Principles of Grain Marketing:
Some Lessons from Australian Experience

A.S. Watson

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Foreword

This paper was originally prepared as a contribution to a project, funded by ACIAR (PN9228), on China's grain markets and their regional integration. The paper deserves an even wider audience.

One of the objectives of the ACIAR project was to comment on current policy issues in grain marketing reform in China. Australia's experience of the development of grain marketing arrangements was of great interest to the Chinese collaborators in the project.

They sought a review of the history of the development of grain marketing arrangements in Australia and a commentary on the issues that emerged.

They sought also a brief commentary on lessons which China might take from that experience.

Dr Watson, a freelance economist now based in Melbourne, Australia, was commissioned to prepare this paper for that purpose. Previously he held senior positions in the School of Agriculture and Forestry at the University of Melbourne and in the Australian Bureau of Agricultural and Resource Economics. His research interests have included grain marketing, wool marketing, irrigation policy and the interaction of domestic and international policies affecting the agricultural sector.

The paper stresses the importance of efficient mechanisms for price discovery in agricultural markets and the importance of transport in developing efficient domestic and international marketing systems. It shows how stabilisation objectives can be negated by macroeconomic developments or international events that affect an economy via its external accounts. The report also highlights aspects of storage, and examines with some care the role of futures markets.

Of particular interest to our Chinese colleagues was the analysis in the paper of the nature and functions of markets. They were also interested in the detail of:

- the history of the role of the Australian Wheat Board in the export market;
- functions of the Australian grain handling authorities; and
- the effects of the pricing formulas used before domestic market deregulation.

I would like to thank Dr Watson for his willingness to take on this task and for his contribution to the project, both through the preparation of this paper and through his commentary on some of the work to date.

I want also to acknowledge the support of ACIAR staff for this publication, including that of our project coordinator Dr Padma Lal and the editorial input and design of Arawang Information Bureau.

Christopher Findlay
Chinese Economy Research Unit
University of Adelaide
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Preamble

Production, consumption and domestic trade in grains are important to both China and Australia, but there are fundamental differences in their agricultural economies. Nowadays, only 3% of Australia's gross domestic product comes from the farm sector, about equally divided between crops and livestock products. National income is measured differently in China (Cheng 1993). Consequently, a more convenient way of distinguishing the agricultural systems of China and Australia is to compare the distribution of the population and work force.

Around 80% of the population of China is rural and only 20% live in urban areas. In Australia, those proportions are roughly reversed. Moreover, only about 5% of total employment is provided within the farm sector. Around 70% of employment in China is in farming, forestry, animal husbandry and fisheries. In China, almost 60% of the total value of agricultural output, which under the Chinese definition includes sidelines and village-run industrial enterprises, is from crops, about four times the value of output from animal husbandry. Around one third of the total Chinese working population is engaged in the production of crops. This is around twenty times the proportion in Australia.

International trade in grain is a significant factor in world commerce, with trade between Australia and China in wheat and other grains of considerable importance to both countries. The grains industries are so important in both countries that it is impossible to discuss grain marketing adequately, without introducing some general questions of agricultural and economic policy. A broad definition of grains is used in this paper to embrace cereals, oilseeds, pulses and grain legumes that can be used, usually with only limited further processing, either for direct human consumption or as feed grains in the production of livestock products.

The grain industries in Australia have several features that distinguish them from those of other countries. Crops are produced on large commercial farms under dryland conditions, with only a limited amount of irrigation in a few regions. Generally speaking, grain production in Australia is not a specialised activity. A number of grains will usually be grown in rotation. Moreover, grain production is also most often associated with livestock production, particularly sheep for wool production. Wheat is by far the most important grain product.

Compared with North America and Europe, feed grains are unimportant, for two climatic reasons:

- The major livestock industries of Australia are based on year-round grazing. Sheep and cattle do not have to be housed in winter. Grass-based meat production is cheap.
- The climate is unsuitable for large-scale production of maize (corn) and soybean, two major crops used in the intensive livestock industries and important in world trade in grains.

With increasing incomes and changes in consumer diets, usually increasing consumption of meat, feed grains have gradually become more significant in the agricultural systems of many countries. Though there has been a relative decline in the direct consumption of traditional staples like wheat and rice in developed and developing countries, grain production and other grain-based farming industries remain economically and politically important in many countries. Australia is no exception in this respect (Whitwell and Sydenham 1991).

Particular attention is given in this paper to major factors influencing the way policy and marketing arrangements might be organised in China and Australia to take advantage of opportunities presented by the world market. The major supply and demand factors operating in world markets for grain are reasonably well known. However, many of those factors have recently been subject to change. It is important to identify aspects of the economic and marketing environment which have changed in ways which challenge the rationale on which earlier grain marketing policies of China and Australia were based, and consider other changes that may occur in the future.

Agricultural marketing is a topic of interest for a number of reasons. In this paper, there is an underlying

concern with matters to do with economic coordination. The regional diversity of the grain industries of China and Australia is considerable with respect to both production and markets. This creates a profound need for the provision of economic information and transport resources to coordinate grain production in space and time.

The remainder of the paper is organised as follows.

The next section provides some background to the issues being discussed in subsequent sections. The first issue considered briefly is the role of government in marketing in both China and Australia. In the next sub-section of the paper, an important distinction is drawn between the disciplines of price analysis and marketing analysis which are applied throughout the paper to a variety of problems of the grain industry. A further distinction is then made between government action intended to 'assist' producers and that intended to 'regulate' agricultural markets. This section of the paper is concluded with some comments on the role of economic information—an important theme revisited at various points.

The third section of the paper discusses various approaches to agricultural marketing. Following from the significance of direct consumption of grain by producers in China and the rapid transition to a more cash-based and market-oriented agricultural economy, the emphasis is more on retail/wholesale aspects of marketing than would be considered appropriate for Australia, where interest in grain marketing generally ceases with sale of grain to domestic processors, or agents in importing countries. The distinction rests on who is considered to be the principal customer in each situation.

The fourth section of the paper outlines the history of marketing and pricing arrangements for the Australian grains industry, with emphasis on wheat. The grain marketing system is now subject to gradual deregulation, which is connected to general political and economic developments in Australia as well as recognition of the earlier problems of grain marketing.

The fifth section discusses marketing functions in the context of grain marketing in Australia and China.

The topics discussed are as follows:

- futures markets, as instruments of price discovery and risk management;
- buying and selling arrangements;
- grading;
- storage—public and private.

The penultimate section discusses some implications of the analysis for the situation of the grain industries in China. Some concluding comments follow.

Background

Intervention by Government

International trade in food and feed grains is characterised by substantial concentration amongst exporters and, to a lesser extent, amongst buying countries. The international grain trade is also characterised by a substantial amount of intervention by the governments of the key exporting and importing countries (Ryan 1994). Government policies are directed towards both the domestic and international aspects of grain production. The intervention results in economic policies that assist or hinder grain production, deliberately and accidentally. Generally speaking, positive assistance to agriculture is a feature of industrialised countries, where agriculture is declining. Many developing countries, including China, have frequently penalised agriculture and the grain sector.

At other times, intervention by government is directed towards the conduct of internal and external trade in grain. For example, Australia and Canada control grain exports through government agencies (statutory marketing authorities or 'boards'). Those authorities most often trade in grain on their own account, but may also sell grain to large multinational grain trading companies, rather than the final importer. Sales of Australian wheat made through trading companies are usually to known destinations, essentially involving provision of marketing services to established customers of the Australian Wheat Board (AWB) rather than sales to optional destinations determined by the grain traders.

The United States relies mainly on private companies to market grain, although U.S. trade is now often assisted by export subsidies with the United States Department of Agriculture (USDA) closely involved in marketing activities to subsidised destinations. Many countries, including China, use central buying agencies to control the volume and terms and conditions of purchase for grain imports. China also controls grain exports, with an export embargo imposed in 1994.

An important feature of the world grain trade is its instability. With many countries close to self-sufficiency, weather-induced fluctuations in output have substantial effects on world prices and trade flows. As has been strikingly evident in recent years, with widespread drought in eastern Australia, Australian production and exports are particularly vulnerable to climatic variability.

Around 20% of the 550 million or so tonnes of wheat produced annually enters world trade. Coupled with the small population of Australia, this explains why Australia, whose wheat production is actually modest on an international scale, is the fourth largest exporter after the United States, Canada and the European Union and is of some significance in the world wheat trade. Only around 4% of the around 500 million tonnes (paddy basis) of rice produced enters world trade. Rice is the 'thin' market, sine qua non. Australia produces only around one million tonnes of rice, about 80% of which is exported. The world rice market is important to the Australian rice industry, but not vice versa.

Intervention in the world grain market arises for a variety of reasons:

- in pursuit of national food security by importing countries;
- in response to instability of production and prices, domestically and internationally;
- reflecting the ideology of mercantilism which promotes exporting as an objective in its own right, irrespective of its cost;
- because of dissatisfaction with the costs of marketing and/or the economic behaviour of private marketing firms;
- as a planned or unplanned consequence of the domestic agricultural policies typical of rich countries, which were initially intended to offset the effects of economic growth and structural change in agriculture on their own farmers' incomes;
- as part of international aid programs associated with the relief of famines, or long-term food shortages in some countries;

- finally, representing both a cause and an effect of intervention, in the attempt by both exporting and importing countries to turn the terms-of-trade for grain in their favour.

The two main issues in the political economy of grain in Australia over many years have been:

- the roles of the public and private sector in the performance of marketing functions;
- the market power that can be achieved by statutory marketing boards.

Stated differently, the second issue concerns whether intervention increases prices received by producers. This has also been reflected in the controversy over the 'weak selling' that was (is?) believed would occur if a large number of traders handled exports of grain (Piggott 1992).

Chinese attitudes and concerns

Analogous policy problems obviously exist for China. The role of government in grain marketing needs to be established. The Chinese authorities have to decide which marketing arrangements would enable China to acquire imports of grain on the best possible terms. In the past, China was also a significant exporter of grain (rice and oilseeds). This situation could occur again in the future. Arguments about selling arrangements for grain are therefore relevant to Chinese policymakers, along with buying arrangements.

In the last fifteen years, China has moved away from a system of agricultural production and marketing based on communes, with rigid central planning and control, to a more decentralised and market-orientated system. China now has a mixed economy in its grain sector, with plan and market operating in production, marketing and consumption (Sicular 1988). Finding a balance between plan and market is a challenge to economic analysis, empirical observation and experience, not to mention political and administrative subtlety in implementation of policies.

Watson and Findlay (1993, p. 1) have pointed out that:

> ... reform of the grain marketing system has been among the slowest and most conservative of all the elements of the rural reform process, and grain has been among the last of the agricultural commodities to be fully liberalised. This wariness was most clearly demonstrated by the stalling of grain reform in the mid-1980s. It was not until the economic growth and structural changes of the 1980s had become consolidated that grain market reform began to move ahead again.
>
> In the event, the implementation of grain marketing reform came very quickly, once the initial steps were taken ...

Given the radical changes now taking place in the Chinese grain economy, a fundamental concern of policymakers is the distribution of the benefits of marketing reform.

The main feature of previous policies was their emphasis on self-sufficiency at the national, provincial, regional and even the commune level (Lardy 1983). By and large, the system taxed peasant producers for the benefit of urban consumers, impeding capital accumulation within agriculture and economic growth more generally. Nevertheless, the pursuit of self-sufficiency remains a powerful influence on Chinese policies at all levels of administration. Policymakers in all countries have the habit of focusing on market shares in trade, as if these market shares should be an objective of policy, rather than emphasising economic efficiency and distributional questions in production and marketing. Market shares are a useful descriptive or summary statistic of market developments but of no real significance to important questions of economic policy. Increasing market share can be inconsistent with economic welfare. Policies which maintain resources in declining industries or sectors, like subsidising exports, will increase market share, but decrease welfare. Conversely, large countries with market power would do better to restrict trade and lose market share.

In effect, Chinese policy had turned its back on the gains from regional specialisation in grain production based on the idea of comparative advantage. In a country as vast and diverse as China, this involved a substantial economic cost, even accepting that in the past there were valid political reasons for attempting to achieve national self-sufficiency in grain. At the same time, the rigid marketing system did not allow the evolution of methods of price discovery and development of marketing infrastructure that would make it possible to balance inevitable short-term surpluses and deficits of grain associated with climatic differences between regions. On the other hand, consistent with the idea of comparative advantage, Chinese policies have long sought to balance national surpluses and deficits in grain through international trade; exporting rice from the south, and supplying coastal and northern centres through imports of wheat.

The Australian situation

While on-farm production decisions in Australia have always been essentially determined by the individual decisions of farmers, grain marketing, which was previously subject to substantial government control, is now characterised by a gradual process of deregulation. Moreover, prices received by Australian farmers are more closely connected with market forces on both the domestic and international markets than was the case in the past. Previously, the Australian grain marketing system did not allow establishment of premiums and discounts around the average price that reflected differences in quality or time of sale. The storage, transport and handling system for the domestic and export markets was provided by grain handling authorities, usually owned and operated by State governments. In South Australia and Western Australia, grower co-operatives with special privileges under State legislation, operated the handling and storage system.

Changes to grain marketing in Australia in 1989 deregulated the domestic market for wheat and other grains. Export marketing is still under the control of statutory authorities. The previous system gave farmers no discretion in marketing. Farmers are now able to store grain on farms and make judgments about when, where and to whom production is sold on the domestic market. Some of the State handling authorities have been or are being privatised, usually in the hands of cooperatives or private companies where producers have a considerable share of ownership.

A fundamental characteristic of the system of agricultural production in Australia is that ownership of individual farms is based on freehold (and readily negotiable) title. This means that aggregation of holdings can occur in response to economic and technical developments in agriculture, as painful as the process can be in such an unstable production and marketing environment. Furthermore, rural–urban migration in Australia does not present the same problems in China because the number of farmers leaving the land at any time is small in relation to the urban population.

Drawing on Australian experience over the last 50 years, this essay concentrates on the principles of agricultural marketing as they affect trade in grain, with special reference to the implications for the reform of the Chinese grain marketing system. Although there are vast differences between the grain economies of China and Australia, notably with respect to the importance of direct consumption of grain by farm households in China and the role of external trade for Australia, there are some common questions with respect to marketing policy.

In particular, decisions have to be taken about how existing public marketing agencies will be managed. Australian experience suggests that even limited reform of grain marketing is difficult to achieve through negotiation because farmers and their organisations maintain a strong commitment to the status quo, even when the reasons for the introduction of earlier policies and creation of associated public agencies have disappeared (Cashin 1986; Martin 1990).

Policy makers in China and Australia are also concerned with the absolute levels and stability of domestic and international prices and how grain prices are affected by the trade policies of other countries. Consequently, it is convenient and sensible to consider factors affecting grain prices in Australia and China, alongside issues concerning marketing and marketing policy.

It is interesting to note that development of the multinational firm as a form of business organisation is, in part, an adaptation to the chronic difficulties of trade between nation states. Multinational firms perform an important function in world trade in grains (Morgan 1979). Their size and influence is related to their ability to transcend national political boundaries and the profound influence of economies of size in generation and processing of technical and economic information, which is at the core of commercial success in the complex and volatile grain trade (Caves 1977–78).

Understanding Agricultural Prices and Markets

It is helpful to distinguish between the sub-disciplines of price analysis and marketing analysis, both of which can be applied to studying the economic behaviour associated with agricultural commodities.

- Price analysis concerns the determination of absolute price levels, sometimes referred to as the 'flat' price, according to underlying supply and demand conditions for the commodity.
- Marketing analysis concerns determination of price differentials, around the absolute price of the commodity, that reflect differences in location, time, form and quality.

Grain which is harvested by farmers, often at one time of the year, has to be consumed by remote consumers on every day of the year. This simple-sounding process involves a great deal of economic activity, which has subtle implications for the economic system as a whole.

Within a competitive market, prices will be uniform after the costs of adding (or subtracting) place, time and form utility are taken into account. Hence, for example, the price of the same grade of the commodity would be the same at all locations at the same time, apart from transport costs. This is, of course, a manifestation of the possibility of bargaining between buyers and sellers, or arbitrage. It is also an application of the 'law of one price', a powerful way of thinking about the process and effects of competition in an exchange economy.

Stated slightly differently, marketing analysis is concerned with the cost and demand conditions facing firms providing marketing services necessary to supply the commodity to consumers, who have diverse requirements and economic characteristics. Marketing is not just an activity taking place beyond the farm gate. Marketing is an important part of farmer decision-making.

As an analytical convenience, the 'price' of grain can be regarded as having several dimensions. Prices observed in economic transactions are a composite of absolute prices and the differentials or margins arising in markets for marketing services. It is important to recognise that prices of particular marketing services may be determined competitively, even though there is intervention by government in determination of the absolute price, or monopolistic features in the provision and pricing of other marketing services by private firms.

Nor should distributional aspects of grain production and marketing be ignored if price analysis and marketing analysis are to be useful. Producers' incomes depend on the price of grain, whether commercial or subsistence farming is practised. Grain prices are a determinant of the living standards of the rural and urban population, in countries where grain is an important part of the diet. This is why the political economy of determination of grain prices and institutional arrangements for marketing grain assume crucial significance in many countries.

Obviously, separating factors affecting absolute prices and marketing margins will be difficult because the way prices are determined interacts with performance of marketing functions. This is especially true in rich countries because farmers and governments often justify price-raising interventions, designed to increase incomes, behind a smokescreen of complaints about the efficiency and equity of marketing. While such complaints should be taken seriously and regarded as empirical questions worthy of detailed investigation, there are straightforward explanations for the variability of agricultural prices and their long-term decline without needing to invoke problems specifically connected with marketing. (These explanations are elaborated at various points of the paper.)

A similar confusion in popular discussion of price and marketing policy in rich countries is the frequent description of government intervention as 'stabilisation', when the intent is not to stabilise prices about their average level, but to raise average prices and incomes permanently. This confusion has bedevilled discussion of agricultural policy in Australia over many years. Wheat marketing arrangements were something of an exception in that there was a genuine element of stabilisation in the intent, if not the effect, of Australian policies.

Assistance and Regulation

Stripped to their bare essentials, the important questions about the grains industries concern the role of government. Intervention by government can be more readily understood by distinguishing between the assistance and regulatory effects of intervention. Assistance refers to the direct effects of government policy on prices received and paid and the incomes of producers and consumers. Regulatory effects refer to the way government policy affects development of marketing institutions and performance of marketing functions. As a general rule, the way political forces influence provision of assistance by governments means assistance regimes reinforce established industries, compared with newer industries and economic opportunities.

Most often, regulation and assistance occur together but there are exceptions. United States grain policy has recently provided considerable assistance to farmers, without much effect on marketing, which is mainly organised on free market lines (McCalla and Schmitz 1979; Roberts et al. 1989). The European Union (E.U.) also provides substantial assistance to

grain growers and other farmers within a market-based production and distribution system. The effects of assistance to the domestic grains industries of the U.S. and the E.U. have spilt over to the world market and are an important source of instability in world prices (Johnson 1991).

In contrast, Australian policy has provided little direct assistance to grain growers, and at times negative assistance, but has involved extensive regulation by government over many years, with substantial effects on the evolution of the marketing system (Longworth and Knopke 1982; Hussey 1986). The situation in Canada is closer to normal—considerable assistance is provided to Canadian producers, with an extremely regulated marketing system.

Government intervention in the agricultural sectors of market economies is intended to correct deficiencies occurring through operation of market forces if firms are left to their own devices; or, intended to redistribute income and wealth amongst producers, or between producers and the rest of society. Usually, both reasons coexist. Although politicians and policymakers often talk as if there are few ways they can act, it is worthwhile to separate in principle the *objectives* of economic policy, which are limited because they are politically determined, from *instruments* of policy where on closer inspection and analysis greater discretion will exist.

The Role of Economic Information

Economic systems differ in the way political problems and economic opportunities associated with growth of the agricultural sector and increasing specialisation in the economy are expressed and reconciled. This is especially true with respect to the way economic information is generated and translated into decisions about production and consumption and, most importantly, how the uncertainty of production and marketing is managed.

Controversy over the role of information is central to debates concerning economic planning and the conception, scope and implementation of plans. Consideration of a large part of the economy such as grain production and marketing illuminates broader theoretical, historical and empirical features of economic and political organisation extending beyond immediate concern with grain production, consumption and marketing. This is especially so for China, where grain production is an important component of economic activity.

Transition from rigid central planning to a more market-based approach to economic organisation in China has placed considerable demands on arrangements for the generation and transmission of economic information necessary for grain producers and consumers to make decentralised decisions about production and consumption.

Another pervasive characteristic shared by grains is that they are produced seasonally, with output variable from year-to-year for climatic and other reasons. However, grains are consumed continuously by geographically-dispersed consumers at a more or less constant rate. Consequently, production has to be financed from season to season either from savings of producers, or through credit provided by financial institutions. Storage also has to be financed, within and between years, for consumption to be maintained.

It follows that understanding grain marketing is connected with analysis of development of financial arrangements for farmers and marketing institutions enabling storage, transport and processing of grain and its products (McKinnon 1973). Sometimes, credit and financing services to farmers will be provided by marketing agencies in association with other marketing functions, but as the economy develops, more production and marketing activities will be financed separately by banks and other specialised financial intermediaries.

The development of agricultural marketing is an important aspect of economic development (Watson 1983). The strategy pursued in establishing marketing institutions in developing economies has consequences for the economy as a whole. As observed in China, the rapid growth of township–village enterprises in recent years has been influenced by changes in agricultural production and increasing use of marketing services. Examples include growth of transport and marketing facilities to supply urban centres with food, and farmers with fertilizers and other inputs, and the development of early stage processing of food in rural areas.

Markets may be thought of as the means by which exchange takes place between buyers and sellers. Exchange requires coordination of buyers and sellers and performance of essential marketing functions. This coordination can take place in a variety of ways.

Changes in the way markets are organised have come from improvements in market technology and increasing specialisation in the performance of market functions (Phillips 1966).

The first major step in the development of markets was the invention of money which reduced costs of communication. The next important step was the introduction of specialist middlemen into cash markets. Then followed arrangements so that production and consumption could be coordinated in time as well as space. Forward and futures markets represented a significant innovation in coping with uncertainty and enabled further specialisation by market participants. The persistence of different methods of marketing in many situations suggests that no single method is inherently better than others.

Approaches to Agricultural Marketing

Introductory Comments

There are several ways of thinking about and studying agricultural marketing. A simple but useful starting definition is that agricultural marketing concerns the economic processes occurring as goods move from producers to consumers and money moves in the opposite direction. The emphasis in this paper is on the nature and performance of marketing functions and determination of the prices of marketing services (marketing margins). Considerable attention is given to the role of the marketing system and marketing institutions in coordinating economic decisions by producers, consumers and other participants in the marketing system.

Grain crops have economic and other characteristics which require development of sophisticated marketing systems in the process of economic growth. As is well known, the relative importance of agriculture in the economy declines with economic growth. A major reason for this decline is that services and non-agricultural goods have a higher income elasticity of demand, compared with food products (Anderson 1987).

Moreover, the competitive structure of agriculture in market economies lends itself to rapid introduction of techniques of production substituting capital for labour and ensuring rapid rate of growth in productivity within agriculture. Recent analysis of the declining share of agriculture in the course of economic growth has emphasised the effects of changing relative factor supplies (Martin and Warr 1993). As elaborated by the well known Rybczynski theorem in international trade theory, as capital accumulation proceeds throughout the economy, the output of capital-intensive industries increases but the output of more labour-intensive industries declines.

This has long-run implications for the size and structure of the agricultural sector, and its relationship to the rest of the economy. As greater division of labour occurs in the economy, the increasing non-farming population requires access to food, with a consequent need for storage, transport, processing and other marketing services provided by agribusiness firms. At the same time, farming becomes more capital and input-intensive with an increasing need for specialised firms to produce and supply inputs to farmers. The growth of commercial and merchandising activity in the early stages of economic development will often be undertaken by the same firms, whether these are private or public entities. In China, merchanting activities have traditionally been carried out by local supply and marketing co-operatives.

Kohls and Uhl (1980) have suggested three ways of studying agricultural and food markets:

- the functional approach;
- the institutional approach;
- the behavioural systems approach.

All of these approaches are used to some extent in this paper.

Biases Against Marketing and Middlemen

An important advantage of adopting a functional approach to agricultural marketing is that it immediately disposes of the most common fallacy about marketing; which is that marketing services are less necessary, or even less worthy, than activities like farming and manufacturing which produce tangible outputs. This fallacy is a major barrier to proper understanding of agricultural marketing and is a substantial impediment to formulation of marketing policy.

The existence of widespread and profound distrust of marketing across a wide range of cultures and different economic systems suggests that there may be a common cause. A more subtle explanation is required than merely drawing attention to the normal feelings of disdain expressed by 'producers' about the activities of 'middlemen'. (Middlemen are individuals, firms or public agencies that perform functions necessary for goods to move from producers to consumers, and associated financing activities.)

A more persuasive explanation of the almost universal suspicion of marketing and middlemen is that parts of the marketing system have features leading to monopolistic behaviour by firms, with

potential exploitation of farmers and/or consumers. This concern applies to both market and centrally-planned economies. Consequently, distributional issues are central to evaluation of the performance of agricultural markets.

A major difficulty in assessing the degree of competition in the provision of agricultural marketing services is the possibility that economic information may not be available on reasonable terms to various parties in many marketing transactions. Developing arrangements for the provision of market information is critical in the establishment of marketing institutions, especially in the transition from a centrally-planned to a market economy (Intriligator 1993).

The performance of the marketing system should be treated as an empirical question requiring analysis and evidence. It is not sufficient to assume monopoly or competition is the case in particular situations; circumstances prevailing in agricultural markets have to be investigated. In market economies, the most important question to consider is the ease of entry and exit of firms supplying marketing services.

Too often, debates over agricultural marketing, as with other aspects of trade and industry policy, have been muddied by the failure to recognise that there is a logical and methodological difference between the economic theory and empirical evidence that is relevant in analysis and research at the firm level and the industry level. In particular, there has been much confusion about the meaning of 'competitiveness' at the firm, industry and national levels (Krugman 1994).

In essence, all marketing systems perform the same physical and economic functions of exchange, physical and temporal transformation, financing and information generation whether marketing systems are regulated or unregulated, or exist in market-based or centrally-planned economies. While it should be obvious that these functions are as necessary and essential to the operation of the economy as any other activities, popular suspicion of marketing and the various intermediaries (middlemen) who provide marketing services does have some connection with controversies in the development of economic theory, in particular the distinction drawn by the classical economists between 'productive' and 'non-productive' labour.

In that discussion, however, 'productive' did not mean 'useful'. The classical economists had no doubt about the usefulness of merchandising and related activities required to bring buyers and sellers together as the economy becomes more specialised (Blaug 1970, p. 282). Productive labour in these theories meant labour that produced a surplus over and above the wages paid to it, and thereby contributed to capital accumulation. The distinction did not concern labour in particular occupations.

At issue in those earlier debates was the difference between economic activity resulting in capital accumulation and activity servicing immediate needs of households. The concepts of productive and unproductive labour used by the classical economists were closer to modern concepts of gross investment and consumption than ideas about the necessity or usefulness of marketing.

Nevertheless, it seems that this confusion explains the low priority given to the development of marketing in centrally-planned economies in most of the twentieth century. It is most unfortunate that distrust of markets and marketing was such that mundane and uncontroversial marketing activities like village fairs and local markets were curtailed from time to time.

Marketing Functions

The major marketing functions have been categorised by Kohls and Uhl (1980, p. 24) as follows:

A. Exchange functions.
   1. Buying (assembling).
   2. Selling.

B. Physical functions.
   3. Storage.
   4. Transportation.
   5. Processing.

C. Facilitating functions.
   6. Standardisation.
   7. Financing.
   8. Risk-bearing.
   9. Market intelligence.

While the nature of individual functions is largely self-explanatory, more difficult issues arise concerning how functions are organised within, and between, firms and in deciding what is the meaning of concepts like productivity and economic efficiency in the context of marketing.

- Exchange functions involve the transfer of ownership, a process implying the existence of processes for price discovery and determination of other terms of sale. The performance of exchange functions also requires a system of property rights

for agreements between buyers and sellers to be enforced and disputes settled.

- Physical functions are activities involving handling, transport and transformation of the product—that is, problems of 'when', 'what', and 'where' in marketing. These are productive activities in their own right, certainly from the perspective of people performing the functions. Processing of agricultural products will usually be thought of as a production activity per se and not regarded as a marketing function. This is true for products like meat, milk and sugar where initial processing is essential before products are useful to consumers.
- Facilitating functions are activities that allow exchange and physical functions to take place smoothly. Facilitating functions include functions concerned with generation, transmission and use of economic information—about the product itself, and about prevailing economic conditions affecting marketing decisions.

Some economists regard issues concerning information as central to the whole idea of marketing (Phillips 1968). The role of information in the discovery and behaviour of agricultural prices can be illustrated by introducing the idea that economic affairs concern the known, the unknown and the unknowable. Prices observed in markets reflect known information about past prices and quantities and precise knowledge of forthcoming supply and demand. Other information is unknown, but sufficiently important to participants operating in the market that it could be discovered if enough effort were invested in finding out. Other information is unknowable—it cannot be known until it occurs. Obvious examples from agriculture are climatic conditions and political decisions about market access. These issues are elaborated below in the context of the role of futures markets as instruments for price discovery and risk management.

Kohls and Uhl (1980) suggest that there are three characteristics of marketing that can be recognised from applying a functional approach to marketing.

- First, marketing not only adds costs, it adds value. Evaluation of marketing functions, or the marketing system in aggregate, has to involve consideration of benefits and costs. Efficiency of marketing cannot be judged by simple comparisons of costs; in particular, by resorting to the common and misleading criterion of the farmer's share of the consumer's dollar. Obviously, this ratio can be high, as with roadside sales by subsistence producers, or low, as with sales by producers in countries like Australia to consumers in the northern hemisphere, without the ratio providing useful information about the efficiency of marketing or the prosperity of farmers.
- The second important advantage of applying a functional approach to marketing pointed out by Kohls and Uhl (1980) is that though there are different ways marketing functions can be organised by individuals, co-operatives, government agencies or private firms, it is difficult to eliminate marketing functions altogether. Farmers or consumers may seek to eliminate middlemen, but only at the cost and inconvenience of performing the functions themselves.
- Third, marketing functions may be indispensable, but the functions have different economic features which, together with the economic characteristics of agricultural products, influence the extent to which marketing functions can be combined within the one organisation. The skills required to undertake marketing activities are vastly different between the individual functions, and, especially, from those required in agricultural production.

The characteristics of marketing functions differ in important respects. Economic and technical relationships between size and cost differ between marketing functions. This means the scale of operations is different for firms specialising in particular marketing functions. Public or private firms providing storage are generally large. Management of storage is complex and risky, technically and economically. In addition, storage firms are large because the capital cost of storage increases less than proportionally with increasing storage capacity. Storage is associated with a degree of natural monopoly which is not consistent with competitive markets.

In contrast, the optimal scale of operations of firms performing marketing functions needing special attention to requirements of customers is less subject to economies of size. Businesses providing important marketing services like provision of some types of specialised market information are often small.

The way differences between product characteristics and economic features of markets affect the economics of agricultural pricing and marketing can be illustrated by considering the situation of Australia's broadacre industries (grains, meat and wool). Thus, grains and meat are affected on the demand side by problems of market access, whereas an industrial material like wool is vulnerable to fluctuations in the trade cycle.

A Note on Value Adding with Special Reference to Australia

Comparisons of marketing costs between commodities, between countries and between time periods are an unsatisfactory way of evaluating the efficiency of marketing. In a not dissimilar way, it is fallacious to regard value adding through further processing of agricultural products or investment in other marketing activities as economically beneficial per se (Watson 1993). In essence, this fallacy is another version of the rejection of the principle of comparative advantage and denial of gains from specialisation, which is at the heart of popular distrust of marketing.

It is important to note that these observations about value adding for an exporting country like Australia do not apply to a developing country like China where increasing agricultural production is taking place close to expanding markets in urban centres and large cities. Investment in further processing and provision of transport infrastructure will have an important economic role in these circumstances.

However, confusion over the concept of value adding has had pervasive and generally negative effects on other aspects of agricultural policy in Australia. Further comment is justified in this paper.

The 1992 Amendments to the *Wheat Marketing Act 1989* included as an objective for the AWB 'to participate in value added activities and the power to do so. These are deemed to be activities which increase the value of grain or grain products' (Ryan 1994, p. 111). The AWB has recently established a joint processing venture with an enterprise in southern China through an investment funded by the Wheat Industry Fund, financed by levies on wheat growers.

The investment of the AWB should be judged on its merits, however, because it is neither sensible, nor possible, to make a categorical statement for or against particular examples of investment in further processing or value adding. However, Malcolm (1994, p. 154) has interpreted the current interest of the AWB in value adding as 'little more than a diversionary part of the critical process of transforming a statutory marketing authority, the AWB, into a private grain trader'.

The interesting and important questions about value adding are with respect to public policy. It is illogical to believe all countries should export agricultural products in more processed forms. Further processing is not an end in itself. Providing marketing services adds cost as well as value. The critical question is whether the rate of return to investment in processing is greater than the rate of return in other economic activities, including additional production of commodities.

Returns to marketing activities are returns to costs incurred and resources invested in providing additional marketing services. What needs to be assessed is how economic forces favouring processing or adding value to grain close to the point of production interact with factors favouring processing close to the point of consumption? For firms in processing industries, significant risk occurs due to the financial costs of holding inventories, semi-manufactures and processed products. The costs and risks of inventory management increase as the distance, in time and space, from the point of production to the point of consumption becomes greater.

Unsophisticated Australian advocates for value adding consistently underestimate the economic costs of control in producing processed products for consumers in remote markets. Some Australian firms who have accepted the simple-minded approach of the enthusiasts for value adding are now experiencing considerable difficulties. Put another way, the comparative advantage enjoyed by Australia in grain production and any comparative advantage that might exist in further processing of grain are entirely different matters. The other important issue involving further processing concerns the roles of government and the private sector in pursuing opportunities for value adding.

Australia has market power in the wool industry by virtue of its substantial share of the world market, whereas Australia is a price taker for most commodities on the world market, except in so far as problems of market access mean that it is sometimes profitable for Australia to intervene to control the supply of meat and grain to some world markets. With respect to the performance and organisation of marketing activities, meat is perishable, whereas grains and wool are storable. Wool can be stored more cheaply than grain. On the supply side, grains are annual crops and meat and wool are continuously produced livestock products.

The industrial organisation of firms engaged in marketing needs to be considered vertically and horizontally. The vertical structure describes the way firms are organised to perform marketing functions, singly or in combination, for goods to move from the producer to the consumer.

The vertical structure identifies the marketing channels that exist to carry out the marketing task. In a flexible and competitive marketing system, these channels will be in the process of forming and reforming. As firms compete in seeking out different ways of performing marketing functions, the channels

can also be considered as being in competition with one another.

Horizontal competition describes competition between firms performing similar marketing functions. Because marketing is a specialised activity, requiring specialised capital equipment and, importantly, access to specialised information and knowledge, marketing firms often operate in a number of commodity markets. The way that marketing functions are best organised within and between firms is an extremely complex issue, the more so for an economy like China which is in the process of economic liberalisation.

Issues concerning the industrial organisation of grain marketing are discussed below in the context of the performance of individual marketing functions.

The Institutional Approach

Whereas the functional approach describes the 'what' of marketing, the institutional approach describes the 'who'. Kohls and Uhl (1980, p. 29) classify middlemen in marketing as follows:

A. Merchant intermediaries.
   1. Retailers.
   2. Wholesalers.
B. Agent intermediaries.
   1. Brokers.
   2. Wholesalers.
C. Speculative intermediaries.
D. Processors and manufacturers.
E. Facilitative organisations.

Merchant intermediaries take title to the products they handle. The distinction between retailers and wholesalers is that the former deal with the final consumer, whereas wholesalers sell to retailers, other wholesalers and industrial users. Wholesalers are particularly important in agriculture, collecting products from farms and transferring them to population centres. Merchant intermediaries depend for their incomes on the margin between buying and selling prices being sufficient, over a series of transactions, to cover the costs of the services they provide.

Agent intermediaries act as representatives of their clients without ever owning products, charging fees or commissions for their services. Unlike merchants, agents do not bear the risks arising from price changes occurring during the time they are handling goods.

Speculative intermediaries are merchants whose primary objective is to profit from price changes while holding stocks of the commodity. In effect, their role is to specialise in the function of risk-bearing. In the process of buying goods when they are cheap and selling when they are dear, speculative intermediaries stabilise prices. Successful private speculation should therefore be regarded as making a useful economic contribution. These speculative activities are often carried out by firms providing storage facilities.

Stabilising speculation is the underlying objective of national and international buffer stock schemes, introduced with the intention of stabilising prices of agricultural and mineral commodities. The success of buffer stock schemes depends upon setting prices that balance supply and demand in the long-run. If prices are set too high, stocks will accumulate and financial reserves will be exhausted. (Correspondingly, if prices are set very conservatively, the stabilising effect will be minimal.) Operating a buffer stock scheme requires skill in forecasting or, at the least, knowledge of the probability distribution of prices so that mechanical buying and selling rules can be implemented. (Buffer stock schemes are discussed further below.)

Frequent opportunities for successful speculation may indicate deficiencies in the provision of market information to market participants. Moreover, speculation may be destabilising if trading in stocks is adjusted in the same direction as prices change. This would happen if large numbers of speculators based expectations of future prices on current prices and acted to protect their investment in stocks by assuming a continuation of the trend in prices; reducing stocks on a falling market and vice versa.

Reconciling different views on the role of speculation and the activities of speculators is one of the most controversial issues in the whole field of agricultural marketing.

The immediate role of processors and manufacturers in transforming agricultural products is self-evident. The interesting issue is the extent to which processors and manufacturers involve themselves in other marketing functions. Processors may sometimes act like merchants and purchase commodities directly from farmers. Occasionally, processors may contract with farmers to produce commodities to the specifications they require. Processors may also act as wholesalers and distribute manufactured products to retailers. In other cases, processors may assume functions usually associated with retailers by engaging in consumer advertising and other forms of promotion to encourage sales of their own output.

Facilitative organisations do not usually participate directly in marketing. Their role is to assist marketing firms undertake their functions. Examples of facilitative organisations include futures exchanges, the bodies which establish and enforce rules under which trading in futures contracts takes place; central wholesale and retail markets, management of which is often the function of local government; and, trade associations that provide services such as market information to their members.

The existence of all intermediaries is an expression of advantages that accrue to specialisation and division of labour. The role of middlemen has to be considered from both supply and demand sides. Some marketing functions are characterised by economies of size. Other functions are labour-intensive. Cost savings occurring through use of specialised intermediaries have to be compared with costs that would be incurred by producers and consumers if they performed marketing functions on their own account. Most often, the cost is an opportunity cost, since time diverted to marketing is at the expense of other activities, in production and consumption.

There are economic limits to the extent to which division of labour occurs in agricultural marketing at various stages of economic development. From the perspective of the supply and demand for marketing services, increasing costs of labour associated with economic growth are both a spur and an impediment to increasing specialisation in marketing. Economic growth is accompanied by higher wages, which encourages the substitution of capital for labour in marketing. Usually, this enhances the role of intermediaries.

While the demand for most marketing services is income elastic, increasing labour costs slow down growth of marketing functions which are inherently labour-intensive. The growth of supermarkets in wealthy countries where, in effect, consumers take on marketing functions that were previously performed by retailers on their behalf, is an interesting case in point. In this case, the saving of time, which has an increasing opportunity cost for consumers, more than offsets the higher labour costs embedded in marketing services.

The complexity of marketing means that it is inherently difficult to prescribe in advance the most desirable marketing system. Agricultural products and markets are neither homogeneous nor stable. This is why agricultural marketing lends itself to coordination by the price mechanism.

The Behavioural Systems Approach

Kohls and Uhl (1980, pp. 34–36) identify four major types of problems, and their associated behavioural systems, which can be used to further categorise the agricultural marketing system. The behavioural systems approach can be applied to either a marketing firm or a collection of firms in a marketing channel. In terms of this approach, marketing can be considered as:

- an input–output system;
- a power system;
- a communications system;
- a system for adapting to internal and external change.

The analysis of marketing as a behavioural system is useful in emphasising that other branches of knowledge are important in studying marketing, rather than only the discipline of economics. Thus, focusing on input–output relationships draws attention to the role of operations research and engineering principles in analysing marketing. For example, knowledge of statistics and the theory of probability is essential to understanding the economic role of storage, deciding how much to store and in designing storage systems.

The idea of marketing as a power system in which agents seek to control events introduces the need to apply political science and social psychology to marketing. Conventional economics does not have much useful to say about what leads to spurts of enterprise and innovation in marketing or what causes consumers to behave in an individualistic or group fashion.

In a similar way, the disciplines of sociology and business management explain communication within and between firms. Understanding communication is important to marketing. The ability to process information is a major determinant of the size of firms and marketing agencies.

Finally, marketing firms and enterprises exist in an environment where the ability to adapt to changes in economic conditions and technology is paramount. This is another dimension in which agricultural marketing must be studied. For example, introduction of objective grading systems, which have pervasive economic effects on marketing by allowing commodities to be sold and purchased sight unseen, depends upon the existence of defensible scientific criteria to measure the characteristics of agricultural products.

Grain Marketing in Australia

Economic Aspects of the Grains Industries

Australia has an intrinsic comparative advantage in grain production by virtue of abundant land and satisfactory, if difficult, climatic conditions for grain growing. These endowments have been supported by investment in scientific research and development of the social and physical infrastructure necessary to sustain grain production and marketing. However, these natural advantages and associated private and public investment have not always ensured the prosperity of the Australian grains industries.

Vigorous debates over price and marketing policy for grains were once an important feature of national political life. Even though the conceptual issues remain the same, the significance of these arguments has declined because the grains industries have declined in relative importance. The political power once held by grain growers is now greatly diminished with continuing urbanisation of the Australian economy. Most of the heat has gone out of the debate over grain marketing. Many of the reasons for earlier controversies have faded into distant memory. In any case, marketing policy has been subject to slow but continuous change.

As is true with any interesting question of economic and agricultural policy, the critical issue concerns the role of government in determining the balance between private and public activity in grain marketing. The effects of government on grain marketing in Australia have been so pervasive that farmers had little scope for autonomous action in marketing, until recently. This explains the emphasis given to the Australian Wheat Board (AWB) in this paper.

It could be argued that the approach to marketing in Australia was based on a misdiagnosis of the problems of the grain industries. Previous policies were based on implicit and explicit assumptions about the adequacy of marketing arrangements. In particular, the assumption that actions of private marketing agents were detrimental to producers. This should have been regarded as an empirical question, deserving inquiry and evidence. The same answer could not be given today as in the past, when the foundations of existing policies were laid.

The structure of the Australian grains industries and their domestic competitiveness were, and are, more important than marketing policies for the prosperity of grain growers. Low income problems arise within the grains industries because the distribution of farm size is skewed. There will always be marginal farms. All farms are vulnerable to low prices or low yields caused by adverse weather. The farmers who run into difficulty will be those whose borrowing decisions, intended to enable expansion of their farms, have left them financially exposed. The competitiveness of the grains industries has been affected by developments in the economy as a whole. The growth of mining in Australia has had substantial effects on other tradeable goods industries in the past 30 years, through its effect on the exchange rate (Gregory 1976).

Although political commitment to intervention is now on the wane, the history of marketing and pricing arrangements for grain over the past 50 years has been dominated by intervention by government in determination of prices and government regulation of marketing functions. This intervention was not always the case. Initially, the marketing system had developed along traditional lines with grain merchants and other intermediaries performing their classical role of coordinating trade between producers and consumers (Beasley 1928; Dunsdorfs 1956).

As in other countries of recent European settlement, development of wheat and other grain industries in Australia depended on adapting techniques of production originally developed in the northern hemisphere, to local agronomic conditions. In addition, when markets in the northern hemisphere grew rapidly in the nineteenth century, the development of export grain industries depended on investment and innovation in transport facilities. A powerful influence on the development of the Australian grain industry was falling freight rates for land and sea

transport, following growth of the local railway system and introduction of steamships. This enabled new and remote grain-producing regions in countries like Australia to be linked to the old world. For bulk commodities like grain, production and trade are influenced by transport costs as well as costs of production.

Frequently, transport costs will be more important than production costs in determining the pattern of regional production and domestic and international trade. Consequently, the efficiency of the transport system is a crucial determinant of the profitability of grain production and the cost of grain to consumers in all countries. In particular, gross differences between the cost of land and water transport have a pervasive effect on the regional pattern of production.

Once the Australian grain industry was linked to the world market, Australian producers were vulnerable to international developments, with all that this implied for the level and stability of their incomes. The origin of most intervention in the Australian grain industry was the economic situation in the 1930s, when depressed conditions on the world market, problems of market access, and the disastrous consequences of ill-judged decisions by earlier Federal and State governments with respect to land settlement, combined to create an acute low income problem in much of the grain industry (Lake 1987).

The world wheat market then had features which many Australian producers did not find to their liking. (And it essentially still does.) The demand for wheat for human consumption is inelastic. This means that fluctuations in output lead to wide swings in prices, although these fluctuations may be moderated by private and public storage.

Until the mid-1980s, the stockholding policies of the United States placed a virtual floor under world prices (Miller and White 1980). The situation changed drastically when the U.S. embarked on an aggressive strategy of attempting to recover its 'market share' from the European Union through the Export Enhancement Plan, an ostensibly targeted and selective program of export subsidies, designed to force the E.U. to the negotiating table (Roberts et al. 1989).

These stated intentions have not stopped U.S. policies having a most disruptive effect on world trade — to the benefit of some importing countries, and to the considerable cost of exporters like Australia. More realistically, the trade policies of the U.S. can be interpreted as having the additional effect of enabling higher domestic (U.S.) prices, thereby providing assistance to U.S. producers. The oft-proclaimed objective of regaining 'market share' in those export markets supposedly 'lost' unfairly to the E.U., provides the mixture of nationalist sentiment and incantation necessary to disguise the fact that current U.S. policies represent a substantial retreat from the liberal trade policies advocated by the U.S. in the past. Current U.S. policies have significantly increased the level of assistance to U.S. farmers, however they may be justified in the rhetoric of trade diplomacy.

Australia's share of world wheat trade is insufficient to affect prices, except under special circumstances. Australia has very limited influence on the trade policies of importing countries or competing exporters. It is only on the domestic market that there is a prospect of raising prices and revenue through cooperation between producers, under the aegis of government.

The diversified output and complex economic organisation of the Australian grain industry has implications for the management of production and marketing risks. Farm incomes will be partly stabilised on multiple-output farms because prices of commodities are not perfectly correlated. Farmers can manage risk by controlling expenditure on inputs and capital investment. Furthermore, under Australian conditions, fluctuations in grain yields have more significant effects on farmers' incomes than price fluctuations. It follows from these observations that the financial risks to which producers are exposed are partly a matter of individual choice, since there are different ways production can be organised. Farmers also make choices about financial organisation of their businesses, including the way they use labour and capital on and off the farm.

This throws into question the longstanding emphasis of Australian policy, especially for grains, on government intervention to support or stabilise agricultural prices through marketing boards, in the name of orderly marketing. The more so, in the last decade, when foreign exchange rates and financial markets have been deregulated. Marketing boards could stabilise local currency prices for producers only through draconian intervention, which, inevitably, would interfere with the response of producers to developments on the world market.

Sloppiness on this point was a principal cause of the collapse of the Australian wool reserve price scheme, with all that meant for wool growers and wool

consumers in all countries. A not dissimilar story has been told about the world tin industry (Anderson and Gilbert 1988, p. 14), where 'the combination of accumulated production–consumption imbalance with exogenous movements of foreign exchange rates resulted in the deformation of the sixth ITA [International Tin Agreement] into the defence of a monopolistic price floor.'

Given they no longer have an influence on absolute prices, intervention by government-sponsored marketing boards has to be justified by the profitability and efficacy of marketing activities undertaken by the boards. The following discussion concentrates on wheat, the main crop in Australia. Prices and marketing of other grains are affected by wheat because other grains are substitutes in production and consumption and use the same marketing services. In any case, intervention in other grains has been modelled on the wheat industry.

Characteristics of Wheat Marketing

The traditional system of wheat marketing in Australia had four main characteristics (Watson and Parish 1982):

- the AWB was the exclusive marketer of wheat within Australia and for export;
- a buffer fund operated with the objective of stabilising prices through taxes on exports at times of high prices and payments when prices were low;
- there was differential pricing between the domestic and export markets, and, within the domestic market, between wheat for human consumption and wheat for stockfeed;
- an elaborate pool-payment system existed to disburse to farmers the net proceeds of sales on various markets, after allowance for marketing costs and stabilisation transactions.

These comprehensive provisions determined the structure of marketing institutions and the performance of marketing functions. Australian wheat pricing policies drove a wedge between prices on the world market and domestic prices paid and received by producers and consumers. At times, Australian wheat producers received higher than world prices and at other times received lower than world prices and which involved costs for trading countries.

This had significant effects on resource allocation and income distribution within the grain industry, and the economic relationship of the grain industry to the rest of the economy (Longworth and Knopke 1982).

Australian wheat stabilisation schemes remained unchanged in their main features from the introduction of the first (five year) scheme in 1948, itself a continuation of wartime measures, until the expiry of the sixth scheme in 1979. Earlier modifications to wheat marketing had merely involved tinkering with various parameters of the scheme, rather than challenging its underlying principles. The changes that occurred in 1979 had involved a considerable amount of political conflict and bureaucratic effort in finally convincing wheat growers that previous policies and regulations had actually outlived their usefulness to their intended primary beneficiaries, making deregulation consistent with the private interest of most wheat growers, as well as the public interest (Martin 1990).

The process of reform was accelerated by a public inquiry into the wheat industry in 1977 conducted by the Industries Assistance Commission (IAC) (IAC 1978). The IAC, now the Industry Commission (IC), is the government agency responsible for reviewing assistance arrangements. As an important part of its process of investigation, the IAC/IC conducts public inquiries (Mauldon 1975). The need to account publicly for previous policies did a lot to break down resistance to change in the wheat industry, because it revealed that there were serious divisions of opinion within the wheat growers' own ranks.

The seventh scheme introduced major changes with respect to the financing of the scheme, payment of growers and pricing on the domestic market. Buffer fund stabilisation was eliminated and replaced with a (government) Guaranteed Minimum Price (GMP), based on a proportion of a weighted average of previous prices. This was also referred to as 'underwriting'. The GMP became the basis of the payment system and the financing of the AWB. The monopoly position of the AWB on the export and domestic market was unchanged.

One of the most important reasons for introducing the GMP was because it had become clear in the 1970s that the pool payment system had acted in a completely contrary way to the intentions of the buffer fund and had actually destabilised growers' incomes. The procedures for payment of pools concentrated receipts from a number of years in years of high wheat prices and vice versa (Watson and Parish 1982).

Cost of Production Pricing

In the first significant rebuff to established policies and entrenched farmer attitudes, the grievously flawed 'cost of production' system for setting prices was abolished in 1974. Cost of production pricing is invalid for both theoretical and practical reasons (Campbell 1944; Campbell and Fisher 1982, pp. 98–101). The relationship between cost and price is an indirect one. No pricing system can completely ignore the demand side: even more so for a product like Australian wheat, which is traded predominantly on the world market. Cost is relevant to farmers only in so far as costs affect their decisions on how much they wish to produce and offer for sale.

There are four main practical problems in using pricing formulae based on costs.

- What non-cash costs should be included to account for depreciation of capital, owner-operated labour and returns to capital? There are no unambiguous solutions to determining how these items can be allowed for in total costs.
- How should costs be allocated between wheat production and other commodities that are produced on cereal–livestock farms? Any system that is devised must be arbitrary and can have no logical economic basis. In the early stages of Australian wheat stabilisation, the practice was to subtract all receipts from 'sidelines' from total farm costs to find the costs that were to be attributed to wheat growing. (The underlying assumption must have been that no profits are made from sidelines.) When the world price of wool boomed in 1951, this procedure implied that the calculated cost of production of wheat was negative!
- Costs vary substantially from farm-to-farm so that selection of a sample, and even the definition of a wheat farm, affect the estimated cost of production.
- Average costs per unit of area have to be converted to per unit of output by choosing an average yield. Given the variability of wheat yields in space and time, Australian administrators had plenty of room for manoeuvre in selecting a 'yield divisor', and hence adjusting prices in any required direction. In that sense, official cost of production pricing was largely a charade.

Miller and White (1980, p. 6), then officials in a position to know what actually happened with cost of production pricing, remarked:

> Although developed from objective Bureau of Agricultural Economics survey data, the assessed cost of production was determined by the Commonwealth Government after discussions with the Australian Wheatgrowers Federation and other interested groups. In particular, some of the imputed items, such as the value of capital and the owner–operator's contribution, and the yield to use in calculating a cost per bushel, were subject to extensive negotiation ... Whatever the merits of the guaranteed price may have been for other purposes, ... its relationship to the world market price was purely fortuitous. It had to be renegotiated between plans. During such renegotiations, the level of world prices undoubtedly had an effect on the choice of levels at which some of the variables that made up the assessed cost of production were set.

Another theoretical objection to cost-based formula pricing is related to the theories of economic rent and asset valuation. If land values are included as a cost, a spiral of prices can be set in train with increasing prices of wheat-growing land, resulting in higher administered prices for wheat, resulting in higher land values, higher prices and so on. Using 'cost of production' to set prices is a dead end in the pricing of agricultural commodities.

Later Changes

The IAC next reported on the wheat industry in 1983. The report (IAC 1983) recommended deregulation of the domestic market, reduction in cost pooling and provision of more information to assess the performance of the AWB. Few changes were made in the 1984 legislation. Direct sales under permit were allowed for feed wheat, replacing restrictive and almost token grower-to-buyer sales which had been allowed under the 1974 Act. The IAC was dubious about the case for AWB involvement in futures trading but this was permitted in the 1984 legislation (Watson 1984).

Pressures for reform intensified in the mid-1980s with a sharp decline in prices associated with the change of U.S. policy, concentrating the attention of the Australian wheat industry on domestic marketing costs. A Royal Commission on Grain Storage, Handling and Transport was established in 1986 which found that greater competition could reduce marketing costs (Royal Commission on Grain Storage, Handling and Transport 1988). The combined effects of the Royal Commission and a further IAC report (1988) were influential in the far-reaching changes in wheat marketing that occurred in 1989.

In 1989, the method of underwriting was changed to provide a government guarantee to AWB borrowings to finance payments to wheat growers at harvest, rather than a supported price. This was largely in response to the substantial payments that were made by the Commonwealth under the eighth (1984) scheme, after the world market had collapsed in the mid-1980s. The domestic market was deregulated, but the AWB maintained its monopoly on the export market.

The Wheat Industry Fund was created to establish a capital base for AWB trading, and to finance value adding activities. The Wheat Industry Fund is supported by compulsory levies on producers of 2 per cent of their gross receipts. Subsequently, arrangements were made to make growers' contributions like a negotiable asset through buy-back provisions. The *Wheat Marketing Act* (1989) also removed the sunset provision, which under previous Acts had been five years on the life of the AWB. The AWB was permitted to trade in grains other than wheat on the domestic and international markets. This extension of powers was based on the belief that there are economies of scale (scope) in the provision of marketing services. By implication, it represented a ringing endorsement of the AWB's role in Australia's grain trade.

The emphasis of the 1989 amendments to the Act is increasing returns to growers. The AWB now has power to override State transport authorities. The creation of a trading division has allowed the AWB to be involved in selling grain to the expanding markets for feed grains to the dairy industry and cattle feed lots.

Representation on the AWB was changed so that it no longer has a majority of grower members. Board members are now selected on the basis of their commercial expertise, including grower members. In practice, the method of selection still allows the Grain Council of Australia—the peak growers' organisation—to have considerable influence on the composition of the Board. The 1989 Act was amended in 1992. Apart from the encouragement given to value adding mentioned above, the amendments included extension until mid-1999 of government underwriting of AWB borrowings to finance the payment to growers at harvest.

The AWB as a Single Seller

Under traditional arrangements, the AWB had the exclusive right to acquire wheat from farmers and monopoly power to dispose of wheat in the domestic and export markets. Because of the division of powers under the Australian Constitution, regulation of wheat marketing required complementary legislation by the Commonwealth and State governments. Commonwealth legislation provided the AWB with its export powers. State legislation enabled acquisition and maintenance of domestic prices different from export prices. The Commonwealth buttressed these pricing powers by controlling imports. While a combination of Commonwealth and State powers provided control over external and intrastate trade, there was ambiguity about interstate trade, which is meant to be 'free', according to Section 92 of the Australian Constitution. Given the conflicting interpretations of Section 92, considerable uncertainty surrounded interstate trade in wheat and other products. Wheat marketing legislation was often the subject of challenge and protracted litigation in the courts (Coper 1978). In the event, the ambiguity of the legal situation was overtaken by the decision to deregulate the domestic market; partly in 1984, and completely in 1989.

The powers of the AWB need to be considered from at least three angles:

- whether the AWB can achieve higher prices than private traders?
- whether more competition for the AWB would reduce marketing margins to the benefit of growers and users?
- whether organisational arrangements can resolve conflicts between growers, especially political conflicts between growers in different States?

Each of these issues is now considered in turn.

'Single desk' or 'weak selling'

Weak selling, as usually defined, means that lower prices are received in an uncontrolled situation with many competitive sellers than with a single seller ('single desk'), or with some regulation by a statutory body. It is only because the world grain trade is subject to so much government regulation that the question whether Australian policies and/or selling arrangements might influence world prices needs to be considered. The Australian share of the world market is not sufficient to suggest that Australia would have much market power under normal circumstances.

Single desk selling would be expected to achieve increased prices only to the extent that particular markets for Australian exports are freight-advantaged. A single seller of Australian wheat would be able to price wheat up to the landed import price offered by

the next most favoured exporter. The instability of freight rates in the competitive market for shipping and the volatility of the wheat market limits the gains that could be obtained from exercising price discrimination in this way.

The export demand for grain from Australia could be inelastic on some markets because of restrictions on market access, especially when other countries have single buying agencies. In some cases, other countries restrict access to markets in ways which allow exporters to reap some of the benefits. It is not altogether clear why they should do this. A possible reason is that other instruments of domestic price support may arouse more interest from groups in their own countries who are disadvantaged by assistance to farmers. The opportunity could also exist occasionally to collude with other countries with the intention of turning the terms-of-trade for wheat in Australia's favour (Alaouze et al. 1978a). The extent to which the exercise of market power could be exercised in all these instances would depend upon the absence of retaliation by importers.

The argument over weak selling is conceptual and empirical. To understand the controversy over weak selling, it is helpful to reconsider ideas about markets and price determination. As discussed, the 'price' of commodities has many dimensions. Transaction prices are a composite of absolute prices and differentials arising in separate markets for marketing services. We can think of absolute price levels as determined by underlying supply and demand conditions—world output, consumer incomes and prices of substitutes in importing countries. The price differentials, around the absolute price, reflect differences in location, time, form and quality. The differentials depend upon markets for transport, storage, finance, processing and grading.

A second helpful idea is the 'law of one price', a powerful way of thinking about the process, and effects, of competition in an exchange economy. The law of one price requires that, in a competitive market, prices will be uniform after the costs of adding (or subtracting) place, time and form utility are taken into account. This is a manifestation of the possibility of bargaining between buyers and sellers, or arbitrage.

The third useful idea from economics is that price determination and competition between buyers and sellers in markets is a discovery process. It is misleading to think that there is some 'right' price, waiting to be found. Any price observed in a commodity market is transitory.

It appears that the controversy over weak selling has been conducted at cross purposes. It is seldom clear whether the lower price allegedly obtained with competing sellers refers to an absolute price or differentials associated with marketing services. Little can be done to capture higher (absolute) prices in importing countries for products with substitutes, including alternative sources of supply. At the same time, higher prices could be obtained as a reward for superior marketing effort. The AWB may obtain higher prices by providing more services—at some cost. Whether this is a sensible strategy is separate from debates over weak selling. In practice, whether prices are low because of economic fundamentals or because traders are pricing grain or marketing services cheaply would be difficult to judge in any real world pricing situation. In the contexts of the concept of price discovery and the distinction between price analysis and marketing analysis, it is impossible to tell if weak selling is occurring.

The argument about weak selling is often rhetorical; a facade behind which people hide their predilections in favour of orderly marketing or laissez-faire. Whether weak selling is important for the Australian or Chinese grain industries should be regarded as an empirical question that can be judged only on a case-by-case basis. Some important issues that would need to be considered in a fuller evaluation of weak selling are as follows:

- market structure in importing and exporting countries;
- the chances of collusion in buying by single buyers playing vendors off against one another;
- the costs of providing marketing services by private firms and statutory bodies—for particular functions, and functions collectively;
- economies of size in marketing for individual functions;
- the relevance of 'corruption' of world grain markets to single desk exporters (and importers);
- the price information available in individual markets for grain, including premiums and discounts associated with marketing services.

The case for single desk selling of Australian wheat has been investigated in detail by Piggott (1992). The results of his analysis are not encouraging. However, it is impossible to capture all aspects of the problem in a formal economic analysis. The case for single desk selling is usually based on faith; in the ability of the AWB to make use of superior market knowledge,

gained through trading in a situation where other exporters are actively practising price discrimination through targeted export subsidies and importers are in a strong position to influence the terms and conditions of sales (Ryan 1994).

The AWB and marketing costs

Even if the AWB could extract premiums from buyers on world markets, this does not automatically justify the statutory monopoly powers given to it. Government could enable Australia to capture those premiums by licensing private firms to operate in markets with restricted market access. If the rights were sold to private firms, annually or permanently, the benefits would accrue to the nation as a whole rather than be the exclusive preserve of the wheat industry. There is no particular reason why economic rents that are earned by grace and favour of the policies of foreign governments should be exclusively captured by wheat growers. Licensing arrangements would be difficult to administer, however, with some danger of discounting of premiums through collusion between private exporters.

Furthermore, export licensing and single desk selling impose additional costs on the wheat industry since they limit entry of other marketing firms and prevent competition between suppliers of marketing services. Costs imposed by export controls or statutory marketing have to be compared with any benefits from single desk selling (Industry Commission 1991, pp. 48–49).

The AWB is essentially a trading organisation. The major investment of trading organisations is in stock. Business success depends upon traders selling on better terms than they purchase, including profits made providing marketing services required by their clients. No such test of business success was applied to the AWB and its associated State marketing institutions. The AWB had the right to acquire wheat compulsorily from wheat growers, subtracting all marketing and financing costs, before paying wheat growers a pooled price.

Trading organisations often do not own the capital facilities used in commodity marketing. In the Australian case, the storage, transport and handling system was not under the direct control of the AWB. It was owned and operated by State authorities or, sometimes in the case of storage and handling, grower co-operatives given special powers under State legislation. The terms and conditions under which these organisations operated were specified in the complementary Commonwealth and State legislation, which set up the AWB, and established the framework for wheat pricing, marketing and stabilisation arrangements.

Gradually, this system came under increasing strain. Marketing costs were pooled nationally until 1979. This was an incentive for profligate investment and poor administration. Authorities in States where the wheat industry was expanding rapidly were able to shift costs of new capital investments to growers in the States with established wheat industries. Not surprisingly, large disparities in marketing costs emerged between the States, when national pooling was replaced with State pooling of marketing charges after 1979. Storage and handling charges ranged from $6 per tonne in Victoria to $12 per tonne in New South Wales and Western Australia.

Nevertheless, similar problems existed with State-based pooling of marketing charges. State transport, handling and storage authorities did not have strong incentives to economise on marketing costs, or price services to test the demand by wheat growers for marketing services. Their costs could always be recovered from growers who had no choice in the services they were obliged to pay for. In particular, until 1984, wheat growers had limited ability to market grain outside the regulated system, which had been designed for exports. Obviously, some grain producers are located close to large domestic users of grain with opportunities for savings of marketing costs on both sides. State transport, handling and storage authorities were vulnerable to pressures applied by special interests — from their work-force, for favoured conditions of employment; from growers, for a deluxe system of handling, which did not carefully consider the economic trade-off between handling costs and delays faced by wheat growers at harvest. This resulted in a marketing system which was over-capitalised and costly.

Eventually, controversy over the costs of grain marketing in Australia led to the Royal Commission into Grain Handling, Storage and Transport from 1986–88. The findings of the Commission and the associated comprehensive program of research were influential in the deregulation of the domestic wheat market in 1989 and major changes in the relationship between the AWB and State authorities which gave the AWB greater control and discretion in the use of marketing services (Fisher and Quiggin 1988; Ryan 1994). Compulsion on growers to use State rail

systems was modified in some States. Furthermore, deregulation of the domestic wheat trade limited the monopoly pricing powers of the State authorities.

During the 1990s, ownership of some State handling and storage authorities has passed to other hands. In two cases, Queensland and Victoria, the AWB has been interested in becoming a part-owner of these marketing facilities using funds provided by the Wheat Industry Fund. This has offended growers in other States and also attracted the attention of the Trade Practices Commission because of potential anti-competitive implications of AWB involvement in grain handling. It would appear to be against the spirit of the deregulation of the domestic market for the AWB to be involved directly in handling and storage. This is a difficult issue to judge. For flexibility in marketing operations and economies in grain handling and storage, it is sensible for grain traders to be vertically integrated. In some circumstances, partial deregulation could turn out to be worse than the previous situation, if the AWB is precluded from participation in handling and storage in the more deregulated market that is emerging.

The AWB and grower politics

The changing role of the AWB over the years reflects the interaction of the complex politics of the wheat industry with the competing requirements of government, which has to represent wider national, consumer and taxpayer interests. The faltering progress towards deregulation of the domestic market through grower-to-buyer sales and a permit system over 15 years is an indication of how complicated those processes are. The political behaviour of the wheat industry is also somewhat unusual in that at several times in the earlier history of wheat stabilisation, the net effect of government intervention was to the detriment of wheat growers. Despite these occurrences of negative assistance which, although infrequent, were of much greater absolute magnitude than when positive assistance was provided, the political organisations of wheat growers have remained steadfast in their support of regulation, even though the form of that regulation has been changed substantially over the years (Watson 1982).

There has always been a strong element of income redistribution in the intent, if not the actual effect, of Australian wheat pricing and marketing arrangements. Behind the concern with guaranteed prices, price stabilisation and pooling of marketing costs lies a tradition dating back to the unfortunate events of the 1930s, which led to the quest for ways of ameliorating the effects on growers of adverse prices arising from the vicissitudes of the world market, and of sharing the risks and costs of marketing (Whitwell and Sydenham 1991).

The wheat industry is diverse in several major respects which, at face value, should influence the political attitudes of wheat growers. The relative harmony amongst wheat growers is therefore difficult to understand. The economic situation of individual wheat growers and their likely attitudes to government intervention will be affected by the following:

- the settlement history of different regions, the distribution of farm size and, hence, the distribution of farm incomes;
- climatic and agronomic features which determine production alternatives — crops and/or livestock, particularly features affecting the riskiness of production and marketing.

The politics of the wheat industry is complicated by the need for the States to ensure the passage of complementary legislation necessary to maintain the powers of the AWB. The Federal system of government in Australia is reflected in the structure of farm organisations. There are some differences in approaches to regulation between States, and within and between the State affiliates of the national wheat growers' organisation. In practice, these tensions are resolved by rotating leadership of growers' organisations between the States. The most significant changes in wheat marketing have coincided with times when leadership at the national level was amenable to change. The early 1980s was such a time in the history of wheat marketing.

The differences in attitudes and interests between the States have had to be reconciled at times by modifications of the marketing and pooling system, which were obviously politically rather than economically determined. The superior bread-making quality of wheats grown in northern New South Wales and Queensland was recognised by the payment of premiums for quality. Changes to the grading of wheat grown in southern Australia came much later. Transport and handling charges were adjusted close to State borders to reduce the attractiveness of interstate sales and reduce the chances of legal challenges to wheat marketing by disaffected growers.

In earlier times, there was an allowance to Western Australia to reflect its proximity to some major export markets. The search for consensus between the States necessary to achieve the legislative basis of wheat

marketing made negotiation of wheat marketing arrangements every five years costly and tortuous, and neglectful of economic efficiency in marketing and production (Miller and White 1980). Special concessions even had to be made in the transport of wheat to Tasmania, a non-wheat growing State, to enable passage of wheat legislation.

Guaranteed and/or stabilised wheat prices do little to stabilise Australian farm incomes, when yields are unstable and other commodities are important to farmers. The attraction to measures based on prices can be explained by suspicion of the price mechanism and distrust of private marketing activity, based on experience of the past, or pure ideology. It is believed by some farmers that financial institutions respond favourably to demands for credit, if farmers have greater (ex ante) stability in prices. However, financial institutions would be foolish if, when incomes are unstable, the appearance of price stability affected their lending decisions.

Continuing political support for pooling of marketing costs by wheat growers and governments can be attributed in part to pursuit of an income distribution objective—although it is far from obvious that pooling could have or had much effect on the distribution of income. This issue is taken up below, in a section concerning the economic rationale and effects of pooling.

Political controversy in the wheat industry has also been concerned with the issue of 'grower control' of statutory marketing authorities, especially the AWB. Although this controversy has waned in recent years, with greater acceptance of the principle that the management and control of marketing authorities should be placed in the hands of those technically equipped for the task, there are still political pressures within the wheat industry to revert to the previous situation, when influence in farm organisations was the established route to appointment to positions within the bureaucratic structure of wheat marketing.

Australian experience in wheat and other agricultural commodities, suggests that the skills and attributes required for a successful career as a political activist in farmer organisations and in management of the complexities of agricultural marketing, are not commonly shared by the same individuals. Successful wheat marketing institutions, public or private, need a balance of experience and skills in production, in commodity trading, in merchandising, in futures trading, and in accounting, management and finance (Miller 1984).

Buffer Fund Stabilisation

Intervention by governments to influence agricultural prices in a market-based economy can be separated into two broad categories:

- price support programs that are intended to raise prices permanently above their market-determined level.

  Instruments of price support may be classified further, according to whether their economic effects flow from interventions in agricultural supply or demand, or depend on direct payments by government (Lewis 1965). The complexity of regimes of agricultural price support in most countries derives from the fact that several methods, each of which may be straightforward in principle, are usually used in combination. The choice of price support instruments in different countries will depend upon on what other economic instruments are available to achieve the objectives of price support.
- Price stabilisation which aims to reduce or eliminate fluctuations of prices around their average value.

  There are two basic approaches to price stabilisation according to the means by which prices are stabilised: buffer funds, where revenue is transferred between time periods; and buffer stocks, where prices are stabilised through transactions in stocks. (Buffer stock programs are discussed in more detail below in the context of the economics of storage.)

Fluctuations in the prices of commodities may be short-term or long-term. Although the emphasis on stabilisation has declined recently, Australian wheat marketing arrangements until 1979 were intended to tackle both sources of instability. The effects of short-term fluctuations were reduced by pooling receipts from each harvest and by averaging sales made at different times in different markets. Long-term fluctuations were tackled by transferring revenue between years, the traditional buffer fund mechanism.

Stabilisation policies (and price support) are a means to an end rather than an end in themselves. Concern with agricultural prices usually arises because of direct effects of low and/or variable prices on farmers' incomes. In addition, price instability is believed to have unfavourable effects on farm investment. Although farmers might be expected to require a higher rate of return on capital investment to offset price risks and therefore reduce investment in a risky environment, that issue is not as clear cut as would first appear (Campbell 1964).

Producers could invest more in a risky financial environment because, in the interests of long-term survival, they elect to reduce their consumption below that which would take place with a more stable flow of receipts. A greater surplus is then available for investment over a run of years. This latter response to price instability is sometimes called the 'residual funds' hypothesis. Investment is effectively being treated as a residual, funds are available for investment once consumption requirements are satisfied.

The balance of these contrasting behaviours is an empirical question, which is difficult to settle one way or the other. Without much doubt, the record of the political behaviour of Australian wheat growers (predictably) supports the conclusion that farmers prefer more stable prices to less stable prices. The more interesting question is the economic costs and consequences of the measures undertaken in the pursuit of price stability.

A buffer fund operates by applying taxes at times of high prices and making refunds at times of low prices. At least in principle, a buffer fund is less costly to operate than a buffer stock scheme because it does not involve costly investment in storage facilities or stocks. However, buffer funds require a system for collection and distribution of payments which may impose strains on the financial system and public administration.

Both approaches to stabilisation face some similar problems in their management. Buffer funds have to establish procedures to set price bounds before applying the tax and making refunds. The maximum size of the fund has to be established, together with the amount of the tax and the refund per unit of output. Clearly, setting the stabilised price involves judging the long-run trend of prices, if the revolving buffer fund is indeed to revolve. The buffer fund will soon be exhausted if prices are set too high. Excessive funds will accumulate if prices are set too low.

In the Australian case, the rules for the buffer fund provided for payments to and from the fund when prices reached certain levels, but with limits on per bushel payments. The Commonwealth was liable if the fund was exhausted, but that liability was limited to a fixed quantity of exports and a maximum payment per tonne exported (Miller and White 1980, p. 8–9).

A buffer fund can also be thought of as a form of enforced saving undertaken by government, generally via a statutory authority, on behalf of agricultural producers. Implicit in the use of buffer fund stabilisation is the belief that farmers are unable to manage their own flow of funds using the financial system. That judgment may be based on perceived problems in the ability of farmers to handle variable income streams or inadequacies in the financial system. Again, it is an argument that can be settled only by thinking of the facts and circumstances of the particular case.

In developing economies, taxes on exports at times of high prices have sometimes been used to insulate the economy from fluctuations in receipts from export earnings. These export taxes may have motives other than stabilisation of producers' incomes and were occasionally a mechanism by which the governments of some developing countries diverted income from peasant producers in the interest of urban dwellers (Blandford 1979; Anderson and Hayami 1986).

The form and management of past wheat price policies in Australia was influenced by broader effects of wheat prices on domestic consumers and the economy. In fact, the wheat stabilisation scheme of 1948 has been interpreted partly as a partial and ineffective response to problems of inflation in a situation where other remedies to macroeconomic problems were either unavailable or judged politically unacceptable (Campbell 1950). This is because wages were indexed to consumer prices and bread had a significant weight in the index. In an era of fixed exchange rates, keeping wheat prices low was seen as an alternative to revaluation of the currency, when wheat and other commodity prices boomed following the Second World War.

Moreover, it was also believed that elasticities of supply of agricultural products were low in the agricultural systems of all countries. While these arguments probably could not stand up to closer scrutiny, this was an important part of the rationale for schemes introduced at the time which were intended to stabilise international commodity prices (Johnson 1950; Rowe 1965).

For those attracted to these views, taxing wheat relative to other products and making the proceeds available at times of low prices was not expected to have significant effects on resource allocation in Australia's multi-product agricultural system. With wheat prices stabilised and wool prices determined by market forces, this did not prove to be anything like the case in Australia (Watson and Duloy 1966). In the past, wheat marketing arrangements had substantial and deleterious effects on resource allocation in Australian agriculture because they drove a wedge between world prices and prices received by farmers.

Differential Pricing

Traditional Australian wheat marketing arrangements were characterised by rigid separation of the export and domestic markets; and, on the domestic market, differential pricing of wheat for human consumption and wheat used for livestock feeding and industrial purposes. Although modified by the stabilisation objective, these arrangements had similar features to the price discrimination which is commonly practised in Australia to raise the prices and incomes of producers of some commodities permanently, or 'home consumption price' schemes.

Home consumption price schemes increase producer revenue by diverting supply from the less-price elastic domestic market to the export market. Supply diversion can also be achieved by taxes on production that are then used to finance payment of subsidies on exports. Although this is simpler and, especially important for Australia, a constitutionally less-controversial method of price support, marketing boards are the preferred mechanism when price discrimination is practised in Australia. Governments are attracted to marketing boards because any assistance given to producers is less visible than levy/subsidy methods of price support of protecting farmers, which are based on using the taxation powers of the state and consequently under regular political scrutiny. However, it is a choice which has profound effects on the way the marketing system evolves.

Because of the existence of a home consumption price coupled with the objective of stabilisation, prices paid by Australian consumers could be above or below world prices. The price responsiveness of demand on the Australian market was obviously less for wheat used for human consumption than price responsiveness for wheat used in the intensive livestock industries, where wheat had many substitutes not subject to intervention.

When domestic prices were higher than export prices, producers were tempted to sell exclusively on the domestic market to avoid dilution of average (pool) prices by lower export prices. Domestic users needed to offer only slightly more than the expected average price to attract supplies. The temptation to bypass regulation by using the interstate market was strong for producers and consumers.

Conversely, when domestic prices were below export prices, grain users in the intensive livestock industries were able to purchase wheat at a fixed price that did not reflect the value of wheat in the world market. Sales of feed wheat were therefore unstable, with disruption of the coarse grains industries. With a most inelastic demand, the effects on the quantity of wheat used for human consumption were minimal.

Differential pricing had a number of effects. Prices received by producers were different to those on the world market. To the extent that producers were responsive to prices, the pattern of output did not reflect market circumstances. Consequently, Australia did not share in all the gains from high wheat prices in the 1950s and 1970s, with adverse effects on productivity in the long-run (Campbell 1964). The growth of intensive livestock industries was discouraged in the early years of wheat stabilisation. Development of coarse grain industries was impeded by low domestic wheat prices.

Income was transferred between consumers and producers. The transfers could not be justified in terms of reasonable objectives with respect to income distribution between growers and consumers, in whatever direction the redistribution was occurring. Within the wheat industry, income was also redistributed because of the random effects of yield on stabilisation transactions. Growers, with large crops when prices were high and the fund was accumulating, but producing a small crop when prices were low, lost money to growers with the opposite sequence of yields (Longworth 1967).

The experience of the wheat industry in practising differential pricing between the domestic and export markets was not a propitious one. A great deal of energy was expended by governments and growers' organisations debating issues about the domestic market, when more than 80% of grain was exported. Consequently, much more important issues concerning the efficiency of the grain transport, handling and storage systems for wheat destined for export were neglected for many years.

Home consumption pricing was a political albatross for the wheat industry. Growers paid a high price for the regulatory system. Paradoxically, their organisations supported the status quo. Home consumption prices were arbitrarily linked to costs, which inevitably moved out of line with world prices. Hundreds of millions of dollars were lost to the wheat industry in the 1950s and 1970s when growers subsidised consumers. During the 1960s, the situation was reversed, but the income transfers were less. The impression was created by the transfers in the 1960s that the wheat industry was inefficient (Miller 1977). By the 1980s, when the wheat

industry was in difficulties, the system of price support had changed. With substitution of the GMP for cost-based home consumption prices, the government guarantee was scarcely called upon. Underwriting was triggered only once, in 1986–87. Again, the impression was created that the industry received substantial assistance, which was far from the case.

Bardsley and Cashin (1990) pointed out that the effects of underwriting on assistance to the wheat industry from 1979–80 to 1988–89 cannot be measured solely by cash payments by the Commonwealth. Underwriting reduced risks associated with wheat growers' returns in all the years it operated. Bardsley and Cashin recognised that the GMP was like a put option taken out by the Commonwealth on behalf of growers, who were given the opportunity of selling to the AWB at a floor price. Using the theory of option pricing, Bardsley and Cashin calculated the assistance equivalent of this free price insurance, which had not been considered formally in IAC estimates of assistance, although the effect had been recognised in principle (IAC 1988). The implicit subsidy calculated by Bardsley and Cashin from underwriting was around $3 per tonne, adding around 3% to estimated effective rates of assistance for wheat.

The Role of Pooling

The principal forms of intervention in the wheat industry over the past 50 years have been described by Whitwell and Sydenham (1991, p. 286) as follows:

> ... orderly marketing was a commitment both to a particular institutional framework and to certain ideals. The ideals were grower equality, the sharing and hence minimising of risks, and the stabilisation of prices (which in turn, so it was thought, would help to stabilise incomes). The institutional framework had at its heart a national pooling scheme, administered prices and a national marketing organisation. This in turn was to be organised on the basis of three main principles, namely that the pool be compulsory, that the marketing organisation be granted monopoly powers and that it be grower-dominated.

Perhaps the simplest way of encapsulating policy developments in wheat marketing during the succession of wheat stabilisation schemes since 1948 is to observe that there has been a gradual retreat from adherence to the pooling principle, correctly identified by Whitwell and Sydenham as the cornerstone of wheat marketing, in both industry rhetoric and economic substance.

As we have seen, the most recent (1989) *Wheat Marketing Act* included three major changes which have drastically altered the marketing environment for grain in Australia:

- deregulating the domestic market for wheat;
- establishing the Wheat Industry Fund as a capital base for financing payments to growers and value adding activities;
- permitting the AWB to trade in grains other than wheat.

Deregulating the domestic market gives producers and consumers the option of avoiding pooling by operating completely outside the regulated statutory framework of wheat marketing. It is obviously not an option that all could take up in an industry where the export market is predominant. The effect of domestic deregulation on the export market is indirect. Greater competitive pressure is placed on markets for transport, storage and handling. Indeed, domestic deregulation can be interpreted as the means by which the Commonwealth Government finally succeeded in putting enough pressure on the States to reform their own agencies. Furthermore, domestic deregulation eliminates economic losses associated with differential pricing. It is hardly surprising that the intensive livestock industries have grown rapidly since deregulation of the domestic wheat market in Australia.

The other two major changes that occurred in wheat marketing in 1989 foreshadow a role for the AWB in new business areas, which extend well beyond its traditional functions as an institution set up to market wheat on behalf of growers. These changes are largely prompted by the desire to eventually privatise the AWB, although that idea is not uniformly acceptable to growers (Malcolm 1994; Ryan 1994).

Traditionally, the most important manifestations of pooling were with respect to payment systems, grading, AWB selling expenses and storage, transport and handling. The economic effects of pooling vary according to the characteristics of these marketing functions; in particular, according to the extent to which it is feasible for statutory authorities to price marketing services close to the long-run costs of providing these disparate economic activities.

Pooling of receipts and charges was not complete. There were exceptions to full application of the pooling principle. Transport costs were not completely pooled. In all States, rail transport costs paid by

growers were related to the (radial) distance from export terminals at the seaboard and were deducted from the first advance paid to growers at the point of delivery. Growers distant from market were not paid the same price as producers close to the seaboard. To ignore distance completely and pool rail transport costs within a State, let alone Australia as a whole, would have defied common sense, strained the credibility of wheat marketing, and jeopardised the political acceptability of regulation in the wheat industry itself. Because the market for land reflects distance from markets, pooling of transport costs is clearly irrelevant to equity among growers.

While complete pooling of transport costs would have been economically damaging, some pooling did occur by having transport charges related to distance. This encouraged growers to deliver grain to silos on branch lines close to their farms rather than cart grain to busier lines. There are substantial differences in the overhead costs incurred on different railway lines that have to be allocated to grain and other freight, according to the amount of grain and other traffic carried.

Charging distance-related freight rates and uniform storage and handling charges was not the most efficient way of managing the rail system or encouraging a rational distribution of delivery points for grain. Transport costs loom so large in grain marketing that policies which encourage waste, in the provision or use of grain transport facilities, need to be strenuously avoided.

The major concern with the widespread pooling in the Australian wheat industry was that pooling had more effects than the sharing of risks. Pooling averaged costs of performing various marketing functions amongst growers. Wheat growers therefore were not able to make economic decisions based on the costs of marketing services and their valuations of the benefits of marketing services. Under pooling, a standard service, which all must use, is offered for a common charge. Charging an average price for marketing services means that some users pay more than the costs they impose on the system. Others pay less. Similarly, the service that is offered is less than some would be prepared to pay for. Others are purchasing more of the service than they would choose if a range of services with different characteristics were offered for different prices.

One of the major difficulties when considering the economics of pooling is that many of the marketing services where charges are pooled are capital-intensive. Transport, storage and handling are obvious examples. Pricing is inherently complex in these cases, whether pricing decisions are made in a private market or under public ownership. Private firms have to recover their capital and operating costs in the long-term or face insolvency. In private markets, other firms will purchase the assets of insolvent firms with revaluation of the capital stock. These firm then attempt to recover their capital outlay. Public agencies that do not recover their capital and operating costs are condemned to be reliant on government subsidy.

There is more to the idea of cost recovery than meets the eye, when full cost recovery is advanced glibly as the rule to be followed by private or, especially, public business. The prices that are necessary to recover costs depend upon the way capital costs are amortised over time. While operating costs of marketing services requiring durable capital may be calculated reasonably precisely, how the cost of capital is converted into an annual charge depends upon predictions about the future, about which different private owners would take different views.

The unit capital charge required by firms which are optimistic about future prospects will be lower than that required by pessimists. In that sense, what are sometimes referred to as marginal costs in economic analysis represent matters of opinion rather than economic 'fact' (Webb 1977). Decisions about how capital charges are incorporated in prices are part of the competitive process between firms. In public enterprises, some charge has to be made for capital to prevent extravagant investments and regulation-induced slackness (Quiggin 1988).

The pooling system required that there be a means of paying growers the aggregate pool price based on averaging returns from all markets, with deductions for marketing costs and adjustments when applicable for buffer fund transactions. Until the introduction of underwriting, the pool payment system meant that the proportion of final payments paid in the first advance varied inversely with the export price. As pointed out above, this meant that the pool payment system worked against the intention of the buffer fund and destabilised farmers' receipts with drastic effects on farm financial management. Only with the deregulation of the domestic market, have growers regained the opportunity to gain some control over their flow of funds by controlling their time of marketing.

There are several different ways of thinking about pooling. In the first instance, pooling can be thought of

as an insurance contract whereby producers agree to share price risks (Sieper 1982). In markets for commodities, producers face considerable uncertainty in deciding what is the 'real' price given that the prices observed in free markets exhibit randomness as well as reflect purely economic signals about current and anticipated supply and demand. Therefore, pooling is not exclusively a characteristic of statutory marketing, although compulsory pooling is usually associated with statutory arrangements. Although it will not always be recognised as such, some pooling arises informally in private marketing arrangements due to limits to the frequency at which prices can be changed. When allowed the option, producers often pool prices voluntarily in private or cooperative marketing systems to manage the price risks of sales in different markets, in space and time.

The view taken by Quiggin et al. (1994) is that pooling is like a common property resource. This contrasts with the private interest theory of pooling where pooling is seen to be in the private interests of particular groups. Sieper (1982) is the most notable Australian advocate of the private interest view. The argument of Quiggin et al. is that 'income redistributional analysis is implausible because there is no obvious reason why grain handling authorities or Governments would want to redistribute income in this way.' (Quiggin et al. 1994, p. 263).

The argument in favour of the common property view is that pooling is related to producers' ex ante contributions to pools rather than their ex post realisations. Growers are regarded by Quiggin et al. as the owners of pooling authorities rather than passive victims of pooling. In effect, growers, who are part of a 'pool' see themselves as arranging investment in capital facilities, which are characterised by substantial economies of scale and scope, on their own behalf. Growers obviously stand to gain if they can encourage technical efficiency in investment decisions.

Requirements for Effective Grain Marketing

Preliminary Remarks

It is now possible to summarise the important themes introduced in the paper. Building on discussion of the nature of agricultural marketing and the experience of grain marketing in Australia, the major conclusions reached are as follows:

- marketing activities are unavoidable and involve substantial costs,
  - efficiency in marketing has to be considered;
- a marketing system is required to coordinate production and consumption,
  - this implies the need for a system of price discovery to guide production and consumption and to coordinate, and price, provision of marketing services;
- complex marketing systems involve numerous changes of ownership,
  - how commodities are bought and sold has pervasive economic effects;
- grain is diverse in type and quality,
  - grading and classification is important for producers and consumers;
- production has become more separated from consumption in space and time,
  - this requires transport and storage facilities.

The four aspects of marketing discussed in this section of the paper are:

- price discovery and futures markets;
- buying and selling arrangements;
- grading and quality assurance, including economic characteristics of grading schemes;
- economic functions of storage, especially the roles of private and public storage.

Suggestions about future research on grain marketing are made in the next section, dealing with implications of the analysis for China. Efficiency in marketing is discussed in the conclusion.

Price Discovery and Futures Markets

The process of competition is justified in orthodox market economics because competition not only allows the use of known information on costs incurred by firms and demands from households to establish prices, it is also an efficient means of generating the information necessary to guide decisions by businesses and households in a situation where, in the nature of the case, the economic 'facts' helpful to make those decisions are transient in nature (Hayek 1978). In effect, competition not only uses available economic information, it also 'manufactures' some of the additional information necessary for competition to take place.

Consequently, the concept of price discovery has to be considered alongside the concept of price determination. In agricultural marketing, the prices of interest are the prices of commodities and of marketing services. Price discovery refers to the process by which buyers and sellers arrive at prices and the terms and conditions of sale. Price determination deals with the theory of pricing and how economic factors influence prices under different circumstances.

Methods of price discovery have been categorised by Tomek and Robinson (1981, p. 214) as follows:

- informal negotiation between individuals;
- trading on organised exchanges or auctions;
- pricing via formulas;
- bargaining conducted by producer associations or cooperatives;
- administrative decisions, both in the private and public sectors.

These systems of price discovery are used in the grain trade, often in association with one another. Trading on organised exchanges or auctions is the most significant method because quotations from central markets are a point of reference for other transactions. Direct marketing of products between farmers and processors becomes more important as economic activity becomes more specialised and markets more concentrated. The pricing role of central markets is

enhanced, as distinct from their role as places where actual exchange of products takes place.

Two types of trading occur on organised markets:

- spot or cash trading in commodities, usually based on inspection or samples;
- trading in futures contracts.

Futures contracts specify the price, quantity and grade of the commodity to be delivered at a future date. While futures markets are an important means of price discovery, they perform other valuable economic functions. Futures markets evolved first in the context of storable commodities. More recently, futures trading has developed for financial instruments. Futures markets need to be considered in terms of their institutional form; their economic functions and rationale; and their place in the grain marketing system.

Historically, futures markets developed spontaneously to meet the needs of traders who wanted to fix prices on which they could conduct business at some later date. Once time becomes important in the organisation of economic affairs, traders need protection from their exposure to price risks, in respect of their investment in stocks and commitments they have undertaken for forward sales. Otherwise, economic coordination in time is costly and extremely vulnerable to default (Phillips 1966)

Early forms of futures market arose in the Netherlands in the late sixteenth century, although their modern development dates from the nineteenth century when trans-Atlantic trade in commodities was growing rapidly (Goss and Yamey 1976). Spontaneous development of forward and futures markets has also occurred in contemporary China, in another situation when markets are developing rapidly (Watson 1987). Futures markets are different from forward markets, although they usually develop from forward markets. Futures markets are distinguished by the formal nature of their institutions and practices, and the protection afforded against default.

There are key aspects of procedures followed on futures markets that should to be described before proceeding to a discussion of their economic functions. 'A futures contract is a legal contract, enforceable by the rules of the exchange on which it is traded, to deliver or accept delivery of a definite amount of a commodity during a specified month at a specified price' (Tomek and Robinson 1981, p. 230). Trading is organised by a clearing house which keeps records of all transactions. The responsibility of members of a futures exchange is to the clearing house which is on the other side of each transaction. Non-members of the exchange (the 'public') deal through members of the exchange.

Traders have the option of making delivery on contracts in the delivery month, but delivery in the physical sense seldom occurs because traders take offsetting positions to discharge the obligation to deliver or accept delivery. Traders on futures markets are usually classified as 'hedgers' or 'speculators' according to the trading strategy that has been adopted. Hedgers are defined as traders who have taken an opposite position in the futures market from the position taken in the spot market. This strategy protects hedgers from price changes during the life of the contract. Futures prices and spot prices converge as the contract approaches the delivery time. The option of delivery ties the two prices together at the maturity of the contract.

Speculators take positions with the expectation of making profits through price changes in the time that contracts are held. The distinction between hedging and speculation is somewhat artificial. All traders in futures (and other) markets behave in ways which best advance their economic situation. Rational producers or merchants would not engage in a short (selling) hedge if they believed that there was absolutely no chance that prices would fall in the time that stocks (inventories) were held. Similarly, merchants would not take long positions (buying hedges) in futures markets, if it were strongly believed that prices would fall so that protection against price increases was not required. Hedging therefore should be considered as part of the business strategy of firms with obligations in the physical market, not a routine risk-shifting device.

The futures price for a storable commodity cannot exceed the spot price by more than the cost of storage. This is because it would otherwise pay traders to purchase the commodity and sell a futures contract. The commodity could then be delivered against the futures obligation and a guaranteed profit would be achieved. The resultant sales of futures contracts and purchases of grain under these circumstances restore the difference between spot and futures prices (the basis) to no more than the cost of storage.

There is no logical limit to the size of the negative basis (futures price is less than the current spot or cash price). A negative basis occurs when stocks are low relative to expected supplies — such as at the end of a crop year, when a new harvest is anticipated. The celebrated theory of the price of storage has explained the

negative basis in terms of the convenience yield of holding small quantities of stocks to maintain business and continuity of operations (Working 1949).

It follows that the existence of futures markets greatly assists the carrying of stocks of seasonally-produced commodities. However, there are important requirements for the success of futures trading. In particular, a futures market clearing association can be interpreted as a method of coping with risk of default (Anderson and Gilbert 1988). If rigidly enforced, the risk of default is eliminated by the margin system through which additional collateral (equity) is posted on positions that suffer adverse price movements.

Gains and losses are therefore taken as they occur on futures markets. Each participant is 'marked to the market', providing an automatic protection against default. By contrast, in forward markets, there is always one unhappy party to a transaction, with the temptation to walk away from a forward contract. Gray (1976) described the system of margin deposits as the most important financial innovation in the development of futures trading.

Futures markets for grain are important marketing institutions in North America and Europe in facilitating the supply of private storage, and associated marketing and processing functions. Futures markets are central to the operations of marketing firms. However, farmers' use of futures markets is minimal—less than 10% of U.S. farmers use futures.

Futures markets are not important for agricultural industries in Australia. Most obviously, this is because of past policies which transferred risk management from farmers and marketing firms to public agencies. However, there are other reasons—some subtle, which make the lack of interest of Australian farmers in futures trading a rational response to their economic environment rather than ignorance, which advocates for futures trading are inclined to imply.

Grain futures markets would not be expected to have the same significance in Australia as other countries, because grain-feeding industries are not as important. Furthermore, other means of risk management such as enterprise diversification and financial management strategies have evolved in Australia. Futures markets have to compete as risk management instruments with other mechanisms. In Australian broadacre farming, there is a powerful incentive for enterprise diversification between crops and livestock because greater efficiency is possible in the use of labour, which can be used year-round by integrating the flexible seasonal tasks of sheep and livestock production with the time-specific demands of crop production. In addition, the temporal patterns of the effects of weather variations on output have completely different characteristics for crops and livestock. Crop yields are sensitive to weather variations in the short-term, but quick to recover. Livestock products have the opposite pattern. This reduces the effect of climatic variations on aggregate output on mixed farms. This is another powerful reason for enterprise diversification under Australian broadacre farming conditions.

Once enterprise diversification is practised because of these special relationships in production, a degree of income insurance arises inevitably because prices of crop and livestock products are determined independently. Consequently, the reduction of financial risks associated with enterprise diversification does have characteristics something like a 'free good' in Australia's grain/livestock farming areas. This is very different from the situation in North America or Europe, where specialised production is more common. Farmers with trading margins to protect in specialised farming systems are most likely to use futures markets.

For several reasons, futures markets are unlikely to be important for farmers in most countries. Usually, farmers will find that saving and borrowing through the financial system is the most convenient means by which risk can be managed. It should be stressed that futures markets are much more important to processors and traders than individual farmers. Farmers benefit because marketing and processing is more efficient. Futures markets are useful because they allow marketing firms to specialise because they are able to shift risks. Futures markets increase the range of options available to marketing firms. For China, further development of futures markets is potentially useful to marketing agencies because of their contribution to greater trade and regional specialisation in grain production and grain-based industries.

In effect, futures markets allow decisions about the time of selling grain to become part of a conscious marketing strategy rather than a residual one. Similar transactions are possible through international grain merchants. It is also possible to increase or protect industry revenue through forward or futures transactions in money and freight markets.

A characteristic of successful commodity trading companies is that they organise their affairs to concentrate on the provision of marketing services to their

customers. In a world of uncertainty, this requires that traders minimise effects of price risks on the survival of their operations. In other words, they do not speculate. In practice, hedging will not be performed in a routine fashion. Specialised traders will use their knowledge of market developments acquired in the performance of their other marketing functions.

An important role of futures markets is to focus the attention of large numbers of buyers and sellers on commodity prices. In that process they aid the process of price discovery, shift risks to market participants willing and/or able to bear risks of price changes and allow intermediaries to concentrate on the performance of marketing functions.

Buying and Selling Arrangements

How commodities are bought and sold has pervasive effects on production and consumption. In recent years, an elaborate system of retail and wholesale markets has developed rapidly in China following economic reform and substantial deregulation of the economy. Most aspects of the retailing and wholesaling of grain lend themselves to coordination by the price mechanism. Even on small farms, output is large relative to the daily needs of the consumer. For a cash grain economy to emerge, a network of assemblers, wholesalers and retailers is necessary to provide the small parcels of grain required regularly by consumers.

With diverse products like grain, attention has to be given to quality and customer needs. Large organisations are unlikely to provide the same service as small, local and accountable businesses. The customer is best placed to express her/his requirements with a decentralised marketing system and, in particular, will be in a position to act quickly if dissatisfied.

As markets evolve at the local level, producers and consumers will be reasonably well-informed about the qualities of grain and will be able to express their preferences through their sales and purchases. The situation becomes more complicated as private trade in grain extends between regions and between the countryside and urban centres. Quality control will then become more of an issue and mechanisms will be required to solve disputes about prices and technical qualities of grain. Price reporting and provision of local inspection services guaranteeing the integrity of weight and measures will contribute to the confidence of buyers and sellers as the market is widened.

More difficult issues come into play with respect to inter-regional trade in grain. In China, inter-regional trade is occurring in both directions—buying and selling. Decisions have to be taken about the advantages of single desk buying as well as single desk selling. The objectives of provincial governments have to be reconciled with those of the national government. The Chinese grain economy is so large that it is not feasible that centralised operations could be more successful than trading decisions taken at the local level. The information needed to exercise control is substantial in a situation where inter-regional trade is a balancing item. Prima facie, the arguments in favour of single desk buying are slightly stronger than those for single desk selling. This is because government-to-government relationships may be involved. This difficult economic question is worth exploring further.

Grading and Quality Assurance

The economic role of grading of agricultural products can be thought of most simply as sorting undifferentiated commodities produced on farms into various grades before offering the grades to consumers. Output from farms will comprise several grades; deliberately, because of conscious plans by farmers to differentiate their product; or accidentally, because agriculture is a production process over which farmers do not have complete control. Consumers have different tastes and incomes, within and between the groups to whom the commodity is sold.

Grading allows price premiums and discounts for different grades of the commodity to emerge around the average price for the undifferentiated product. Grading is an important aspect of the coordination function of marketing, guiding what will be produced and how it will be sold. There are economic benefits and costs in grading from the points of view of both producers and consumers.

On the demand side, grading is advantageous because it allows consumers with different incomes and tastes to express their separate demands for grades of the product. Low income consumers will be able to purchase cheaper grades of the commodity, which would be impossible if the product were undifferentiated. Grading always represents an improvement for consumers, because consumers have the option of purchasing the commodity in the proportions of the ungraded product.

The case for grading is more problematic on the supply side. Farmers benefit from the introduction of grading to the extent that their pattern of output matches the premium grades and/or they gain from lower costs through specialising in the production of a particular grade. Inevitably, some producers were receiving a higher price for less-preferred grades of the product, before grading was instituted. (The underlying economics of grading has much in common with the economics of pooling.) More costs of adjustment are involved for producers in shifting their pattern of production following grading than is the case for consumers, who can change their consumption patterns more or less without cost.

The fact that price differentials emerge after introduction of grading does not constitute an overwhelming case for more grading and segregation. Costs of grading should be considered. Although grading adds value to products, it is essential that there is a clearly defined market for the product and grading is profitable. Grading raises different issues for grain than other commodities. This is because once grades are commingled, grain cannot be segregated.

Grading comes to the fore in agricultural marketing once output of agricultural commodities exceeds the requirements of bare subsistence. Problems related to inadequate systems of grading in the past emerged in China following the economic reforms of 1978. Matching supply to demand was not a problem when shortages existed during the two previous decades. When incomes rose rapidly in the 1980s, consumers were more selective in their purchases. In the absence of grading systems that reflected consumer valuation of quality differences and the costs to producers of producing separate grades, the Chinese Government was left with excess stocks of the poorer qualities of grain which proved difficult to sell (Sicular 1988, p. 290).

Grading has both technical and economic dimensions. Grade standards have to be established and credible means of communicating them to producers and consumers are required. The critical economic issue is the role government should play in grading. Government usually will have to guarantee the integrity of grading. The longer the marketing chain, the more difficult it becomes for buyers and sellers to agree and enforce terms and conditions of sale.

It should be noted that the absence of standard grades developed and enforced by government does not mean that grading does not exist. Information about quality can be transmitted informally by members of a trade.

Government has an obvious role in providing inspection services in international trade, which are necessary to satisfy protocols with foreign governments. Sometimes the grading standards imposed by foreign countries are unreasonable and effectively non-tariff barriers to trade. The recent GATT Uruguay Round succeeded in achieving international agreement on rules of conduct for sanitary and phytosanitary procedures, directed towards legitimate concerns with reasonable quarantine standards.

In recent years, there has been a reconsideration of the characteristics of goods and services which determine their suitability for market-based organisation. This has led to re-examination of the economic case for government involvement in grading and inspection. The following notes on grading are based on a paper by Wills and Harris (1994), developed mainly in the context of Australian trade in meat. Many of the same observations apply to grain.

Goods can be thought of as being 'search', 'experience' or 'credence' goods, according to the method used by buyers to obtain information about product characteristics. Consumers, retail or wholesale, cannot ascertain all the desirable attributes of grain by direct inspection, or 'search'. Some of these attributes will be immediately experienced in use, such as taste and freedom from contamination. Because this information will be used by consumers in deciding whether to make repeat purchases, 'experience' goods can generally be traded freely on the basis of the reputation of firms. Some other attributes (of 'credence' goods) cannot be traced back to a particular supplier, because it will be some time before the effects are noticed by consumers, if at all.

Credence goods, therefore, are usually certified on the basis of official inspection by exporting and importing countries. There is no reason, in principle, why trade in credence goods could not be based on the reputation of private firms, as is obviously the case in world trade in electronic goods, beer and wine. Private trade in credence goods will be successful if buyers can be convinced that sellers have enough to lose through misrepresentation. In essence, this is the function of company branding and other devices like warranties that both establish and maintain reputation.

Establishing reputation by private firms involves cost and time; a process which is almost certainly characterised by economies of size. This is why small firms

and/or new firms find it difficult to trade in credence goods. The variability of international trade in grain is also an impediment to using private brands to establish reputation in the grain industry.

Grain clearly satisfies the criteria that define both experience and credence goods. International trade in products like grain creates serious problems in quality assurance. Multinational firms and joint ventures are one method of solving the difficulties in transmission of information about quality between buyers and sellers.

Because of a lack of objective information about grain quality, foreign buyers are often placed in the position of using country of origin as a proxy for judging quality. This leads naturally to calls for regulation of quality by the governments of exporting countries to protect firms from the irresponsible behaviour of others. There are two principal issues that have to be considered with respect to official inspection schemes:

- Individual private firms still have some incentive to cheat because their individual reputations are not on the line; nor do they have the same commercial incentive to use the normal mechanisms for guaranteeing buyers that their products are of the required quality.
- The method and costs of providing official inspection have to be considered, including how the costs of inspection will be recovered.

As a practical matter, grain exporting countries have no real choice but to have official inspection arrangements. Health is a politically sensitive issue. Consumers of credence goods are not in a position to protect themselves and expect governments to do so on their behalf. It is most unlikely to be a satisfactory strategy to rely exclusively on country of origin as the basis on which trade in grain is conducted.

The system of product description has to cope with a range of types and grades of grain. A coherent public or private marketing strategy should always provide for disposal of output which is not of the most desired grade, so long as the grades are accurately described.

When private firms arrange their own quality control systems, they have powerful incentives to do so at least cost. This does not apply to official inspection schemes. This is an argument for recovery of inspection costs from exporters. Another argument is that exporters receive the benefits of grading and therefore should be expected to pay.

Irrespective of theoretical arguments, it is a matter of fact that quality standards of export wheat are higher, in the sense of the reliability of grades in meeting consumer requirements, under the closely regulated Australian system than the more market-based U.S. wheat marketing system.

Storage

Storage enables the supply of a commodity to be redistributed in time and permits divergences between the rate of production and the rate of consumption (Parish, undated). Even in a world of certainty, storage would be undertaken because of seasonality of production; changing demand over time; and economies of size in production and distribution which mean that it is cheaper to obtain large quantities at intervals and store the product until it is used. The first and third of these explanations are obviously important for the storage of grain between harvests and storage of locally-produced or imported grain consumed by the non-farm population.

In a world of certainty, storage would not present many problems. The major problem would be arranging the physical aspect of storage; in particular, providing facilities which maintain the quality of grain and minimise losses in the period that grain is stored. Grain is subject to damage from many sources. The importance of investing in scientific knowledge of the postharvest treatment of grain and all technical aspects of grain storage should not be underrated.

The difficult issues arise because of uncertainty of production and consumption. Surpluses occur because of better-than-average harvests in countries which are more or less self-sufficient in grain. Surpluses also occur for trading countries when demand is less than anticipated. Storage is required in both instances. How much storage should be provided depends upon the benefits and costs of storage which, in turn, depend upon the variability of production and consumption; the price responsiveness of supply and demand; the costs of storage, most notably, the actual or imputed interest costs of funds tied up in stock; and the size of the market over which the risks of surpluses and shortages are being spread.

For individuals or firms the incentive to store is an expected rise in the value of the commodity. In the absence of futures or forward markets, expectations may not be realised and individuals require a higher

return on their investment in stocks to offset risks of losses during the period of storage—a 'risk premium'. This would be reflected in lower prices for producers at harvest. As explained above, futures markets enable the return from storage to be known with certainty. This is an example of the observation made above about futures markets. Shifting price risks enables marketing firms to specialise in the provision of other marketing functions and allows marketing services like storage to be performed at lower cost.

The economics of storage cannot be separated from the processes of price discovery and price determination. Pricing grain over time requires some form of speculation. The important issue with respect to storage is whether it should be performed by private firms or public agencies. Does the free market provide an appropriate means of organising storage? The question, as with many other issues concerning price stability, has been analysed at some length with no overwhelming conclusion pointing in either direction (Schmitz 1984). The classic work in an extensive theoretical genre is Newbery and Stiglitz (1981). After engaging in conjecture along standard lines of inquiry, some pragmatic comments are offered on the Realpolitik of storage, based on Australian experience with wheat and wool.

Storage has features that lead to the existence of private monopoly, especially at the local level. There are economies of size in storage which create problems of entry for new firms. Specialised knowledge is required to trade in commodities over a long period. Speculators have the potential to exploit producers and consumers. Little wonder governments and producers have sought to limit private speculators, regulate private storage or provide public storage. An alternative approach for government would be to provide or encourage price-reporting services, including futures markets, offsetting the danger of concentration of information in a few hands.

The benefits of storage will be maximised when the marginal benefit of storage equals the marginal cost of storage. In a well-functioning market, with many firms engaged in speculation and storage, the maximum benefits of storage occur when the expected price difference between buying and selling periods equals the marginal cost of storage. A monopolist, local or otherwise, would attempt to equate the marginal cost of storage with marginal revenue from storage. With a downward-sloping demand curve, marginal revenue is less than price. Consequently, the prediction from economic theory is that less grain would be stored with monopoly storage than with competition in the provision of storage.

The situation changes if producers are organised in a marketing cartel. Marketing cartels then assume the role of speculators as well as providing storage services. As speculators, producers may be willing to accept some loss or less profit on storage, provided they receive compensating gains as producers. In this situation, the opportunity producers have to practise price discrimination in setting the absolute price also has to be considered. Producer marketing cartels will consider the possibilities of influencing prices in buying and selling periods, as well as returns from storage per se. It is therefore unclear as to whether monopoly in the storage industry would lead to more or less storage than a private market for storage.

Given the fluctuations occurring in the price of commodities and the catastrophic effects that can occur, national and international attempts at price stabilisation are easily understood. Buffer stock schemes have been used for a range of storable commodities, whereby an official body attempts to stabilise prices and guarantee availability of supplies through official speculation. That is, by 'buying the commodity cheap and selling dear'.

Buffer stock schemes have a most chequered history internationally, and their frequent failure has been attributed to a mixture of conceptual and administrative difficulties (Gardner 1985). Storable commodities like grain are subject to peaks in prices when unforeseen increases in demand, or shortages of supply, mean that stocks are insufficient to moderate price rises (Wright and Williams 1990). The danger for a buffer stock scheme is that the reserve price follows these peaks upwards, because the change is regarded as permanent by the managers of the scheme. Behind the general enthusiasm of politicians for buffer stock schemes, national and international, hides the common and superficial confusion between the worthiness of an objective (more stable prices) and the chances of bringing that objective to fruition. The actual performance of buffer stock schemes has not lived up to these expectations.

Two economic problems stand out in administration of official stabilisation schemes:

- the difficulty of forecasting prices;
- the inevitable tendency of public storage to displace private storage.

Despite the enormous amount of effort devoted to forecasting commodity prices, there is no convincing evidence that these efforts have been worth while. In fact, orthodox market economics and common sense teaches that prices cannot be forecast, rather than that they can. In well-functioning commodity markets, prices will reflect available information on current and forthcoming supply and demand. If any credible information about forthcoming prospects were available, that information would have already have been incorporated in the current price. For information to be genuinely new, it must have arrived at random. Otherwise, it would have been anticipated and reflected in the existing price. This simple theory is easiest to understand in the case of perishable products. It does not require much modification in the case of storable products. Storage has the effect of spreading periods of unusually high or low demand over several periods.

Even if prices could be forecast successfully by well-informed administrators, the theoretical attractiveness of buffer stock schemes is diminished once it is recognised that public storage drives out private storage. The stockholding task then becomes larger than was envisaged.

Like economic activity in the private sector, economic activity in the public sector must be managed. The chances of buffer stock schemes being successful depends on the quality of their administration. Prices have to be set taking account of long-run trends in supply, demand and prices. There will be the temptation for producer and consumer interests to concentrate on short-run developments. Because of the tendency of agricultural prices to decline in the long-run, substitution possibilities with uncontrolled products and supplies available from outside the buffer stock arrangement, buffer stock schemes are vulnerable to the short-sighted behaviour of producers tempted to push price beyond reasonable market expectations.

Successful buffer stock schemes require strict codes of conduct and professional, strong and independent operation. A reasonable analogy is the autonomy granted to Central Banks. Recent unfortunate experience in the Australian wool industry provides a spectacular example of the perils of allowing producers too much influence over buffer stock schemes, especially in an environment where the source of volatility in prices has changed dramatically (Watson 1990).

Public stockholding is not justified for the Australian grain industry. The AWB follows a policy of selling the crop each year with only limited carryover to maintain supplies to the local market. The main reason for this is the unpredictability of export prices. Prices can just as easily move in either direction. The cost of storage is always positive. Consequently, the expected net revenue from storage is negative (Alaouze et al. 1978b). The only circumstance under which it would pay Australia to store from season to season would be if the world market is over-supplied and it is known that other countries are restricting their sales to increase prices (Alaouze et al. 1978a).

Storage policy is more complex for countries like China, which is close to self-sufficiency in grains. The motive for stockholding is food security not price stabilisation as with buffer stock schemes. There are substantial differences in stockholding for food security from buffer stock schemes. The costs of shortfalls in supply are substantial. Fortunately, China has a range of crops and harvest times in its flexible cropping system. Imports of grain are a cheap way of managing food security, particularly because the form of price support practised in the United States effectively guarantees that supplies of grain will be available.

An efficient storage system also requires adequate transport and physical storage facilities, together with institutions like futures markets which generate economic information and enable pricing of grain over time. Detailed mathematical and statistical research on grain storage in China using the techniques of operations research is likely to be a most fruitful activity.

The key policy question for the Chinese authorities is to decide who is in control of storage operations. While there are good arguments for decentralising decision-making in most aspects of grain marketing, the argument is different with respect to strategic stocks. Coordination is required for stocks held for food security purposes. Provincial or local governments, whether in grain surplus or deficit regions, are unlikely to face the same imperatives as the national government.

The mathematics of inventory theory suggest that a smaller strategic stock of grain for food security purposes is possible, the wider the market over which grain is stored. While stocks held for food security purposes need to be held in a range of locations for reasons of flexibility, the stocks should be under central control.

Some Implications for Grain Marketing in China

The Chinese authorities, like their Australian counterparts, have to reconcile competing objectives in the design and implementation of agricultural marketing arrangements. In both countries, the history of grain marketing and attitudes of producers have to be taken into account. What is possible in marketing reform depends on what is understood and acceptable. Reform of grain marketing should be accompanied by plans for implementation and consideration of second-round effects.

The objectives of agricultural marketing policy include the following:

- minimisation of marketing costs;
- enhancing the coordination function of marketing;
- creating public and private marketing institutions to satisfy economic, physical and technical aspects of grain marketing.
- managing the integration of marketing policy and price policy—in particular, how marketing policies should be directed to distributional objectives.

Ultimately, price and marketing policies are the outcome of the interaction of political and economic factors. A critical factor in designing pricing and marketing institutions will be the mechanisms available to achieve price and income objectives. China has limited capacity to use the taxation and social security systems to achieve transfers of income to farmers and other groups. This is not the case in Australia. While analysis of grain marketing in Australia provides many insights, the comparison should not be pushed too far. Income transfers can be readily undertaken in Australia. There is no need to intervene in the grain marketing system to provide direct income support. Food security is not an important objective because such a high proportion of agricultural output is exported.

The claim on income of a high proportion of the Chinese population is tied to employment in grain production and consumption of their own output. Instability of prices and production therefore have immediate and severe consequences for producers and consumers. Finding ways of stabilising prices and incomes will have high priority. Australian experience of wheat stabilisation provides little encouragement that managed programs provide all the answers. As pointed out by Schmitz (1984), liberalised trade reduces the need for buffer stocks held for food security because trade has a stabilising effect. This applies to both inter-regional and international trade.

In a sense, trade has similar effects to price-stabilising speculation through buffer stocks. That is, trade is also a means by which individuals, firms and countries can engage in 'buying cheap and selling dear', through economic transactions, rather than by shifting stocks over time.

The complexity of production, consumption and marketing of grain and the diversity of information required to make marketing decisions, mean that the most important policy decisions concern the allocation of grain marketing functions between public and private organisations. Not all grain marketing functions lend themselves to unfettered operation of private enterprise and the price mechanism. Grain storage has economic characteristics leading to local monopoly; to the disadvantage of farmers, with the danger of excessive prices being charged to consumers. Some form of regulation is required to control margins and ensure competition in the supply of storage services. In many circumstances, public or cooperative supply of storage may be necessary to protect producers and consumers.

In addition, some marketing activities which are perceived as exclusively in the domain of private enterprise in market economies could just as sensibly be described as regulated. For example, futures exchanges closely supervise the behaviour of their members to ensure prudential operation. Government agencies also exercise controls on futures markets. As discussed above, margin deposits and margin calls were a crucial innovation to ensure that futures markets are a successful risk management and price discovery device. However, futures markets do not influence the economic forces that determine grain prices. Futures markets allow marketing services to be

provided more efficiently but their role in influencing the absolute price of grain is negligible. While the development of futures markets in China should be encouraged, their economic effects should not be exaggerated.

The importance of institutions concerned with the generation and distribution of information for a well-functioning market economy have been graphically described by Intriligator (1993) in the context of the acute problems faced by the Russian economy in its faltering transition, following the abandonment of central planning.

> The basic transaction of a market economy is extremely simple: one economic actor, i.e., an individual or an entrepreneur wants to sell something and another wants to buy this commodity, so they make a mutually profitable transaction. This is multiplied an astronomical number of times in a market economy. What provides for such a microeconomic transaction? First, the buyer and seller must know what they own and what they can buy, making necessary a system of property rights. Second, the seller must know about the existence of the buyer. This requires advertising, especially classified advertising, and other information systems. Third, there must be a way of formalizing the transaction and settling disputes, necessitating a system of contracts, laws, commercial codes, etc. Fourth, a banking and financial system is required to finance the transaction. Fifth, an insurance system is unavoidable so as to insure what is bought and sold. Sixth, an accounting system. Seventh, barter transactions should be avoided if possible, which requires money, both as a unit of account and as a means of payment.

The simple analytical rule which describes the spatial organisation of production in competitive markets is that price differences cannot exceed transfer costs (Tomek and Robinson 1981, p. 151). Arbitrage will occur until it is no longer profitable to shift production between markets. The consequence for marketing policy is that anything that lowers transfers costs enhances trade and offers the prospect of second-round gains from further regional specialisation.

The development of institutions to provide economic information to producers, consumers and marketing enterprises is crucial to the efficiency of agricultural marketing. In the first instance, price-reporting services which make information on regional price differentials and transport costs readily available would encourage growth of trade and specialisation. Moreover, price-reporting services are an important ingredient in ensuring that a reasonable degree of competition exists in the supply of marketing services. As stated, parts of the grain marketing system are vulnerable to anti-competitive behaviour. Widespread dissemination of economic information can provide some protection against monopolistic actions by marketing agencies.

Research on transport policy is one of the most useful activities that could be undertaken to improve the efficiency of grain marketing in China. Not that it should be presumed that greater trade should be sought per se. Expansion of domestic trade in grain will require a major investment in transport and other marketing infrastructure. In particular, grain transport and storage is characterised by an inherent peak load problem because of seasonal harvests. It is necessary to consider carefully investment in capital facilities which are used intermittently.

Australian experience is that internal (land) transport charges amount to about 25% of the seaboard or f.o.b value of grain, and sea transport charges another 25% of the landed or c.i.f. value at major destinations. Transport and associated handling costs account for a high proportion of the value added in Australia's participation in the world grain trade. There are no policy issues of concern to either grain exporters or grain importers with respect to ocean transport, because rates are determined so competitively. The difficult questions are with respect to domestic carriage of grain.

On this score, China faces interesting policy questions with respect to transport, which are amenable to quantitative economic analysis. The basic choice that has to be made with respect to grain transport policy is the emphasis to be given to transport of grain by various modes. In Australia, the debate has concerned road versus rail transport. In China, the choices include transporting grain from domestic sources by rail or internal waterways, or from external sources using ocean transport. Since expanding land transport is going to require capital investment, this is an important economic issue. Sea and water transport are cheaper than rail transport in China, which is in very short supply.

Concluding Comments

Australian experience in grain marketing teaches several lessons. The most obvious consequence of intervention and orderly marketing in the Australian wheat industry for the thirty years following 1948 was that producers received prices which were not closely related to world market prices. Moreover, marketing costs in transport, storage and handling were much higher than justified. With considerable patience and effort, the marketing system has gradually been reformed.

Government intervention, without careful attention to its effects on the marketing system, may easily impose costs on producers, consumers and the economy as a whole. One of the key lessons was summarised by Miller and White (1980, p. 2) who observed that wheat marketing in Australia has been characterised by a 'confusion of objectives pursued in much of post-war wheat stabilisation policy'. The objectives were a mixture of income, price, production and national goals that were not always consistent and were easily perverted by convoluted political processes.

The story of grain marketing in Australia is a story of gradual change in the direction of deregulation. Whether the AWB is moving in the direction of becoming a private grain trading company along the lines of the multinational grain trading houses is the next major question being considered (Malcolm 1994).

It is an interesting technical question in financial economics whether an organisation which is essentially engaged in trading can be privatised in the manner of a joint stock company. There is no logical basis on which the assets of trading organisations could be calculated by those outside the organisation. The main asset of a trading organisation is information about markets, the value of which is ephemeral. Nor would it be easy for control of salaried management to be exercised at a distance by dispersed grower shareholders. In fact, the large trading houses in the grain industry are often family-controlled companies.

It seems likely that the fragile interstate alliances between wheat growers on which the past history of wheat growing and wheat marketing were based would prove fragile with the creation of a privatised AWB. Regional differences between producers remain a key issue for the Australian grain industry. Local differences with respect to access to export markets will be most difficult to reconcile without the backing of legislated powers.

In the Australian case, one of the most important lessons from the history of grain marketing is that the marketing system is not an effective means of achieving objectives with respect to income distribution. Because of the differences in the production system and institutional arrangements, the same conclusion does not necessarily apply to China, although it is an issue that should be kept uppermost in framing government policy.

Productivity and economic efficiency are not easy concepts to come to terms with in the study of agricultural marketing. Normally productivity is thought of in terms of relationships between inputs and outputs. Measures of productivity may be partial or total. Another way of thinking about the same issue is in terms of benefits and costs. Approaches based on measurement of marketing performance can be applied to parts of the marketing system. At times, technical measures of efficiency and comparative analysis will make sense.

The main test that has to be applied to marketing efficiency in a market economy concerns the ease of entry and exit of firms into the grain marketing system. The flexibility of the marketing system in terms of the ability to reorganise itself, vertically and horizontally, also needs to be considered. The efficiency of the marketing system cannot be judged simply by measurement of marketing margins and comparisons between products, between time periods or between locations.

What has to be attempted is a study of market performance analysing the rate of return or profitability of firms providing marketing services. The best guide is the ease of entry and exit of firms since this will indicate the chance of excessive profits persisting. The study of marketing efficiency in public marketing enterprises creates even greater challenges.

The two principal conclusions of this paper with respect to the development of the grain marketing system in China are that most attention should be given to the provision of market information and issues concerning grain transport, handling and storage. While improvements in market information can be achieved at relatively low cost and yield substantial benefits, the problems of transport and related activities are more difficult. This is because the costs of providing these parts of the marketing infrastructure are substantial and many of the specialised assets have few alternative uses. Efficient utilisation of capital embodied in the grain marketing system is a key issue.

Even more fundamentally, analysis of issues to do with transport, handling and storage is important because performance of these grain marketing functions is most likely to be characterised by uneven distribution of market power between producers, consumers and marketing enterprises. Policymakers obviously need to be concerned with the distribution of the benefits of marketing reform, not only for reasons of maintaining equity between the different groups affected. Unless the benefits of investment in transport and related infrastructure are shared with producers and consumers, the full benefits of marketing reform cannot be realised through second-round effects on production and processing of grain products.

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