MC_{rb} < MC_{tb} < P_{pb}$
- (f) $MC_{rb} < P_{pb} < MC_{tb}$

The resulting nine possible rank order relationships — that is, combinations of

these situations — between subsidising and subsidised regions are given in table 10. Where rail transport is the cheapest transport alternative in the subsidising region (cases 4–9), the rail authority would still be able to pool costs if road restrictions were removed.

Where rail is the cheaper alternative in only the higher cost, subsidised region (case 1), a monopoly rail authority may charge a higher rate in that region than the marginal cost (up to the road rate) and a lower rate elsewhere: that is, it may practise price discrimination. Similarly, it may be possible to arrange cross subsidies between grain and other rail freight both within and between regions. For this analysis it was assumed that these cross subsidies do not occur, so that the effect of cost pooling and road restrictions can be isolated from those broader possibilities.

J.2 Losses from pooling and restricting road transport

The extent of losses from the combination of rail cost pooling and restricting road transport depends on the particular relationship between road costs, regional rail costs and the pooled rail charge. Whether removal of restrictions on road transport will eliminate some or all of those costs or will have no effect also depends on those cost relationships. No attempt is

made here to provide an exhaustive listing of the possibilities. However, two examples are illustrated in figures D and E.

The case illustrated in figure D is case 2 in table 10. Road is the cheaper mode of transport in both the subsidised region and the subsidising region. With no restriction on road transport the unit price of road transport services would be P_{ta} or P_{tb} and the level of use Q_{ta} or Q_{tb} . With road transport precluded and pooling of rail costs the equilibrium prices and quantities are given by P_{pa} , P_{pb} and Q_{pa} , Q_{pb} , respectively. The price and quantity levels, P_{ra} , P_{rb} and Q_{ra} , Q_{rb} , are those which would apply if road transport were precluded but there were no pooling of rail costs.

There are three types of costs. Losses on the farm are represented by the coloured areas. Losses from the use of inappropriate levels of transport, storage and handling services are represented by the black areas. These losses have the same interpretation as those outlined in appendix I. The final cost is the direct excess of transport cost arising from the use of the more expensive mode of transport: this is represented by the grey areas.

The top half of figure D indicates the costs which arise from the existing arrangements. In both regions there are costs arising directly from the use of the more expensive rail transport rather than

10 Cost relationships between subsidising and subsidised regions

| Case | Most efficient transport mode | | Cost relationships | | Potential for cost pooling when road transport allowed |
|------|-------------------------------|--------------------|------------------------------|------------------------------|--|
| | Subsidised region | Subsidising region | Subsidised region | Subsidising region | |
| 1 | Rail | Road | $P_{pa} < MC_{ra} < MC_{ta}$ | $MC_{tb} < MC_{rb} < P_{pb}$ | No |
| 2 | Road | Road | $P_{pa} < MC_{ta} < MC_{ra}$ | $MC_{tb} < MC_{rb} < P_{pb}$ | No |
| 3 | Road | Road | $MC_{ta} < P_{pa} < MC_{ra}$ | $MC_{tb} < MC_{rb} < P_{pb}$ | No |
| 4 | Rail | Rail | $P_{pa} < MC_{ra} < MC_{ta}$ | $MC_{rb} < MC_{tb} < P_{pb}$ | Yes |
| 5 | Road | Rail | $P_{pa} < MC_{ta} < MC_{ra}$ | $MC_{rb} < MC_{tb} < P_{pb}$ | Yes |
| 6 | Road | Rail | $MC_{ta} < P_{pa} < MC_{ra}$ | $MC_{rb} < MC_{tb} < P_{pb}$ | Yes |
| 7 | Rail | Rail | $P_{pa} < MC_{ra} < MC_{ta}$ | $MC_{rb} < P_{pb} < MC_{tb}$ | Yes |
| 8 | Road | Rail | $P_{pa} < MC_{ta} < MC_{ra}$ | $MC_{rb} < P_{pb} < MC_{tb}$ | Yes |
| 9 | Road | Rail | $MC_{ta} < P_{pa} < MC_{ra}$ | $MC_{rb} < P_{pb} < MC_{tb}$ | Yes |

road. As well, the pooling of costs means that there is overproduction in the subsidised region. On and off farm resources are therefore used only up to a certain point, where the marginal return to their use is less than their actual cost to the economy. The combination of pooling and regulation also results in less production in the subsidising region than would be efficient. There is a loss of opportunity for net returns on farms and in the road transport industry, represented by the two shaded areas between Q_{pb} and Q_{jb} .

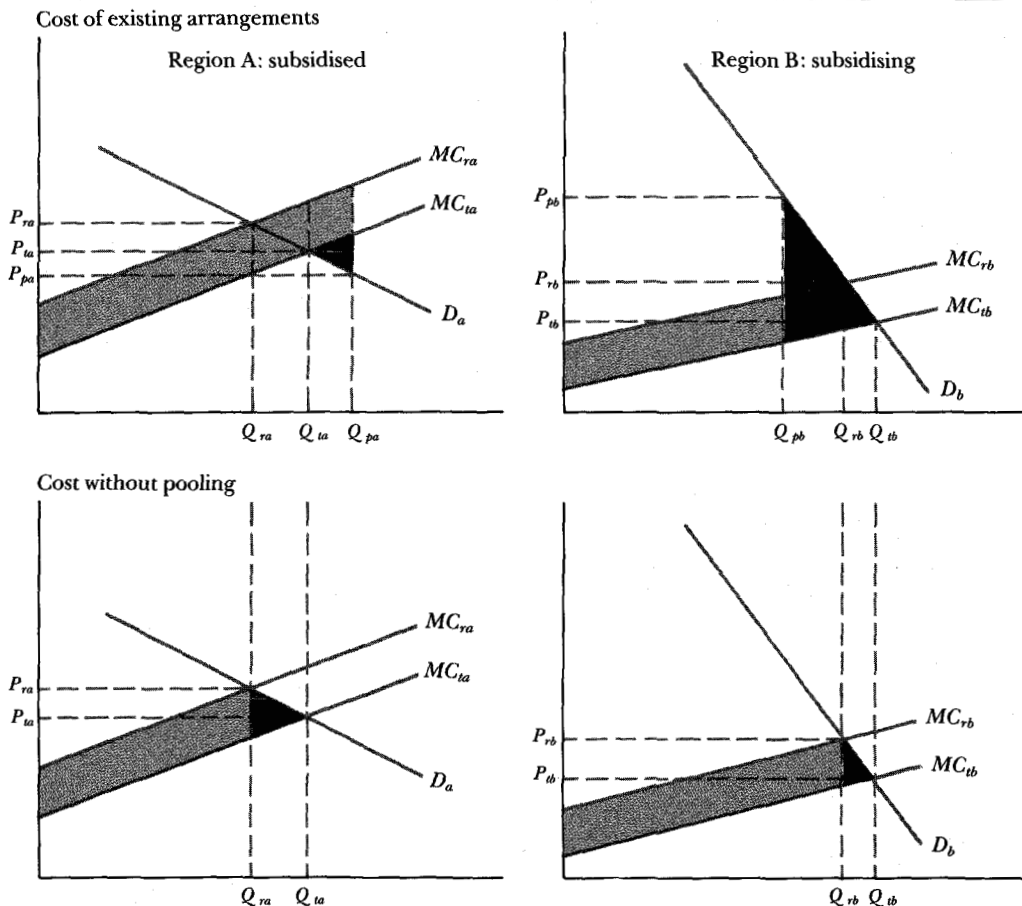
The bottom half of figure D indicates what would happen if pooling ceased but road regulation remained. Production would increase in the previously subsidising area, but by too little to be fully

efficient. Production would decrease in the previously subsidised region, but by too much to be fully efficient. In both regions there would be excessive transport costs and losses of opportunities for increased net returns on the farm and in road transport. In contrast (since road transport is the cheaper mode in both regions), removal of road regulation would allow elimination of all the costs illustrated in the top half of figure D.

In figure E, case 5 from table 10 is represented. In the subsidised region, the combined costs of road regulation and rail cost pooling are essentially the same as for the previous example. But since rail is the least cost mode in the subsidising region, the costs in that region are confined to the

D Economic losses from pooling rail costs, where road transport is cheaper in but precluded from both regions (case 2)

BAE chart



types of losses from pooling outlined in appendix I. In the subsidising region, cessation of pooling would eliminate the losses. From the bottom half of figure E it can be seen that the cessation of pooling would result in no transport sector losses.

But in the subsidised region, both cessation of pooling and removal of road restrictions would be necessary to eliminate losses. Removal of road restrictions alone would have no effect, since pooled rail charges are less than road rates.

J.3 Empirical estimation

In section 4.2, there was an attempt to measure part of the cost incurred in the

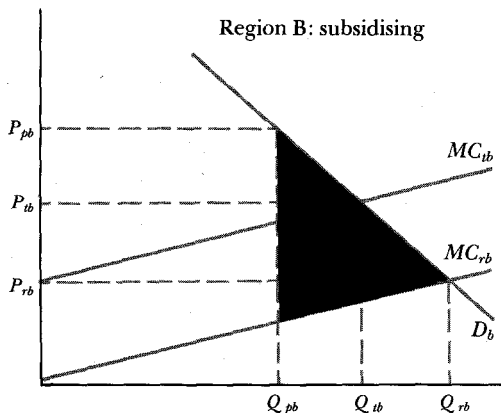
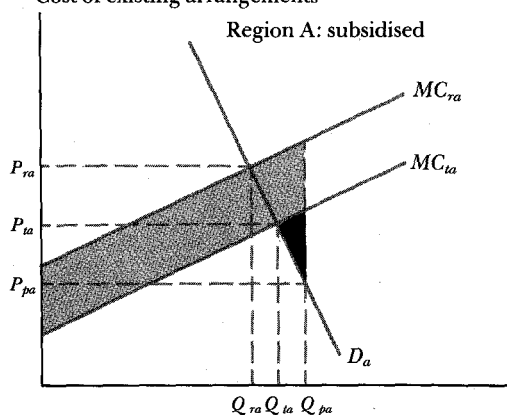
transport sector due to the prohibition of road transport of wheat and to cost pooling by the rail authority in Victoria. The losses were measured only in those wheat growing regions where the marginal cost of transporting wheat from a country silo to port was less by road than by rail. The three cases for which this is true are represented in figure F. The example depicted in the first diagram in figure F is the same as the subsidising region in figure D (subsidising cases 1–3 in table 10); that in the middle diagram to the subsidised region of cases 3, 6 and 9; and that in the last diagram to the subsidised region in D and E (subsidised cases 2, 5, 8).

The economic loss measured in section 4.2 is represented by the grey areas in

E Economic losses from pooling rail costs, where road transport is cheaper in region A only and precluded from both regions (case 5)

BAE chart

Cost of existing arrangements



Cost without pooling

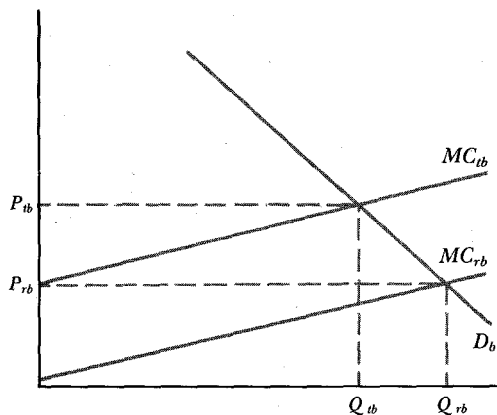
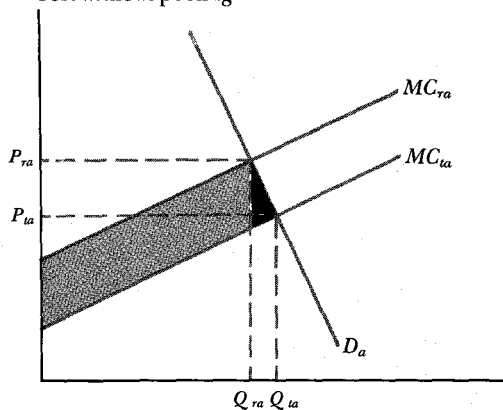


figure G. The amount of wheat delivered to a silo when the cost of transporting wheat from that silo is the pooled rail freight rate is Q_p . In section 4.2, Q_p is calculated by averaging wheat deliveries to each silo over a certain time period.

The area under MC_r from 0 to Q_p therefore represents the total cost incurred in transporting this amount of grain to port by rail. The area under MC_t from 0 to Q_p represents the total cost of transporting the same amount of grain by road. The difference between these costs is the economic loss incurred in the transport sector as a result of the road regulations and pooling of rail costs. The estimates in section 4.2 will equal this economic loss only if the marginal cost curves are

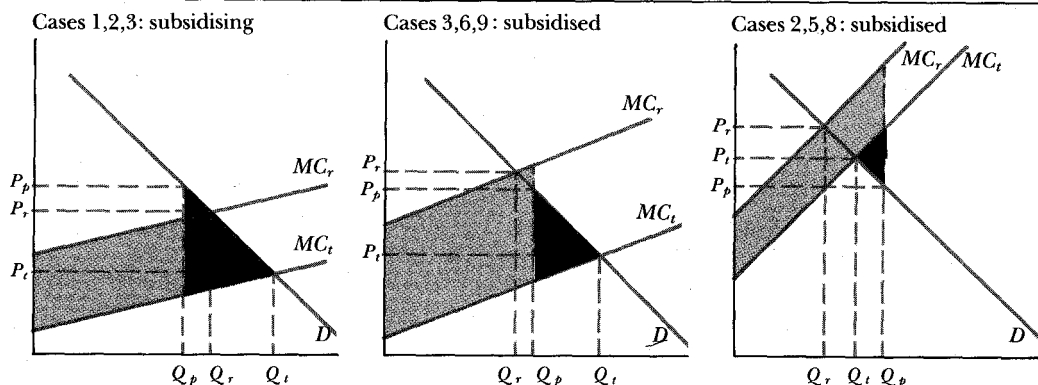
parallel. If MC_r is flatter than MC_t , the estimates in section 4.2 will underestimate this economic cost, and vice versa.

However, the estimates in section 4.2 do not capture all of the economic losses from the prohibition of road transport of wheat and the pooling of rail costs. The indirect on and off farm losses, represented in figures D, E and F by the coloured and black shaded areas, respectively, are not measured.

A further complication is that it was not possible to link subsidising and subsidised regions as was done above. Thus, for the example in figure E, only losses in the subsidised region would have been estimated. It should also be evident that the estimates in section 4.2 must be taken

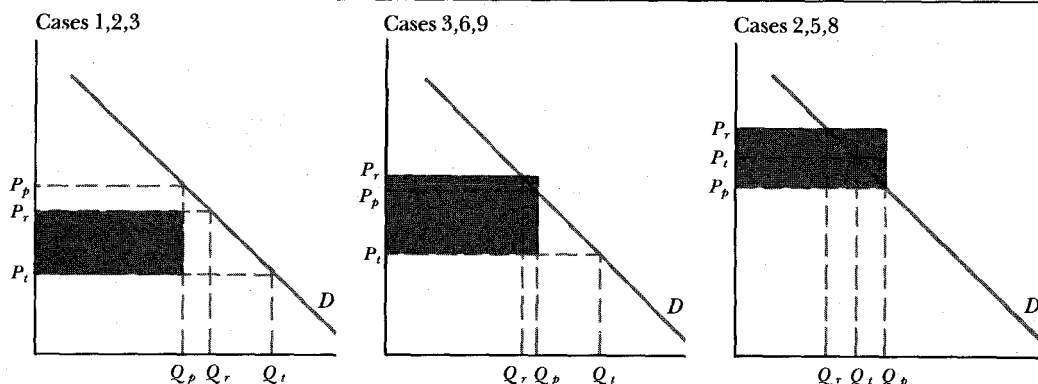
F Economic losses from pooling rail costs, where road transport is cheaper but precluded (cases 1,2,3,5,6,8,9)

BAE chart



G Economic losses measured empirically in this study

BAE chart



as an indication of what could happen if both road restriction and rail pooling were eliminated. In cases such as that illustrated in figure E, merely removing the road restriction would not result in any gains.

The total economic losses from cost pooling and road regulation could be measured only if both on and off farm costs were known. Even if data on the apparent marginal cost of rail transport were available, it would still have to be

determined whether these data accurately reflected the true marginal cost. (Some difference would be expected because of the cost padding characteristic of monopolies.) On the other hand, the estimates provided in section 4.2 do not take into account the cost to society of externalities (for example, noise pollution and increased accidents) that would arise from the unrestricted road transport of grain.

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