CENTRALISATION OF INFORMATION AND EXCHANGE WITH SPECIAL REFERENCE TO THE SOUTH AUSTRALIAN WINEGRAPE INDUSTRY

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SWINBURNE INSTITUTE OF TECHNOLOGY
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SUMMARY

Characteristics of the South Australian winegrape market are: many scattered growers, relatively few grape buyers (winemakers), a perishable product and legislated prices for grapes.

Because of the problems associated with grape pricing in Victoria and New South Wales, as well as in South Australia, the establishment of a free market for grapes was recommended in 1985 by a high level inquiry (McKay report).

While the number of participants on both sides of the market may be sufficient for a free market, the lack of market information is likely to lead to a situation of high marketing risks for grape growers due to widely dispersed prices. The scattered nature of grapegrowing makes search costs high, accentuating price variability.

Economic theory is drawn upon to highlight the potential for the use of market power when incomplete and costly information exists. Also, when this state exists supply and demand shocks cannot be perfectly arbitraged. Centralisation of information would increase the number of effective traders in the winegrape market, and results from experimental economics support centralisation and greater availability of information as factors reducing price risks in markets. The theory also suggests that the problem of "white noise" may not be a serious problem in such a market.

It is argued that centralisation of the winegrape market is best undertaken with the aid of computers due to the reduced costs of hardware and the availability of software to handle centralised marketing.
As well as having a major impact on price discovery methods in the industry there are also expected to be structural effects from centralisation and provision of information. These include, firstly, the enhanced ability of small and/or scattered producers and processors to achieve a comparative equilibrium price and secondly, and end to the discouragement of investment and employment by the industry in South Australia.

In examining the functional alternatives for centralised marketing in the winegrape industry it is concluded, from experiences in the U.S.A., that systems capable of being widely acceptable to users should be adopted rather than more efficient but more alien ones.

In considering the acceptability of advanced marketing systems it is also recognized that an essential element is the ability to describe the product accurately, with acceptable quality differentials adequately expressed.

In the current 1987 winegrape vintage the United Farmers and Stockowners of S.A. Inc. has set up a broking service which matches up intending buyers and sellers of South Australian grapes.

This system is a forerunner of a more sophisticated system to be developed for the 1988 vintage.

State Government funding has been obtained to operate the broking service this season, to undertake the research necessary to develop an efficient and acceptable centralized system and to operate in the 1988 season.

Thereafter it is expected that the industry will itself fund a centralised market and information collection and dissemination.
1.

**INTRODUCTION**

From 1966 to 1985 minimum prices for winegrapes to be paid by proprietary wineries in South Australia were set by the State Government. Minimum prices were gazetted under the Prices Act and covered each variety individually and also distinguished between dryland and irrigated grapes, (there being a higher price for dryland grapes). Cooperative wineries were exempt from the legislation.

In the Murrumbidgee Irrigation Area of New South Wales a marketing board has set minimum winegrape prices since 1975. In the Sunraysia areas of Victoria and New South Wales, minimum prices were covered by joint State legislation and have been fixed since 1972 for the sultana and gordo varieties. In the dryland areas of New South Wales and Victoria grapes have not been subject to legislative prices.

The McKay Report (1985) recommended abandonment of statutory winegrape pricing and said "a move to a completely free market system would be in the long term interests of the grape and wine industries". The report also suggested that "a base price would be one possible stepping stone (to a free market) and would have the merit of freeing up the market. . .".

In South Australia in the 1986 vintage, minimum prices by variety were abandoned and a base price adopted. The base price consisted of a single minimum price covering all varieties of irrigated grapes and a higher minimum price covering all dryland grapes.

For the 1987 vintage the base price for grapes was abandoned in the dryland areas of South Australia, putting those areas on a par with Victoria and New South Wales. A base price was, however, retained in
the Riverland districts, which was not co-ordinated with pricing in the M.I.A. or Sunraysia.

On the total winegrape production of Australia of around 500,000 tonnes, South Australia produces around 300,000 tonnes and of this the Riverland contributes approximately 130,000 tonnes. About one third of South Australian winegrapes are grown by proprietary wineries themselves, and two thirds by independent growers.

Market outlets for South Australian winegrapes can be roughly differentiated as follows:

- 80,000 to 100,000 tonnes to S.A. co-operative wineries
- 250,000 to 230,000 tonnes to S.A. proprietary wineries
- unquantified amounts sold interstate.

During the period of statutory prices the market was characterised by negotiated contracts between the proprietary winemakers and independant grapegrowers, usually specifying minimum prices.

As a general rule, minimum prices were adhered to by proprietary winemakers, but anecdotal evidence suggests that about 10% of grape sales have been be-passing minimum prices by various means. Interstate trading has also allowed local undercutting of legislated prices.

Under the base price regime of 1986, contracts between wineries and growers continued to be written. These contracts became less effective because the price usually remained unspecified, particularly in the cases where premium varieties, expected to receive well above base price, were the subject of the contracts. In practice there was a "free" market operating for grapes expected to trade above base price.
Importantly the South Australian *winegrape* market is totally *lacking* in any market price collection and dissemination, except for low quality market information passed on by word of mouth.

The costs of gathering market information by both buyers and *sellers* are higher if undertaken on an individual basis, as at present, than if done by *pooling* of resources and information. *It* would appear that there is a psychic cost for many *grapegrowers* in *searching* in the market. These costs must be added to the *time* costs of search.

In the absence of market information, the abandonment of statutory *pricing* and the abandonment of base prices for only the *irrigated* areas there is likely to be a wide *dispersion* of *prices* for grapes, *subjecting* *growers* and to a lesser extent *winemakers*, to greater risks than hitherto. *It* is also likely that the market will be characterised by asymmetric information where *winemakers* are more aware of prices being paid (themselves and their *competitors*) than the *growers*. The result could be an average price for *winegrapes* *below* what would eventuate in a more efficient marketing system.

The establishment of a free market in the circumstances applying in the South Australian *winegrape* market requires more than the mere *removal* of statutory prices; substantial innovation is also *required*.

*Technological* advances have made possible *cheaper* and *better* collection and dissemination of data and *computerised* _marketing_ systems. *Computerised_ marketing systems have failed (Henderson, 1984) for various reasons but *competition from* existing _marketing_ system and failure to convince *potential* users _of_ benefits *seen* to be *common* ones.

The South Australian and Australian markets for grapes appear to offer extremely favourable environments in which to innovate, however, because of the _promise_ of comparatively high benefits.
2 PROBLEMS OF DECENTRALISATION

Imperfect and costly information fundamentally alters the conventional idealised notion of a competitive market, where all participants are price takers, the market always clears and there is a single arbitrated price. Indeed there is a growing body of literature which has a basic them that competitive equilibrium might not exist under these circumstances. Stiglitz (1977, p. 391) in reviewing papers in the 1975 Stanford Conference on the Economics of Information claimed that:

"... for at least certain situations, the conventional full information paradigm is not even a good approximation; markets with even a little bit of imperfect information may look distinctly different from markets with perfect information".

2.1 Information Costs

It is usual, at least in casual analysis, to regard the presence of a large number of buyers and sellers in a market as being a sufficient condition for the market to produce perfectly competitive outcomes. Recent theoretical work, however, has highlighted the importance of information as a factor influencing the equilibrium outcome of a market.

A large number of models of equilibrium in markets where information is imperfect have been produced in recent years, based on the consumer search models1 developed by Stigler (1961), McCall (1965,

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1 The term information here refers specifically to information about the price of a homogeneous good, from various sources. Where quality is objectively and costlessly measurable, and the product divisible, the analyses generalise to heterogeneous goods.

Consumer search models concern the activity undertaken by an individual when confronted with a dispersion of prices. It is generally assumed that the consumer attempts to minimise total
1970), and Nelson (1970). Making various assumptions \textit{inter alia} about the distribution of consumer search costs and the distribution of firms' costs, a number of results are derived, including nonexistence of \textit{equilibrium}, single price, or a \textit{non-degenerate} distribution of prices at equilibrium. The area is still in its infancy, as witnessed by the large number of models which have been developed, and the lack of agreement as to the basic assumptions which can be made. As a recent paper by Dahlby and West (1986) noted, "with the exception of a paper by Carlson and McAfee (1983), little attention has yet been paid to deriving testable implications'.

While none of these models perfectly mirrors the market under study, the model presented by Carlson and McAfee provides a reasonable approximation.

Using this model a number of implications can be derived, in particular, they show that in a market with \textit{imperfect} information a dispersion of prices will result and that the variance of these prices will be \textit{greater}, the higher is the level of search costs. Thus the riskiness (in terms of the spread of possible prices received) of a market may decrease with a reduction in search costs.

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2 See, for example: Salop and Stiglitz (1977, 1982); Axell (1977); Rutters (1977); Nermuth (1978); Reinganum (1979); Wilde and Schwarz (1979); Praverman (1980); Macminn (1980); von zur Muehlen (1980); Balcer (1981); Sadanand and Wilde (1982); Burdett and Judd (1983). See also the same 'job search' literature.

3 In the tradition of \textit{comparative} static analysis, these models have \textit{very little} to say about the way in which the \textit{equilibrium} is achieved.
2.2 Market Power and Exogenous Shocks

Because of the characteristics of the winegrape market, we restrict our attention in this section to the possible use of market power by participants in some non-competitive situations and the inability of some markets to fully arbitrage the effects of exogenous shocks.

Salop (1977) considers a monopolistically controlled market where consumers have varied search techniques and therefore associated costs and efficiencies. He argues that the monopolist may in fact create price dispersion in order to separate consumers into submarkets according to their relative search costs and therefore be able to price discriminate amongst them. Consumers facing higher search costs will search less and so on average pay a higher price.

We may modify the above to consider a monopsonist (or a group of co-ordinating oligopsonists) buying from many sellers who face varying search costs. The formal basis of the Salop model is the McCall (1970) sequential search model which can be solved to obtain the optimal expected selling price and number of searches, given the reservation price below which the supplier will not sell (since the marginal cost of further search equals or exceeds the marginal benefit). The intuitive result of the monopsonist paying lower prices to those suppliers who have higher search costs and who will therefore search less follows mutatis mutandis.

A similar modification of the Salop and Stiglitz (1977) model of heterogeneous costs of information gathering argues that perfect competition will not result and that the national supplier, facing higher search costs, will receive a lower price. Price dispersion results from the differing costs of information acquisition and whilst
Salop and Stiglitz do not consider the above mentioned price discrimination potential of this market they consider the secular effect on the adjustment of prices to non competitive equilibrium values.

The implication is that some buyers may lower price (below that of competitive equilibrium) without losing suppliers since the price differential is less than the marginal costs of additional search. The limit to this process is eliminated if all buyers lower prices slightly to maintain fairly constant relative prices. This is the reverse of Akerlof's "Lemons Principle" and the prices could fall towards a monopsonist price level.

Further weight is given to this possibility by Grinblatt and Ross (1985) who model a monopolist behaving like a Stackelberg leader with other suppliers behaving competitively. They show that the monopolist may significantly distort prices when information is heterogenous. The monopolistically competitive outcome implies for our purposes, mutatis mutandis, competitive prices below equilibrium and less than the competitive equilibrium quantity traded.

It has not been the purpose of this section to prove the above propositions. Moreover it is not our intention to imply that the above models accurately describe all markets where information is imperfect. At this stage all we wish to do is draw attention to the potential use of market power when there exists costly and incomplete information.

Finally we wish to consider the ability, or otherwise, of markets with imperfect information to equilibrate exogenous shocks.

Clearly, the above models which feature non-competitive equilibrium price dispersions will have less flexibility to arbitrage both demand
and supply shocks. In addition to this Grossman and Stiglitz (1976, 1980) emphasise that the role of prices is not only to clear markets but to also convey information. They consider two groups of individuals, those who became informed at a cost and those who are uninformed in a formal sense and who rely on the price level for imperfect information. The argue that since prices never fully reflect all information possessed by the informed individuals then exogenous shocks can never be perfectly arbitragd. That is, incomplete information even in a competitive market, will not allow a full equilibration of exogenous shocks.

This problem will be considered in more detail in Section 3.3.

We now turn our attention to the potential benefits of centralisation.

3. BENEFITS OF CENTRALISATION

3.1 Benefits of Competitive Exchange

The previous section outlined problems associated with costly and imperfect information resulting from a decentralised market. The potential gains from improving information can be easily inferred by arguing in reverse. We now wish to support this with the appeal to the law of comparative advantage and the subsequent benefits from trade. However things may not be so straightforward when we incorporate inter alia uncertainty and random shocks to the system.

To this end Mendelson (1985) develops a model of competitive exchange under uncertain preferences and random endowments. He argues (p. 270):
our results are useful in the context of assessing market "quality" as well as in making the decision whether or not to establish organised exchange for trading in an asset or contract. To make these assessments ex-ante, we consider the expected aggregate gains from trade, which represent a monetary value that the community of traders should be willing to pay to have the exchange in operation.

Given that traders are fully informed, the core of the model contains all Walrasian allocations. The solution of the model obtains the exact and asymptotic market clearing price distribution. Increasing the number of traders reduces noise by reducing the variability of market clearing prices. Additionally there is an increased market gain which increases the expected average gains per trader.

Secondly, it is argued that when supply-demand curves are less elastic the resulting price variance is higher and demand and supply imbalances (in the form of excess supply or demand) reduce the expected gains from trade. Under these conditions it is clear that there are benefits from providing information and increasing the number of traders. Increasing trader numbers does not necessarily require new entrants however. The benefits can be achieved by increasing the number of effective traders via centralisation of trading and information exchange.

3.2 Experimental Evidence

One of the great insights that the use of experiments in economics has provided is that different results can be obtained, ceteris paribus, from different institutional structures. Given the wealth of data that
experiments provide, dynamic characteristics such as the speed with which an equilibrium is obtained, and the direction of approach, as well as static properties such as the levels of equilibria may be measured and compared between institutions. Two excellent surveys of much of the literature in this area are Plott (1982) and Smith (1982).

A number of studies have been performed which examine the outcomes in markets where price information is imperfect. In the experimental literature these are referred to as negotiated price markets, since terms of trade must be privately negotiated for each transaction. Buyers and sellers are normally physically separated to prevent information becoming public, and often negotiations and search are the only forms of information available in such experiments.

The first experiment to examine a negotiated price market was Hong and Plott (1982). Their results showed that such markets initially exhibit a wide variance in prices, which tends to shrink with time, and that the mean price tends to approach the equilibrium, even after demand shifts. They found that efficiency<sup>4</sup> tends to be lower than in double oral auctions (80–90 percent compared with 'near 100 percent'<sup>5</sup>), and that the volume traded tended to be larger than the competitive equilibrium volume.

Plott (1982) cites two more experimental studies into negotiated price markets. The first, Grether and Plott (1981) reports similar results to those of Hong and Plott, for small numbers of buyers and sellers. The second, a non-telephone market conducted by Crössmann

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<sup>4</sup> See Plott and Smith (1978) for an explanation of this concept as used in the experimental literature.

<sup>5</sup> See Plott (1982, n. 1493).
(1987), shows prices on average were "near the competitive equilibrium relative to the predictions of other static models\textsuperscript{6}, but that "[t]he smooth adjustments toward the long run competitive equilibrium are not always present, and in some markets the movement is away from the long run equilibrium\textsuperscript{7}. However no pronounced cycles were observed in these unstable markets. There may be two possible explanations for the difference between these results and those reported previously. Firstly, information in these markets was less available than in telephone markets, where several shopping calls could be made quickly and easily. Secondly, sellers in the experiment were required to make binding quantity decisions prior to the opening of a market period.

Until Rums et al. (1987) the only experiments designed to specifically analyse the effect of information on the outcomes of competitive markets were performed by Joyce (1983). The experiments examined the effects of allowing (oral double auction) or forbidding (negotiated price) the subjects to call out prices during the experiment, and the existence or nonexistence of a blackboard listing each transaction's prices. Joyce found that the market structures providing more information (double oral auction and the presence of the blackboard) showed similar mean transaction prices, but smaller variances than those with less. He also found that more rapid convergence, and closer convergence to the mean was associated with the structures providing more information. Efficiency, however, was reported to be "independent of the structures represented", Joyce (1983, n. 423).\textsuperscript{8}

\textsuperscript{6} On. cit. n. 1497.

\textsuperscript{7} Ibid.

\textsuperscript{8} This conclusion may however he a result of the fact that Joyce's buyers and sellers were provided with equal market power.
Thus, while the efficiency effects may not be certain, experimental evidence strongly supports the view that centralization and increased availability of information will reduce the variability of prices in a market, and hence the risk to participants.

3.3 The Problems of "Noise" and Speculation

The growing body of literature on "noisy" rational expectations incorporates uncertainty in the form of noise into the system. Specific formulations by Green (1977) and Grossman and Stiglitz (1980) show that there is not a one-to-one relationship between various possible states of nature and the observed market price. This creates ambiguity in market signals for those individuals who face high information collection costs and who consequently solely rely on the market price for information. Whilst this view has much appeal, it depends on the initial model assumptions. Alternatively, Grossman (1977) considers a related partial equilibrium model in which supply is normally distributed with an unknown mean. Given this, he shows that informational equilibrium always exists (which is due to the monotone likelihood ratio property of the normal distribution). So the presence of noise may create uncertainty but its presence may not be continuous or long term, rather the result of discrete infrequent random shocks.

Crawford and Sobel (1982) argue that centralization may still allow the exercise of market power in the form of better informed traders sending noisy signals to a receiver. While this may be possible, they conclude that the rational receivers expected utility will increase and the signalling will be more informative when agents preferences are similar.
Moreover, Grinblatt and Ross (1985) conclude that the optimal strategy for a Stackelbcrn leading monopolist is not to randomize his strategy by adding white noise to his demand function in order to obscure the information content of prices. This is provided other participants have full information.

Sporleder (1984) argues that it is not only the level of concentration in the market, but the price discovery mechanism, which is important. This is true even for oligopsonistic buyers in that centralised information transfer may reduce privately held information relative to total information.

Finally the notion of speculative price bubbles needs to be considered. It is sometimes argued that speculation will bid prices up or down such that they will become self generating for some period of time. The notion of deterministic bubbles has been criticised because, the structure which generates this volatility has to by nature be intrinsically unstable. Stochastic bubbles are much more plausible but difficult to prove. Indeed, Meese (1986) and Hamilton (1986) warn that econometric "evidence" on speculative financial asset bubbles must be interpreted with care. Flood and Hodrick (1986) claim apparent bubbles are in fact due to misspecification of econometric functions which incorrectly exclude changes in market fundamentals such as switches in government policies.

In the light of these recent studies there is little reason to believe that speculation need cause volatility of prices.
4. CENTRALISATION OF EXCHANGE AND INFORMATION
FOR S.A. WINEGRAPE MARKET

As contracts become less relevant, winemakers will become freer to search for grapes among potential suppliers and will be subject to costs in searching in unfamiliar areas and among unfamiliar growers. In the case of premium grapes where small isolated pockets need to be located, search costs may be prohibitive.

Winegrape growers will likewise be forced, or choose, to negotiate prices with buyers other than those with which they have traditionally had supply contracts. Given the above, centralisation is an obvious option for market development and would result from the creation of a market focus where transactions would be assisted or carried out and from whence market information would be disseminated. The availability of technology and the declining costs of hardware have made electronic marketing the most cost-effective method of bringing together buyers and sellers, effecting trades and generating price and quantity information.

In defining "electronic marketing", Henderson (1984) suggests that the term should be limited to computerised trading networks and to computerised markets which utilise an open, competitive price establishment procedure such as some form of auction and this is contrasted to computerised trading systems which simply provide for private communications between an individual buyer and seller. However, Russell (1984) suggests that a wider definition should have been used by Henderson, moreover Sporleder (1982) points out that computerised trading systems can be developed for private treaty selling. Therefore our definition of electronic marketing will be wider than Henderson's, will include any system where the computer plays a major role in bringing together buyers and sellers.
4.1 Structural Implications of Centralisation

Adoption by firms of a computer-based trading system, given that it is a least-cost system results in expansion of the geographic trading area over which plants in the same industry compete for product; Williamson (1962). This expansion results in a larger pool of potential entrants into any geographic area at any given time. This increase in buyer competition would be greatest if the system were available for adoption by winemakers Australia-wide rather than being confined to South Australia.

A constant fear among grapegrowers is that market concentration of winemakers will result in an oligopsony, to the disadvantage of smaller wineries and independent grapegrowers. A result is that growers are quick to threaten winemakers with action under the Trade Practices Act if there is a hint of collusion in the prices being paid for grapes. However no action has been taken under the Act because of fear among grapegrowers that they would be identified and subsequently suffer a marketing disadvantage. Fairly heavy concentration in processing does exist, with 40% of grape crushed by only 12 wineries out of a total of 380 in Australia (see McKay, 1983). The full benefits of centralisation could not be derived in an oligopsonistic market, but there appears to be no actual evidence for oligopsonistic behaviour.

The S.A. winegrape market is one from which minimum prices have been removed and in which there is no market information generation and dissemination. This market environment would favour large wineries as

9 Ease of entry into winemaking and the spectacular growth of some medium sized winemakers appear to be factors countering heavier concentration.
against small wineries but Sporleder (1983) has shown that with computer-based marketing the geographic areas of small volume processors would expand relatively more than for large volume processors. And Henderson (1980) cites markets, with characteristics of the grape market, where there is information disparity with sellers relatively disadvantaged and suggests that computer-based systems would tend to lessen the disparity.

The technology may therefore enhance competition through both spatial and scale effects, thus lessening trends to concentration.

In a market with no focus and no market information and grape growers disadvantaged relative to winemakers, there would be continual demand by growers for market intervention by governments; previous administered price regimes are seen as results of perceptions of market disadvantage held by growers. These regimes have been costly so it may now be in wineries' own interests to support innovation and structures which allow a free market, even though the innovations and structures will confer some market power on growers.

The incidence of benefits flowing from lower winemaker costs (search costs), as a result of marketing innovation, is of interest particularly as it relates to funding of a grape exchange. Fischer (1981) showed that with a demand at an elasticity of one or greater and supply at an elasticity of less than one, which is likely to be the situation in the wine industry in the short run (one or two seasons), a decrease in marketing costs would create a benefit which would mainly be passed on to the grower.

The discontinuation of the application of statutory minimum winegrape prices in South Australia and the subsequent development of
centralised exchange has implications not only for the State's proprietary wineries but for the cooperative wineries too.

Although empirical analysis is not possible because of the lack of data from the industry it is probable that minimum prices benefited many growers in the short run by increasing producer surplus at the expense of consumer surplus, see Omara (1981). At the same time minimum prices would have caused winegrape surpluses, which would have resulted in those grapegrowers who were left with surpluses being worse off.10

Under statutory pricing of winegrapes, where prices have been above competitive equilibrium, cooperative wineries have had a cost advantage in that their grapes will, from time to time, have been acquired at prices below statutory prices. Proprietary wineries have reduced this cost disadvantage by buying bulk wine from the cooperatives at prices below their own cost of production. The effect of competitive equilibrium prices resulting from the centralised market will be to encourage cooperatives to pay prices that more closely reflect market prices.

The imposition of minimum prices in S.A., Victoria and NSW. meant that winemakers in these States took advantage of section 92 of the Constitution to acquire cheap grapes from interstate. South Australian wineries however are legally prevented from acquiring grapes from interstate (although they can acquire bulk wine or must) and they were thus disadvantaged relative to interstate wineries in cost of raw material.

10 Burns et al. op. cit. showed that the weighted average price for grapes is less in the presence of minimum prices and cooperatives.
Wine wholesaling and retailing has been fiercely competitive and winemakers have been looking to reduce costs of production. Even though the real price of grapes in South Australia has fallen (as measured by statutory prices) the ratio of grape price to wine price has risen substantially over the last decade and according to information provided by two winemakers the acquisition value of grapes as a percentage of vin ordinaire wholesale price has risen from about 16% in 1978 to about 34% in 1981. These trends probably explain why South Australia winemakers have become increasingly vehement in their opposition to statutory pricing.

Apart from disadvantaging S.F. winemakers, statutory prices have probably been responsible for the loss of substantial investment in wine making and the associated employment. Private communication suggests that Lindemans invested in the Victorian Sunraysia rather than the Barossa Valley largely because of higher costs of grape acquisition in South Australia. Also Stanleys relocated to Victoria from the Clare Valley in 1986 and their decision may have been influenced to some extent by the prospect of the purchase of cheaper grapes. The introduction and adoption of a grape exchange, particularly if Australia-wide, would eliminate distortions which have lead to South Australia being disadvantaged in terms of wine production, investment or employment.

4.2 Functional Alternatives for and Implementation of,
Centralised Winemake Marketing

A conclusion to he drawn from U.S.A. experience is that although improved market efficiency resulting from computerised marketing in the form of higher consumer and producer surpluses is a good thing from a
total economy point of view, it is not an important goal for market system participants. We suggest, following Russell (1984), that winegrape growers and winemakers would not be concerned at the end of the season that pareto efficiency had not been achieved. They will be more interested in whether they have achieved lower marketing and procurement costs and whether they have reduced their risks. A priori, market efficiency is highest where there is a computer auction, however some sacrifice of efficiency may need to be made in the case of winegrapes to ensure a viable level of system adoption. Sporlede (1982), stated that the criteria used for choosing among the price discovery alternatives should weigh heavily in favour of industry structure and customs for a particular commodity, rather than programming convenience.

Price discovery mechanisms have not been important for South Australian winegrapes because minimum prices have been in place, however some grape varieties have traded above minimum price and last year many varieties traded above base prices through private negotiation, which is the price discovery mechanism most likely to be used in the absence of introduction of a grape exchange. It is difficult to design software for private negotiation systems, nevertheless it can be done and was the method used in an experimental computerised system for wholesale meat (see Sporlede, 1982). Other systems already in operation, such as the computerised bid/offer systems offered by TELEOT in the U.S.A. for trading cotton, could be appropriate for winegrapes. For any system to receive support, buyers and sellers must accept the price discovery process chosen by the designers and must believe that they are being treated equitably.

Acceptable description of the various value-determining categories
of a commodity is the basis for computerised trading. Information on variety and location of grapes is easily accommodated but detailed quality characteristics such as haume, which requires testing one to two weeks before picking, is more difficult to accommodate. Perhaps a sampling procedure could be agreed upon by buyers and growers which would provide haume and perhaps acid analysis. Potential buyers having been satisfied with respect to these characteristics would also need assurance that the quantity and quality of grapes offered actually exist.

Important implications of the introduction of an exchange are the complexities of information processing and transaction documentation. If buyers and sellers are unfamiliar with each other, as will undoubtedly often be the case, questions immediately arise about the reliability of the buyer in accepting delivery of grapes and the grower in delivering after the trade has been executed through the exchange. Confirmation of sale documentation would need to be produced for the buyer and seller, which however, would be a simple matter where remote terminals were connected to the exchange. Additional support infrastructure would need to include the ability to settle transactions, process accounts, undertake internal and external accounting functions, and disseminate appropriate market information (with confidentiality preserved where requested by market participants).

A grape exchange was initially proposed by the U.F. and S. of S.A. Inc. and the concept being developed to a level where potential benefits were analysed and accepted by grower members. Subsequent discussions with winemakers and their representatives resulted in their tacit if not general support. The control of the development of the grape exchange has been taken on by the grape grower body, but the body intends to bring winemakers into development discussions by direct
participation in a totally autonomous registered company. In the meantime during the establishment period the U.F.S. of S.A. is acting as managing agent.

If this cooperative approach to development of the grape exchange succeeds it will be in contrast to that which has been followed in the U.S.A.; Henderson (1984) concluded that electronic marketing systems had invariably developed because of producer dissatisfaction with the marketing system and had been developed perhaps on the face of buyer resistance. Russell (1984) however said that electronic marketing should be to the benefit of both buyer and seller. Winemakers will undoubtedly have a great deal to contribute in terms of specifying acceptable functional alternatives for an exchange.

There are limited resources in the industry, and this, together with the fact that S.A. State government financial support for a trial of an exchange for the 1987 and 1988 vintages was approved only in late November 1986 meant that there was insufficient planning and insufficient time available for implementation of a centralised, computerised grape market for the 1987 vintage.

A decision was therefore made by the United Farmers and Stockowners of S.A. that innovation would be limited in 1987 to supporting a broker. The broker would bring together buyers and sellers and disseminate information generated by broking functions supplemented by that gathered from other sources.

In 1987 the broker function will not be able to be complete in the sense of carrying out trades or taking responsibility for the change of hands of money and associated functions. Nevertheless, a broker will provide a market focus and disseminate market information and it is hoped that it will be a successful preliminary stage in the
implementation of a more advanced trading system.

Research should be undertaken in 1987 to determine the optimum market innovation in terms of cost-efficiency and acceptability for the 1988 vintage.
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