Principals, Agents and Wheat Marketing in Australia

by

James Bushell and T. G. MacAulay

Former student of the Faculty of Agriculture, Food and Natural Resources, University of Sydney, NSW, 2006

Professor of Agricultural Economics, Faculty of Agriculture, Food and Natural Resources, University of Sydney, NSW 2006

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Correspondence to James Bushell, jamesbushell.au@gmail.com and T.G. MacAulay, BRI Australia, PO Box 7, North Ryde, NSW, 1670.

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"No man can serve two masters: for either he will hate the one and love the other, or else he will hold to the one and despise the other. Ye cannot serve God and mammon."

Matthew 6:24

Abstract

The dual class shareholding company has been adopted as a way of managing the single desk operating system for wheat in Australia. Using B Class ASX listed shares to fund the operation of the company, and the use of A Class grower held shares to control the direction of the company, the objectives of the current arrangements are to maximise net pool returns to growers. Using principal-agent theory, the current marketing arrangements are examined. Considering both groups of shareholders as principals of one agent, this paper has focused on examining the contracts between the agent and each principal, and the incentives provided by these contracts to the agent to act in the interests of each of the shareholder groups. The reward to the agent from each principal is examined, and it is found that the ultimate objective of the company may not be fulfilled by the current marketing arrangements, which will incur agency costs to at least one group of shareholders. It is suggested that a reformulation of the remuneration model is required in order to reduce the risk that the objectives of both groups of shareholders are not met.

Introduction

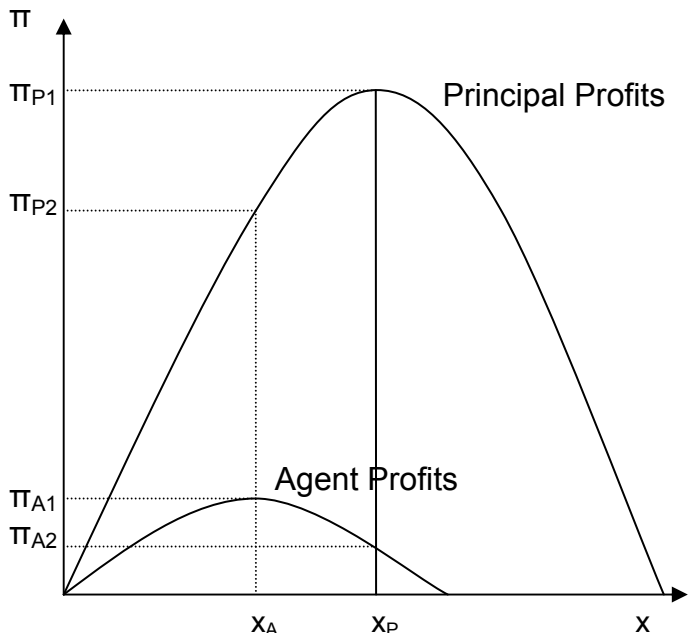
Used in numerous situations for many years, the principal agent framework is a useful tool to investigate the behavioural relationship between a principal and an agent. A principal-agent relationship is said to exist "… whenever there is an arrangement in which one person's welfare depends on what another person does" (Pyndyck and Rubenfeld 2001, p.609). In other words, whenever a person contracts with another person for a product to be supplied, a principal is created in the contractor, and an agent is created in the contractee. In all cases, the principal is contracting with the agent in order to gain access to specialised information (either held directly or hedonically through the agent's skill base). Inherent within this relationship, however, lies a problem, known as the principal's problem (Arrow 1971).

All agents, within all principal-agent relationships are assumed to be rational economic beings, with the aim of their own welfare maximisation. By providing their services to principals, they aim to make a profit out of that sale of information (Biais and Germain 2002). This often creates a problem for the principal. As they do not have the information that the agent possesses (if they did, they would likely be able to undertake the activities of the agent themselves and do away with the agency relationship altogether), their ability to monitor the agent is limited to some degree. This limitation may lead to situations where the agent acts against the wishes of the principal to maximise their own wealth. The costs borne by the principal as a result of the divergent objectives are known as agency costs.

In order to ensure that the objectives of the agent are aligned with their own objectives, then, the principal must engage in various other activities in order to reduce these agency costs. As alluded to earlier, principal monitoring of the agent (as suggested by Holmstrom 1979) is not an entirely perfect method of control of the agent by the principal due to the information asymmetry between the two parties. Other forms of agent control, such as bonding, have been suggested, however perhaps the most successful form of agent control is the performance based incentive contract. The use of a properly constructed incentive contract

will provide the principal with sufficient control over the agent, through ensuring that the aims of the agent are aligned closely, if not perfectly, with the aims of the principal.

Perloff (2001) has illustrated this graphically, as in Figure 1, where an agent will desire to provide effort so as to maximise his or her own profits.

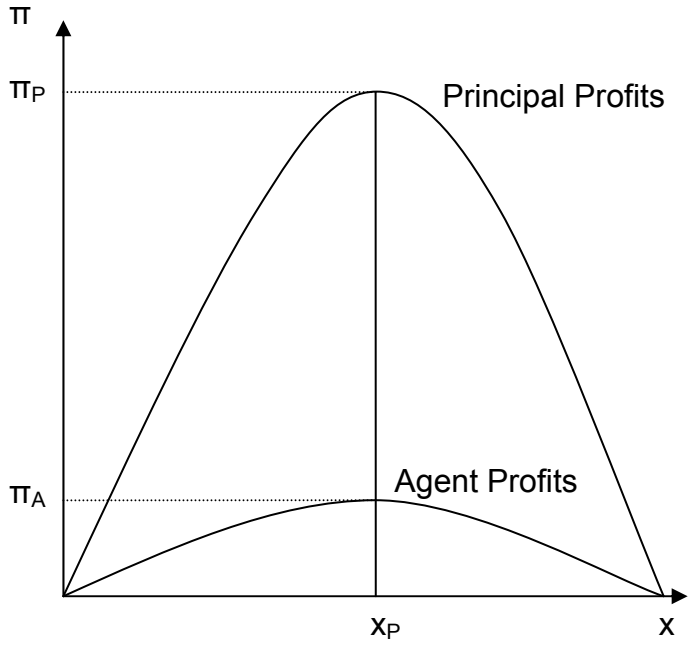


Source: Adapted from Perloff (2001, p. 675).

Figure 1: Agent Effort Levels and Profit without a Performance Based Remuneration Contract

Both curves represent profit functions. Whilst the agent's profit function is shown here to be less than the principal's profit function, there may be situations where the agent's profit function is in fact larger than the principal's profit function. Also note that the functions are increasing to a point, as the difference between marginal cost and marginal revenue are realised into profits with increasing production of the product. They then decrease as the additional production causes market oversupply, and the price falls below marginal cost. From Figure 1, it is clear that the agents profit will be maximised at an agent effort level of x_A, whereas the principal's profit will be maximised at an agent effort level of x_P. The agent will not want to provide the effort x_P to maximise their principal's profits at π_{P1}, as this will reduce their own profit from π_{A1} to π_{A2}. This will result in the principals profit levels being reduced from the principal's optimal profit level π_{P1}, to π_{P2}. The action level of the agent at x_A is Pareto optimal, for with an increase in agent effort beyond this level, the principal would benefit, but the agent be left worse off. The reduced production and the opportunity loss incurred by the agent are an example of the agency costs borne by the principal, which reduces their overall welfare.

With the use of a perfectly constructed performance based remuneration contracts, the agent can be provided with sufficient incentives to ensure that they exert effort at a level that will maximise the principal's profits.



Source: Adapted from Perloff (2001, p. 676).

Figure 2: Agent Effort Levels and Profit with Performance Based Remuneration Contract

With a suitable contract to reward the agent for their actions, the agent will be better off applying the effort, x_P, which would maximise the principal's profit levels, π_P, as it will also maximise the agents profit levels π_A as well.

One of the most widespread and significant principal-agent relationships in the economy of today is the company. The application of principal-agent theory to the construct of the firm by Jensen and Meckling (1976) was groundbreaking in that it provided a fundamentally new framework within which to analyse corporate structures. By viewing the shareholders of the corporate entity as the principals and the managers of the corporate entity as agents, the authors were able to provide useful insight into the agency costs borne by the shareholders of the company as the managers acted in their own self-interest. These agency costs may prevent the objectives of the residual claimants from being effectively carried out, as they choose activities that maximise their own wealth rather than the wealth of the shareholders. Jensen and Meckling (1976) also recognised that the principal was likely to never be able to perfectly monitor their agent, in line with Arrow's formulation of the principal's problem.

Of common use within the company is a multitude of performance-based incentive contracts to ensure that the management of the company engage in activities that provide returns to principals in alignment with their own objectives. These performance contracts can range from individual key performance indicators, to the use of corporate level revenue contracts. The correct formulation of these performance contracts is important so as to set the correct incentives for the agents to react to, and in doing so, fulfil their principal's objectives.
In their analysis, however, Jensen and Meckling (1976) based their paper on the implicit assumption that shareholders all have the same goals in mind when becoming part of a company, that is, the situation is equivalent to one principal governing one agent. In doing this, shareholders were assumed to be hoping to maximise two parts of their wealth, the capital gains in share value, and the dividend yield associated with the shares. The advent of dual class shareholder structures in the Australian grains industry in recent times, however, breaks this homogeneity assumption in relation to shareholders, as there are two distinct and

separate groups of shareholders. Whilst both of these classes are assumed to have the same objective of wealth maximisation, the form of this wealth maximisation will take different forms for both groups of shareholders. The incentives provided to the agent to act on behalf of the two principals are therefore important, as the incorrect formulation of the incentives will cause agency costs to be borne by one, or both, principals, and the failure of one or both of the principals to achieve their desired aims.

AWB and the principal agent problem

Dual class shareholdings are prevalent within the Australian grains industry at the present time, with three of the four major wheat marketers (AWB Limited, ABB Limited, GrainCorp Limited) utilising such a shareholding structure. These companies have all been formed from statutory authorities, and have arisen as a result of changes in government policy. With the rise of economic liberalism and the idea of the free market economy in the seventies and eighties, governments looked to remove themselves from ownership of such entities in order to reduce government spending. They also were aiming to improve efficiency in the provision of the services which these authorities provided, comply with free trade obligations, and also to mitigate any risk exposure through underwriting commitments that they may have had as a result of legislated single desks.

Dual class share structures were favoured as they theoretically ensured that the grower group of shareholders maintained control over the objectives and operations of the respective company, whilst at the same time the company was able to raise capital to fund its operations from the stock market. This necessitated the formation of the second group of shareholders, which would be similar to the majority of shareholders in other listed companies. Instead of being the residual claimants on the income of the company, as in the case of the grower shareholders, these shareholders would possess more of the characteristics of debt holders, who would be paid a reasonable rate of return for the use of their capital in the operation of the company. However, agency costs incurred by shareholders in the operation of these companies are likely to reduce the overall efficiency of their operation, and in doing so, reduce the wealth of one or both groups of shareholders.

In the case of AWB Limited, Australia's largest grain trader and manager of the National Pool (by virtue of the *Wheat Marketing Act 1989*), there are two distinct groups of shareholders. The primary group of shareholders in AWB Limited are A Class shareholders. By definition in the AWB Limited constitution, A Class shareholders are those persons who have delivered or caused to be delivered an average of 33 and one third tonnes of wheat to the AWB Group or agents of the AWB Group (AWB Limited Constitution 2004). Their core objective is assumed to be to maximise the value received for their wheat. As they do not possess the skills necessary to maximise this value themselves, they contract, through AWB (International) Limited, with the managers of the company to do it for them. It must be acknowledged that this contract is not the usual type of contract, in that it is forced upon the growers of wheat by virtue of the operation of the single desk. However, this issue is outside of the scope of this paper and will not be discussed further here.

As the principal, growers need to monitor the actions of their agents to ensure that their agents (the managers of AWB Limited) are acting in the interests of the principal. This is a difficult task, as the principals do not have knowledge of the manager's actions, as it is this for which the managers have been hired. As stated earlier, if the principal had the level of knowledge of the managers' actions required to adequately monitor the managers, it stands to reason that they would not need the managers in the first place (Arrow 1984). One of the major monitoring devices used by the growers is the elected board of directors. Core amongst the roles of the board of directors is the responsibility to ensure that the company is run in accordance with the shareholders' wishes. A formalised method of doing this is by adopting

a corporate constitution, which acts as a contract between members and the company, and the company and management.

In the case of AWB Limited, growers elect a majority of the directors with the aim being to ensure that the managers manage the company in accordance with the principal's (that is, growers') wishes. As discussed earlier, growers are assumed to want to maximise the value of their wheat. This is explicitly enshrined in the Constitution of AWB Limited in article 3.1(b). This reads (with emphasis added):

> "3.1 In the exercise of their powers, the Directors must ensure that:
> (b) the business of the Pool Subsidiary is managed with the objective of:
> (i) *maximising the net pool return for Growers* who sell wheat into the pools run by the Pools Subsidiary by securing, developing and maintaining markets for wheat and by minimising costs as far as practicable;
> (ii) distributing the net pool return to Growers who have sold wheat into the relevant pool".

Further to this, section 3.1 (e) reads (emphasis added):

> "(e) the business of the Company is managed with an objective of the AWB Group (other than the Pools Subsidiary) providing services (which may include but are not limited to administrative, human resources, marketing, risk management, funding and treasury services) to the Pools Subsidiary *efficiently and at competitive prices* and of offering at competitive prices funding services to growers who sell wheat into the pools run by the Pools Subsidiary".

In addition, the constitution of the pool management subsidiary, AWB (International) Limited reinforces this obligation in Article 13.2 (a), which states (emphasis added):

> "13.2 (a) In the exercise of their powers, *the Directors [of AWB (International) Limited] must ensure that the business is managed in a manner which complies with Article 3.1 (b) of the Parent's [AWB Limited's] Constitution*".

In summary, A Class shareholders will want the managers of AWB Limited to maximise the net pool value of their wheat contributed to the National Pool, and to ensure that, amongst other things, costs are minimised. This objective has been implemented through the use of a structure similar to that of a financial managed fund, with the parent, AWB Limited establishing a fund manager (AWB (International) Limited, to manage the National Pool (fund)). A Class shareholders (as principals), by maintaining a majority on both the AWB Limited and AWB (International) Limited boards, hope to sufficiently control the management of AWB Limited (as agent) through the use of adequate regulation and incentives, in order to achieve their abovementioned objectives

The other group of shareholders in AWB Limited are B Class shareholders. The first subgroup of these shareholders, by far in the majority, can trace their membership to the Wheat Industry Fund. This fund was created in 1989 when the domestic single desk for wheat was disbanded. According to parliamentary records, this fund was to be created with the purpose of relieving the government from its obligations to underwrite the returns to the National Pool (Bills Digest 1997-98). In short, growers were levied 2 per cent of sales, which was then held in trust until such time that it was rolled into AWB Limited to provide capital for the operation of the National Pool. Another subgroup of B Class shareholders came into existence when the company was floated on the Australian Stock Exchange, and shares were made available through a prospectus sale. The third subgroup of B Class shareholders, however, is the most important for this paper. This group is made up of those managers and employees who have been provided with B Class shares as part of their remuneration or as part of incentive reward schemes. As an aside, whilst the majority of B Class shareholders

are growers, a cursory glance at the top 20 shareholders of AWB Limited reveals a large number of managed funds and institutional shareholders as well (AWB Limited 2006).

B Class shares are in essence no different to the vast majority of shares in listed companies on the Australian Stock Exchange. They have voting rights at company meetings, are entitled to dividends and are freely tradeable, however these rights are limited in so far as they impinge on A Class shareholder rights. In addition, no one person may own more than 10 per cent of B Class shares. The B Class shareholder principals expect their wealth to be created in the form of dividend returns and capital gains. However, it must be noted that the constitution of AWB Limited tempers management's obligations to provide these returns. Section 3.3 states:

> "3.3 For the avoidance of doubt, in the exercise of their powers in accordance with Article 3.1 (a), (b), (c), (d) or (e), the Directors may have regard to the desirability of providing B Class Shareholders with a reasonable commercial rate of return, and the possibility that further capital may need to be raised but nothing in this clause removes the obligations of the Directors to manage the business with an objective as set out in Article 3.1 (e)" .

Therefore, whilst B Class shareholders are likely to have a desire to achieve maximum capital gain and dividend yield from their shares, management is not obliged to provide them with such returns, as their obligations predominantly lie with A Class shareholder returns. However, it must be realised that the existence of the different objectives of the two principals for the agent to follow, and the arrangement of the AWB Group may create situations where tensions arise and agency costs are incurred to one or both principals, as the agent is unable to be provided with sufficient incentive to align his or her actions with at least one principal's objectives. Each of the principals wants the agent to produce a different set of products in the operation of the company.

In algebraic terms, AWB Limited returns (R_L) consist of returns from providing pool management services (R_S) and returns from other investments in which the company has interests, including its other subsidiaries (R_U), less the costs associated with earning those returns (C_L). Therefore:

$$R_L = R_S + R_U - C_L$$

These returns are available for distribution to B Class shareholders as dividends, or can be maintained within the company, which will strengthen the corporate capital base and lead to capital gains on shares

AWB (International) Limited return (R_I) is equal to the total value of wheat sold from the pool (R_W) minus the costs to the pool for pool management services (C_S), minus the costs to the pool for other costs (C_O). That is:

$$R_I = R_W - C_S - C_O$$

The returns to AWB (International) Limited are those returns that are distributed to A Class shareholders – growers – as pool payments. Note that C_S is the same as $R_{S,}$, as the costs of pool management services to AWB (International) Limited represent the revenues earned by AWB Limited for providing those services, but has different meanings for the different shareholders depending on the type of shareholder that they are.

The key mechanism within the company is the services agreement, which governs the type and quantity of services that AWB Limited is to provide to AWB (International) Limited for use in the National Pool. Part of this services agreement is the remuneration model, which effectively determines the payment that the National Pool makes to AWB Limited for the

provision of these services. The funds obtained from the application of this remuneration model are the payments represented by the C_S or R_S variables. As has already been shown, from the A Class shareholder viewpoint this represents a cost to the pool, which decreases the ultimate net pool value. However, to B Class shareholders, this represents a revenue stream from which dividends can be paid, and, if dividends are not paid, capital gain can be obtained on B Class shares.

Because of the equality of the C_S and R_S variables, a trade-off must be made by management between increasing the returns to one principal against increasing the returns to the other principal. But how is this trade-off made? As it is assumed that the manager acts in self-interest, the incentives provided by each principal to pay the agent are vital for controlling the efforts of the agent, as these are the mechanisms used to align the agent's actions with the principal's objectives. It follows from this that the manager agent will aim to increase returns to that principal for which their action provides the greatest agent remuneration, that is the agent will chose those activities for which he or she will receive the highest personal return and avoid those activities that will give them lower personal return.

Before proceeding further, though, it must be acknowledged that the duality of this share structure and the equality of the C_S and R_S variables does not necessarily lead to a confrontation between the different shareholder classes. If the products produced in the operation of the company are complimentary to each other, then it follows that it may be possible for managers to satisfy the will of each shareholder group simultaneously. Conversely, when the products produced in the operation of the company move out of this complementary zone, and they become supplementary to one another, then shareholder aims will be at odds, and agent behaviour will be costly to one or the other principal. This may be argued to be the case for AWB Limited. The revenue earned by AWB Limited for providing pool management services to the National Pool (which forms part of the company's earnings base, which affects capital gain on share value and dividend yield of shares) directly subtracts from the total pool value available to growers.

The ideal structure of the remuneration formula to calculate the value of the C_S and R_S variables, therefore, is one that is created in such a manner to cause the products produced from agent action for the principals to be complimentary in nature, that is when A Class shareholder returns increase, B Class Shareholder returns also increase. However, overriding this consideration, any remuneration model must be constructed in such a manner so as to provide sufficient incentives to AWB (International) Limited to maximise net pool returns to growers.

The remuneration formula used by AWB (International) Limited to pay AWB Limited for their services has taken various forms since the company came into existence in 1999. The initial remuneration method used by the company was a simple cost plus model where AWB Limited was reimbursed for the costs that it incurred in managing the national pool, plus an eight per cent return. It was argued that this remuneration model did not provide sufficient incentive for AWB Limited management to attempt to maximise the pool value for growers. A second remuneration model was then developed as a result of this claim.

This formula was adopted for the 2001-02 National Pool (AWB (International) Limited 2002), and uses *gross pool value* as the performance measurement and remuneration variable. Gross pool value is defined as the sum of free on board revenue, plus value added by AWB (International) Limited plus interest income, less costs for the benefit of all pool participants (AWB Limited 2004b). The model itself is composed of a two-part payment scheme, with a base assets under management fee and an out performance incentive fee. Both of these components are subject to various floors and caps on remuneration, such that total remuneration can not be more than 3 per cent of total pool value (Macquarie Research Equities 2001). The out performance fee was tested against a constructed benchmark (the

wheat industry benchmark) that was designed to approximate the market for wheat exports. This was needed since with a single desk a competitive market does not exist and so there was no base against which a funds manager's performance could be compared. The wheat industry benchmark is a collection of sub-benchmarks, these being supply chain, price and foreign exchange benchmarks, which aim to replicate the market measures that wheat exporters would be subject to in their performance measurement. In addition, a hurdle rate was also included in the assessment of AWB Limited's performance. This is included in order to prevent AWB Limited earning returns from those factors that provide inherent value to the national pool and over which AWB Limited has no control. These factors include high quality wheat and transport proximity to end user markets, such as Asia and the Middle East.

Following the 2004 Wheat Marketing Review, the remuneration model was altered again and implemented for the 2005-06 National Pool. The use of gross pool value as the base fee calculation measure was abandoned, and instead the base fee is now calculated as the level of costs incurred by AWB Limited in managing the National Pool. The use of gross pool value has been retained as well as the wheat industry benchmark and hurdle rate, to determine the out performance fee payable to AWB Limited.

The use of remuneration models based on gross pool values, however, may not align management's actions with the primary objectives of the company, the maximisation of A Class shareholder returns. As a result, A Class shareholder returns may be reduced and B Class shareholder returns improved. As AWB Limited managers are rewarded for enhancing gross pool value, their focus and attention may not be on reducing the costs to the pool.

Whilst it is true that the pool manager is provided with a benchmark, performance below which will result in no earnings for the pool manager, the focus will nevertheless be maintained on increasing that gross pool value variable in order to maximise the rewards of out performance. In addition, if the benchmark is not constructed properly (for example, it lacks AWB Limited controllable items like ship chartering, and subsequently does not replicate real market performance), the benchmark is unlikely to be a reliable comparison upon which to assess AWB Limited's performance.

Incentives in the AWB Remuneration Model

The A Class Shareholder's problem

In order to examine the incentives provided by these remuneration models, the models were placed in a principal agent framework as developed by Starks (1987) and Golec (1992) designed to examine investment fund manager remuneration contracts. In this analysis, the AWB remuneration formula was embedded into a principal agent model. The standard principal agent model consists of two components, the principal's objective function and the agent's utility function. This is converted into the agent participation constraint, which ensures that the principal is provided with sufficient incentives to participate in the contract which the principal has proposed in the first place. These are both usually expressed in utility terms. Instead of using utility, however, dollar values will be used in this analysis.

As discussed earlier, A Class Shareholders' objectives are assumed to be to maximise net pool value. The gross pool return is a product of price and quantity (P.Q). Quantity, in tonnes, is assumed to be an exogenous variable, as the operation of section 84 of the *Wheat Marketing Act 1989*, ensures that AWB (International) Limited is the buyer of last resort, subject to quality criteria of the grain being met. In addition, wheat production tonnage is fixed for the pool year. Therefore, AWB (International) Limited is not able to significantly alter the quantity of the grain being marketed through the National Pool in any given year. The price of wheat is taken to be the free on board price. Therefore, the price of the grain in the pool is directly affected by the effort (e) expended by the pool manager. Thus, the price

may be represented as a function of effort as P(e). This effort is an aggregation of the possible actions and levels of effort that the pool manager may take in their operation to create returns to growers. Thus, it includes actions and choices relating to end users, transport modes, marketing intensity, and others.

Gross pool value, GPV, therefore, may be represented by:

(1) $GPV = P(e).Q$

where Q is the quantity of grain entering the pool.

Subtracting from the gross pool value are costs. There are two types of costs, direct costs (D), and pool manager remuneration costs (M). Direct costs represent the cost of freight from the point of delivery, port costs, shipping charges, and other non-pool management costs. These are deducted from grower receipts prior to the payment of grower pool distributions or harvest loan advances. This means that the grower pays for them collectively and directly, albeit through AWB (International) Limited, by the virtue of the "at silo" single desk model.

The pool manager remuneration represents the value paid to the pool manager to obtain returns for the pool participants. The pool manager remuneration is the payment made to AWB Limited for their pool management services provided as set out in the services agreement. The first remuneration model, as used in the 2001-02, 2002-03 and 2003-04 National Pools is as shown in (2) below where M is the pool manager's remuneration:.

(2) $M = \alpha GPV + \beta(GPV/Q - (WIB + H)).Q$

where $\alpha = 0.015$, representing the fixed fee coefficient of 1.5 percent of gross pool value, and $\beta = 0.2$, representing the incentive fee coefficient of 20 percent. The wheat industry benchmark, WIB, variable is the calculated value of the wheat industry benchmark, per tonne, and H is equal to the US$5 per tonne as the hurdle rate imposed on the pool, both of which have been previously discussed. For ease and simplicity of analysis, these figures will remain in algebraic terms.

In functional terms, and using equation (1), the remuneration model is therefore a function of the pool manager's effort.

(3) $M(e) = \alpha P(e).Q + \beta(P(e) - WIB - H).Q$

The pool operator can alter both non-marketing costs and pool manager remuneration costs through the exertion of effort. Pool manager remuneration can be increased through an increase in the total pool value realised by the pool manager which increases the total payable by growers to AWB Limited through the remuneration formula. Ultimately, therefore, the pool manager's remuneration is a function of pool manager effort, M(e).

Non-marketing costs can be altered through the sourcing of alternative transport routes, coordination of storage and handling movements, more efficient management of shipping channels (for example, avoiding demurrage) and by other means. However, this change is not a one for one proportionate effect. Due to the considerable economies of size and scope in the grains industry, the level of non-marketing costs will largely vary with the tonnage. Non-marketing costs to the pool will therefore be more reliant on the quantity of grain that is in the pool, and are measured on a per tonne basis. These costs may be represented as a function of quantity, D(Q). The impact of effort will alter this level which will be linked to the effectiveness or the degree that they are efficient. This effectiveness may be represented by a function, ϕ, which acts as a multiplier on non-marketing costs. The lower the value of ϕ, the

more efficient non-marketing costs will be. Effort can be applied by the pool manager to improve the efficiency of sourcing or use of non-marketing services to the pool. Hence, the efficiency measure can be represented as $\phi(e)$. Through the choices that the pool operator makes, there will be an increase or decrease in the non-marketing costs. The non-marketing cost term will therefore become $\phi(e).D(Q)$.

The pool management costs, M(e), incurred by the grower principal are in fact the revenues that the pool manager earns. They are at all times interested in increasing these, assuming a rational profit maximising pool manager. The only way to increase M(e) is to exert effort and improve the price received for grain on the domestic and export market. In attempting to maximise this revenue, the pool manager incurs costs C, which are for the services provided to the National Pool. These costs are directly caused by the exertion and expenditure of pool manager effort, and can therefore be represented by C(e). The net returns from these services flow to the parent, AWB Limited, for distribution to shareholders. In addition, AWB Limited has other divisions that contribute to earnings, represented by O. These are assumed, for the time being, to be unaffected by pool manager effort. A reasonable per share rate of return, R, might be equated to an index, such as the ASX200 or the All Ordinaries Index. This return will have to be provided to all B Class shareholder shares, n, held in the company, such that the total return achieved by the company must be equal to or greater than nR, in order to provide a reasonable rate of return to shareholders to enable that the company can raise capital to fund the operation of the pool.

These factors create the participation constraint which is designed to ensure the participation of the agent in the principals' contract. It is as follows:

(4) $$M(e) - C(e) + O = nR$$

Note that for simplicity of analysis, the inequality term of greater than or equal to will be dropped for this analysis, and will remain an equality term.

Therefore, the problem faced by A Class shareholders is to maximise gross pool value and simultaneously minimise the costs incurred, subject to the participation constraint required to motivate the agent (AWB (International) Limited) and given the floors and caps of the model. Note that in this analysis, however, it is assumed that the floors and caps are not binding. It can be seen that the grower is, therefore, aiming to maximise net pool value.

(5) $$\text{Max } \pi_G = P(e).Q - \phi(e).D(Q) - M(e).Q$$
$$\text{s. t. } M(e) - C(e) + O = nR$$

Using the definition for M as established in (2), solving (5) using a Lagrangean function and taking partial derivatives with respect to 'e', the incentives within the remuneration model can be shown.

(6) $$\frac{\partial^1 {}_G}{\partial e} = (1 - \alpha - \lambda\alpha - \beta - \lambda\beta).Q\frac{\partial P(e)}{\partial e} - D(Q)\frac{\partial \phi(e)}{\partial e} + \lambda\frac{\partial C(e)}{\partial e}$$

As $\frac{\partial P(e)}{\partial e}$ is positive, gross grower income is an increasing function of effort. As such, an increase in effort on the behalf of the pool manager will increase the gross pool value, increasing the profit of the growers. This increase in pool value, through the price variable will increase the remuneration that the pool manager earns, reducing the growers' profits, through the action of the α, β and λ coefficients. The non-marketing cost component is also a decreasing function of pool manager effort. A reduction in the effectiveness coefficient $\phi(e)$,

implies that non-marketing services are being provided at a lower cost which will decrease the non-marketing costs of growers, and increase their profits. In other words, it can be seen that the principal will be better off if the numerator of the differential fractions is acted upon. If the price of the grain in the pool, (P(e)), is increased or if the effectiveness coefficient of the non-marketing costs ($\phi(e)$) can be decreased (meaning reduced non-marketing costs), then the grower's profits will be increased. The grower may also benefit from an increase in pool manager remuneration costs, which stands to reason, as the increase in costs should lead to greater increases in the value of variables that have a favourable effect on grower's returns and a decrease in the value of variables that have an unfavourable effect on grower's returns.

The pool manager's problem

Considering equation (4), the pool manager's participation constraint, it is apparent that the optimal action for the pool manager is to simultaneously maximise M(e) and O, and minimise C(e). Therefore, (4) will become a maximisation problem for the agent, as they try to obtain a rate of return that is comparable to other available returns on the share market. As stated above, the remuneration model is the formula used to determine the income obtained by the pool manager from the operation of the pool, who will use this to maximise profits. Therefore, the agent's maximisation problem is to maximise the returns over and above the returns in the share market:

(7) $\quad \text{Max } \pi_A = M(e) - C(e) + O - nR$

Substituting for the value of M from (3) into equation (7), and taking partial derivatives with respect to e, the incentives that the pool manager reacts to are as follows:

(8) $$\frac{\partial^1 {}_A}{\partial e} = (\alpha + \beta)Q\,\frac{\partial P(e)}{\partial e} - \frac{\partial C(e)}{\partial e}$$

Given that α, β, and Q are all positive, then the pool manager remuneration is an increasing function of pool manager effort. Also, effort expended in relation to reducing costs will increase agent returns. The pool manager will therefore be aiming to make a trade-off between returns and costs in order to ensure that the final unit of effort applied returns at least what it cost to apply in revenues from increasing price. Since $(\alpha + \beta)Q\frac{\partial P(e)}{\partial e}$ is the marginal return to effort, this return is equal to the marginal cost of effort with the returns weighted by $(\alpha + \beta)$.

However, there is no incentive for the pool manager to reduce the non-marketing costs of the pool, as it is not a factor in the remuneration model. If the pool manager expends effort to reduce these costs, there is no reward for doing so. A corollary of this statement is that if the pool manager is not penalised for not acting sufficiently to reduce these costs, then, as a profit maximising agent effort will not be directed to reducing these costs. This is in direct conflict with the principal's objective function, in which a reduction of non-marketing costs will increase their total net returns. Therefore, the contract used to remunerate the pool manager is at odds with the principal's objectives, and thus may be considered to be leading to an inefficient outcome. It is also important to realise that this is also in direct conflict with the constitutional objectives of both AWB Limited and AWB (International) Limited.

Upon using the second remuneration model, that is the model that has been adopted for the 2004-05 and subsequent pools, similar results can be found.

For the second model the M term in the above analysis is re-defined as:.

(9) $M(e) = C(e) + \beta_1(PV - WIB.Q) + \beta_2(PV - (WIB + H).Q)$

where C(e) equals costs that the pool manager incurs in running the pool, and β_1 and β_2 represent the tier 1 and tier 2 out performance incentive remuneration coefficients (currently set at 0.2, that is 20 percent). WIB is the calculated figure for the wheat industry benchmark per tonne, and H is equal to the US$5 per tonne hurdle rate imposed on the pool. For ease and simplicity of analysis, these figures will again be left in algebraic terms.

The PV term represents Pool Value. This is equal to gross pool value minus the fixed fee (representing pool costs) paid to AWB Limited, that is C(e).

(10) $PV = GPV - C(e)$

The pool manager's objective function is still the same:

(11) $\text{Max } \pi_A = M(e) - C(e) + O - nR$

Substituting the new value for M(e), as specified in (9), solving and taking partial derivatives with respect to e will highlight the incentives available to the pool manager.

(12) $$\frac{\partial^1 {}_A}{\partial e} = (\beta_1 + \beta_2)Q\frac{\partial P(e)}{\partial e} - (\beta_1 + \beta_2)\frac{\partial C(e)}{\partial e}$$

From this equation, there are equal weights on the incentives to reduce pool manager costs as there are to improve pool price. However, there are still insufficient incentives for the pool manager to reduce the non-marketing costs to A Class shareholders.

An important point needs to be made concerning the cost term that is used as the fixed fee payment to AWB Limited. It is evident from equation (12) that there are incentives provided through the use of the coefficients on the pool value variable to reduce the costs of the pool manager. However, the pool manager may be willing to sacrifice this part of the payment and instead, increase the pool manager cost variable, ignoring the disincentive provided to do so. This will be investigated further below

As shown in the above models, there appears to be little incentive to reduce costs to A Class shareholders. This implies that the agent is not provided with sufficient incentives to improve net pool value, meaning that the incentives provided to the agent are not in line with the objectives of the principal. This may increase the agency costs to the A Class shareholder or the principals, as the agents can be assumed to act in their own self interest and maximise their own profits.

A net pool value formulation

To better align the agent's and principal's objective, the remuneration formula could be altered to incorporate net pool value as the performance measurement and remuneration variable.

Net pool value is equal to gross pool value minus non-marketing costs. Taking into account the effectiveness of effort by the pool manager the net pool value can thus be represented by:

(13) $NPV = P(e).Q - \phi(e).D(Q)$

Using the NPV variable rather than the GPV variable in the agent's remuneration contract will alter the formulation as in equation (15). Recall from equation (2), that the first remuneration model was specified as:

(14) $M = \alpha GPV + \beta(GPV - (WIB + H).Q)$

Using the definition of net pool value from (13), this now will become:

(15) $M = [\alpha P(e).Q - \phi(e).D(Q)] + \beta[P(e).Q - \phi(e).D(Q) - (WIB + H).Q]$

Substituting into the pool manager's maximisation problem, solving and taking partial derivatives with respect to e yields:

(16) $$\frac{\partial^1 {}_A}{\partial e} = (\alpha + \beta)Q\ \frac{\partial P(e)}{\partial e} - (\alpha + \beta)\ D(Q)\frac{\partial \phi(e)}{\partial e} - \frac{\partial C(e)}{\partial e}$$

From this equation, it is clear that given $\frac{\partial P(e)}{\partial e}$ is positive, then an increase in effort will have a positive effect on profit through prices and a positive effect on profit through improving the efficiency of provision of non-marketing costs. (that is, $\frac{\partial \phi(e)}{\partial e}$ is assumed to be positive). An increase in the pool manager's effort will increase the gross pool value, and increase their profits due to the α and β coefficients. The non-marketing costs and pool manager costs are both decreasing functions of pool manager effort. As a side note, in reality, there may be some degree of a trade-off made in the operation of the National Pool as to where the effort will be directed, between increasing price, and decreasing non-marketing pool costs. Based on the level of return per unit of effort expended that the pool manager can derive from undertaking the different activities associated with the management of the pool, the pool manager, if rational, will choose to expend effort in places that will maximise their payoff.

However, still, there may be insufficient motivation to reduce the non-marketing costs to the pool but including non-marketing costs in the pool manager's remuneration contract is a much better than given in the original formulation. Even so, if the costs of achieving savings to the pool through expending effort to reduce the non-marketing costs are greater than the benefits achieved through increasing remuneration by avoiding the inaction penalty associated with the $\phi(e).D(Q)$ variable, the pool manager is unlikely to act to reduce the costs further, as it is not in their interests to do so.

There are also potential inter-group conflicts here. Whilst it has been assumed that the other operating divisions of AWB Limited are completely separate from the pool operations run under AWB (International) Limited, this may not be entirely true. If the group as a whole may be better off through sacrificing some revenue through the penalty for inaction, and earning more revenue in the storage and handling division, then this action may in fact occur. Therefore, it can be seen that if the company considers that other division profit is a function of pool manager effort, then the O variable will become O(e). Substituting this into the pool managers objective function, and noting the definition of M(e) from (15):

(17) $\text{Max } \pi_A = (\alpha + \beta)P(e).Q - (\alpha + \beta)\phi(e).D(Q) + \beta WIB.Q - \beta H.Q - C(e) + O(e) - nR$

Taking partial derivatives with respect to e:

$$(18) \qquad \frac{\partial^1 {}_A}{\partial e} = (\alpha + \beta)Q \frac{\partial P(e)}{\partial e} - (\alpha + \beta)\, D(Q) \frac{\partial \phi(e)}{\partial e} - \frac{\partial C(e)}{\partial e} + \frac{\partial O(e)}{\partial e}$$

From this equation, there will now be a trade-off between increasing the prices obtained, increasing the effectiveness of non-marketing costs, increasing pool manager costs, and increasing other division revenues. This option may be a very attractive to the directors and executives of the company. If the profits earned by another division of the company are to increase by $1, then the company will be able to earn 100 percent of those profits, by virtue of the coefficient of 1 on $\frac{\partial O(e)}{\partial e}$. However, the company will only be entitled to $(\alpha + \beta)$, or 20.5 percent of the gains through an increase in profit of $1 by increasing the pool value or by reducing the costs to the pool. Such an action would, of course, be counter to the AWB (International) Limited corporate governance rules, as the constitution of the company expressly instructs the directors to maximise net returns to growers.

Substituting the expression for net pool value (13) into the second remuneration model (9), solving and taking partial derivatives with respect to e yields:

$$(19) \qquad \frac{\partial^1 {}_A}{\partial e} = (\beta_1 + \beta_2)Q \frac{\partial P(e)}{\partial e} - (\beta_1 + \beta_2) \frac{\partial C(e)}{\partial e} - (\beta_1 + \beta_2).D(Q) \frac{\partial \phi(e)}{\partial e}$$

Thus, the use of the net pool value effort variable in the remuneration of the pool manager will provide incentives for the pool manager to reduce the non-marketing costs to the pool. As with the analysis of the first remuneration model above, the use of net pool value to remunerate the pool manager will more correctly align the agent's effort with the principal's objectives.

Conclusions and implications for the AWB Group

From the analysis in the previous section, it is clear that there will be a better alignment of the incentives provided to AWB Limited and AWB (International) Limited to maximise net pool returns to growers, as required by their respective constitutions, if net pool value is used as a performance measurement variable. This may result in greater net returns to growers. However, other considerations must be made before the remuneration model is altered in such a manner.

If the net pool value measure were to be adopted, AWB (International) Limited may spend less on obtaining higher prices in the international markets, as it would be considering all costs between the farm gate and end users. This could have the effect of reducing any possible distortions caused in world markets by the existence of the single desk. It may also assist in reducing the price of wheat to domestic users, and increase supplies of wheat available domestically as the company may find that it is relatively more profitable to use the wheat in Australia instead of exporting it.

However, the market power that AWB (International) Limited possesses could have negative effects on other industries in Australia. By virtue of section 57(B) of the *Wheat Marketing Act 1989*, AWB (International) Limited is the only entity allowed to export wheat in bulk form from Australia. Whilst it does not explicitly grant AWB (International) Limited exclusive marketing powers, it gives the company the power to deny permission to any other person or company to export wheat in bulk from Australia. Through this power, it is able to maintain its position as the exclusive provider of wheat export pool management services, which gives AWB Limited monopoly power in the market for export wheat pool management services. This has interesting implications for the agency relationships surrounding the single

desk. As the agent, AWB Limited has market power in relation to the services that they provide so they can charge as a monopolist. As a result, prices are likely to be set above the marginal cost, so that their profits are maximised. This increases the cost to growers of managing the pool.

Due to this monopoly power and the large volumes of wheat that are exported from Australia, AWB Limited has significant bargaining power with the providers of other services to the single desk, such as storage and handling. Should the remuneration model be altered to include a net pool value measure of performance, the attentions of AWB (International) Limited will more than likely be turned to reducing these costs, in order to earn returns for the company. If there is an imbalance in bargaining power, prices for these services may be reduced to levels that are below the market equilibrium. In this way, the presence of the single desk and its operation may act to stifle the development on these industries, through lack of infrastructure investment, due to low potential returns. This is just one of the side-effects of the granting of single desk powers.

In order to realign the actions of the company with the aims of the company, (or in terms of agency theory, realign the objectives of the agent with the objectives of the principal), and recognise the place of the A Class shareholders as the residual claimants on the earnings of the company, the production incentives for managers that are set by A Class Shareholders, through their directors, should be aligned with A Class shareholder aims. Milgrom and Roberts, who have analysed the agency problem and specifically agent contract design, have developed a set of principles that should be considered by the principal when designing a contract to remunerate an agent. Key amongst the four principals that they have developed is the informativeness principle, (Milgrom and Roberts 1992, p 219) which reads:

> "In designing compensation formulas, total value is always increased by factoring into the determinant of pay any performance measure that … reduces the error with which the agent's choices are estimated and by excluding performance measures that increase the error with which effort is estimated".

In other words, the success of an agent in achieving the objectives of the principal can be positively influenced by paying the agent for acting in such a manner to make decisions that will result in the principal's objectives being achieved. In production terms, if the agent is paid for producing those items that the principal wants, then the likelihood of the agent producing those items for the agent is increased. As the agent is provided with incentives to produce in line with the principal's wishes, it stands to reason that they will produce those goods that will achieve their wishes.

Thus, the remuneration variable in the remuneration model should be aligned with the aims of the principal in order to reduce the risk that the principal's objective are not met. In addition, and in order to ensure that the entity wide focus is on the production of A Class shareholder aims, the marginal payoffs from producing A Class shareholder returns for managers and employees should be increased. The best way of doing this is again through applying the informativeness principal, and linking the remuneration of individual employees and managers to A Class shareholder return, or net pool value.

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