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Insider Trading, Strategic Alliance, and Optimal Financial Contracts*

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Abstract

This paper intends to conduct an exploratory study regarding how insider trading regulation may affect product market competition, corporate financing decisions, the structure of debt maturity, and small firms incentives to form a strategic alliance. We consider imperfectly competitive firms that engage in either Cournot or Stackelberg competition with at least one firm faced with an uncertainty in the marginal cost of production. We show that, as in Brander and Lewis (1986), debt may be used to commit to a high-output reaction function in the product market when insider trading is prohibited, which however may cause productive inefficiency in certain states of nature. When insider trading is allowed, an all-equity firm faced with unit cost uncertainty can naturally commit to a high-output reaction function in the product market without incurring the agency costs associated with the use of debt. Hence insider trading restrictions may lead to excessive use of debt by firms faced with cost uncertainty. We also demonstrate that allowing insider trading may resurrect some firms which, because of the huge agency costs associated with debt, can only use equity financing. Allowing insider trading implies a commitment value of equity financing, and hence may make a negative NPV project become one with positive NPV. Finally, we identify conditions under which allowing insider trading may facilitate the formation of a strategic alliance.

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It is shown that if forming the alliance creates a new profit component for each member firm that is independent of the original firm profit, and if this profit component cannot be privately observed before stock trading, then allowing insider trading does encourage small firms to form a strategic alliance. When those conditions fail, however, the opposite may result.

Key words: insider trading, debt maturity, commitment, product market competition, optimal capital structure, strategic alliance.

1 Introduction

The finance literature has long recognized the efficiency roles of financial markets in allocating risks and resources (Arrow 1964; Debreu 1959; Duffie and Huang 1985), generating information about the profitability of new projects (Allen 1993; Khanna, Slezak, and Bradley 1994; Boot and Thakor 1997; Dow and Gorton 1997), and discilining self-interested corporate managers (Scharfstein 1988; Stein 1988; Holmström and Tirole 1993), but it also suggests that under certain circumstances restricting some or all agents' access to financial markets may improve economic efficiency. For example, restricting all agents' access to a new market makes everyone better off in the economy analyzed in Newbery (1984), because trading in both the old and new markets would result in inadequate insurance for producers, and the changes in the latter's production plans further hurt consumers. On the other hand, the moral hazard literature has shown that giving a risk-averse corporate manager access to the credit market may result in a Pareto dominated equilibrium, for the fact that the manager can freely trade in the credit market implies that the principal is faced with additional incentive compatibility constraints when designing the optimal managerial compensation scheme (Rogerson 1985; Chiappori, et al. 1994). Finally, there have been continual debates among legislators, market participants, and scholars in both law and economics regarding whether insider trading should be legally prohibited (Manove 1989; Laffont and Maskin 1990; Leland 1992; Fischer 1992; Fishman and Hagerty 1992; Khanna, Slezak, and Bradley 1994), and if not, whether mandatory disclosure is appropriate (Admati and Pfleiderer 2000, 1991, Fishman and Hagerty 1995). Empirical evidence has shown that insiders consistently earn trading returns that exceed risk-adjusted benchmarks (Seyhun 1986; Meulbroek 1992), and for this reason the Securities and Exchange Commission (SEC) in

the United States has regulated insider trading since 1934. Proponents for insider trading regulations argue that insider trading is harmful because it reduces liquidity in securities markets (Glosten 1989), creates perverse managerial incentives (Easterbrook 1985) and creates a perception of unfairness and loss of investor confidence in capital markets (Brudney 1979). Earlier critics of insider trading regulation contend that even if insider trading does incur social costs regulation is un-necessary because corporate shareholders would have the incentive of restricting it on their own (Carlton and Fischel 1983), and that allowing insider trading can improve informational efficiency in securities markets (Manne 1966), which is socially beneficial because efficient security prices lead to an efficient resources allocation.

The purpose of this paper is two-fold. First it intends to conduct an exploratory study regarding how insider trading regulation may affect product market competition, corporate financing decisions, and the structure of debt maturity. Second, it attempts to examine how allowing insider trading may alter small firms incentives to form a strategic alliance.

We consider imperfectly competitive firms that engage in either Cournot or Stackelberg competition with at least one firm faced with an uncertainty in the marginal cost of production. We show that debt may be used to commit to a high-output reaction function in the product market when insider trading is prohibited, which however may cause productive inefficiency in certain states of nature. When insider trading is allowed, an all-equity firm faced with unit cost uncertainty can naturally commit to a high-output reaction function in the product market without incurring the agency costs associated with the use of debt. Hence our first main result shows that *insider trading regulation may lead to excessive use of debt by firms faced with cost uncertainty.*

The idea that capital structure can be used as a commitment for imperfectly competitive firms to affect the subsequent competitive outcomes was first emphasized by Brander and Lewis (1986). In our model, a firm faced with a stronger rival can borrow long-term debt, which induces the equityholders to adopt a technology that involves risky unit cost of production,[1] and to fully take advantage of the riskiness in production costs, the

[1]This is the well-known *asset substitution effect*, an incentive problem associated with

equityholders will then optimally shift upward its reaction function against its rival in the product market. This forces the rival firm to concede in its output choice (since outputs are strategic substitutes), and raises the profit in the low-cost states. In the high-cost states, however, being able to sell more because of the rival's concession in output choice need not generate more profits than in the case where the firm sticks to the old technology that involves a non-random unit cost. In any case, the firm exhibits a tendency of using much debt when faced with a stronger rival in the product market and an opportuntiy of adopting a new technology that involves a risky unit production cost. When insider trading is allowed, however, the firm can do better by sticking to an all-equity financing strategy. The opportunity of engaging in insider trading based on his knowledge about the realization of the random unit cost is enough to induce a controlling equityholder to adopt the new technology and credibly shift upward the firm's reaction function in the product market. The firm is better off because being all-equity financed, unlike in the case of debt financing where the asset substitution effect is always at work, the firm will not expand output when output expansion will lower the firm value. Thus when insider trading is allowed, the firm optimally chooses to borrow less; or equivalently, insider trading regulation tends to result in too much debt in corporate financing.

Our second result concerns the relationship between insider trading regulation and the viability of small firms. It is shown that *allowing insider trading may resurrect some firms which*, because of the huge agency costs associated with debt, *can only use equity financing*. As we explained above, allowing insider trading creates an additional value to equity financing for firms faced with a stronger rival and an opportunity of adopting a new technology that involves a risky unit cost of production. If the firm can only be financed by either debt or equity, and if debt financing involves too much productive inefficiency, then whether a small firm can obtain financing and stay in business depends crucially on whether equity financing can help the firm gain a better competitive status in the industry, and allowing insider trading does exactly that. When insider trading is allowed, equity financing can help commit to a high-output reaction function against the rival firm, which raises the project value. When insider trading is prohibited, the

the use of debt, which says that the use of financial leverage encourages equityholders' risk-seeking behavior; see Jensen and Meckling (1976).

commitment value of equity financing is lost, and such a firm may cease to operate in the product market.

Our third result considers the maturity structure of corporate debt. We consider an economy where a firm's short-term cash inflows are positively correlated with its long-term cost efficiency. In this case, we show that two debt structures can be optimal. First, if insider trading is prohibited then the firm must borrow enough short-term debt to mitigate the asset substitution problem brought about by the long-term debt in high-cost states, while allowing the firm to commit to a high-output reaction function in the product market in the low-cost states. Second, if insider trading is allowed, either the first debt structure may prevail, or the firm borrows very little (short-term and long-term) debt, relying mostly on equity financing. We show that, other things being equal, *the more volatile the short-term cash inflows are, the more the firm may rely on short-term borrowing rather than long-term borrowing.*

Finally, we investigate how allowing insider trading may alter small firms' incentives of forming a strategic alliance. We identify conditions under which allowing insider trading may facilitate the formation of a strategic alliance. It is shown that *if forming the alliance creates a new profit component for each member firm that is independent of the original firm profit, and if this profit component cannot be privately observed before stock trading, then allowing insider trading does encourage small firms to form a strategic alliance.* When those conditions fail, however, the opposite may result.

The intuition underlying this result is that, joining the alliance creates a new random source of income for each member firm, which may either become a valuable hedging instrument for investors faced with endowment risks or regarded as a valuable piece of information by noise traders. In either way, this raises the gain from insider trading for the owners of the member firms, and furthermore, allows the latter to commit to a high-output reaction against non-member firms in the product market. Such benefits will vanish if insider trading is prohibited completely. Hence allowing insider trading encourages small firms to form a strategic alliance under such circumstances. Note however that when the new income component resulting from the alliance is stochastically correlated with the original firm profit, or when it is possible for some financial analysts to observe the new income component at a cost before stock trading, allowing insider trading may instead reduce

small firms' incentives of forming a strategic alliance.

The rest of this paper is organized as follows. Section 2 lays out the model for the study of the relationship between insider trading regulation and optimal corporate financing decisions. It will be shown that insider trading regulation tends to result in excessive use of debt and reduce the viability of competitive firms that are faced with cost uncertainty. Section 3 considers the relationship between insider trading regulation and small firms' incentives to form a strategic alliance. Concluding remarks are given in section 4.

2 Insider Trading and Optimal Capital Structure

Unless otherwise stated, everyone to appear in this model is risk neutral without time preferences. Consider an industry with two firms A and B. For simplicity, firm A is run by an owner-manager, also identified as A, and firm B was just established by a penniless entrepreneur-manager, also identified as B, who needs to raise money from competitive investors in order to cover a start-up cost $K > 0$. One homogeneous good is produced by the two firms, for which firm A's unit cost is $c > 0$ and firm B's unit cost is $H > 0$.

At date 0, B must offer a financial contract to competitive investors to raise the needed K dollars. If K is spent at date 0, a cash inflow equal to $F > 0$ will be generated at date 1, and in that event B can choose to or not to spend it on a new production technology. The consequence of the adoption of new technology depends on the date-1 state, which can only be privately observed by B at date 1. For simplicity, there are two equally likely date-1 states g and b (good state and bad state), which will be denoted by, respectively, $\omega = g$ and $\omega = b$. In state g, the new technology will alter firm B's unit cost from H to $\tilde{h}_g$, which is equally likely to take the values h and 0. In state b, on the other hand, the new technology will lead to the new unit cost $\tilde{h}_b$, which may take the values 0 and h with respectively probabilities $\epsilon < \frac{1}{2}$ and $1 - \epsilon$.

At date 2, upon seeing the above date-0 and date-1 events, but before seeing the realizations of $\tilde{h}_g$ or $\tilde{h}_b$, the two firms must make output decisions sequentially, with firm A being the Stackelberg leader. Assume for simplicity

that each firm can produce either 0 or 1 unit, and let p_1 and p_{11} denote the product price when, respectively, only 1 firm produces and both firms produce the unit.[2] We assume with Fudenberg and Tirole (1986) that firm B's output is prohibitively costly for investors to verify, so that investors can only affect the output choice of firm B through their financial contracts with entrepreneur B. Demand law requires that

$$0 < p_{11} < p_1. \tag{1}$$

We also assume that

$$p_{11} < c < p_1, \tag{2}$$

which reflects the property of *strategic substitutes* in imperfect output competition. For simplicity, we make the normalization

$$p_1 \equiv 1. \tag{3}$$

In most part of the analysis to follow, we shall also assume that

$$H, h > 1 > \frac{h}{2} > p_{11}, \tag{4}$$

that

$$1 - \frac{h}{2} > K > F > 1 - (1 - \epsilon)h, \tag{5}$$

and that

$$2K < \frac{1}{2} + \epsilon. \tag{6}$$

For simplicity, we also assume that firm B can only be financed by debt and equity. Let D_t be the face value of firm B's debt maturing at date $t \in \{1, 2\}$. Let α be the fraction of firm B's equity owned by public investors rather than entrepreneur B. Thus at date 0, entrepreneur B will offer a contract $\{\alpha, D_1, D_2\}$ to public investors in order to raise the K dollars. We shall consider both the case where insider trading is prohibited and the case insider trading is allowed. For simplicity, we assume that only insider trading in equity is possible in any case.[3]

[2] In Chen and Han (2006), the firms are faced with a linear inverse demand curve. For ease of exposition, we assume here that there are only two feasible output levels. The main results will be preserved despite the much simpler formulation.

[3] Hence think of it as bank debt. Allowing the firms to issue bonds will raise quite a few new issues, which are out of the scope of the current study; see however Lin (2007).

In case insider trading is allowed, we assume that stock trading happens after the firms make output decisions but before the public observe the realization of firm B's unit cost. More precisely, assume that at date 2, right after the firms choose output levels, entrepreneur B privately sees firm B's unit cost, and then the stock market opens. For simplicity, we assume that there is one share of each firm's stock outstanding. For each stock, there are risk neutral market makers competing in posting bid and ask prices. After all bid and ask prices are posted, everyone else can submit orders. Assume that the public investors may trade for liquidity reasons. With probability d one of the liquidity traders may want to buy l shares of firm B's stock, with probability d one of the liquidity traders may want to sell l shares of firm B's stock, and with probability $1-2d$, there is no liquidity demand.[4] After orders are submitted, exactly one order will be selected at random to transact with the market marker that posts the price appearing to be most favorable to the trader that submits the order. (If there are multiple market makers posting that price, then one market maker will be selected at random.) This is the Glosten-Milgrom-Easley-O'Hara quote-driven trading mechanism; see Glosten and Milgrom (1985) and Easley and O'Hara (1992).[5]

We shall let π_T denote entrepreneur B's gain from engaging in insider trading and Let π_i be the date-2 earnings of firm $i \in \{A, B\}$, which includes the firm's date-2 profits and every penny the firm carries over from date 1 into date 2. Both firms are assumed to pay no dividends at date 1.

The timing of relevant events can be recapitulated as follows.

- At date 0, all players first learn about whether there are insider trading restrictions. We assume that either there are no restrictions at all, or insider trading is completely prohibited.
- Firm B chooses debt contract $\{\alpha, D_1, D_2\}$ to raise K.
- Then at date 1, B privately sees the true state $j \in \{g, b\}$ and must repay D_1 or else liquidate the firm; if no default takes place at date 1, then

[4]We can alternatively interpret these as noise trades, submitted by a trader who mistakenly regards noise as relevant information; see for example Black (1989).

[5]Since there is a risk of non-execution according to our descriptions, a more complete analysis should consider sequential trading in a dynamic model. Here we content ourselves with the static model because introducing dynamic trading does not alter our main results regarding the relationship between financial leverage and insider trading and regarding the social value of insider trading regulation.

B must decide whether to spend F on the new production technology.

- Then at date 2, as mentioned above, firms make output decisions sequentially, and after that, if firm B has adopted the new technology at date 1, then entrepreneur B can observe firm B's unit cost privately.
- The stock market opens, and the two firms' shares are traded under the aforementioned quote-driven mechanism. B can engage in insider trading based on his private information about firm B's unit cost, if and only if insider trading is allowed and the new technology has been adopted.
- The stock market closes, and the two firms' date-2 values π_A and π_B are realized.

We shall look for the subgame perfect Nash equilibria (SPNE) of the above extensive game in case insider trading is prohibited, and we shall look for the perfect Bayesian equilibria (PBE) in case insider trading is allowed. The following Lemma characterizes firm B's date-0 capital structure when insider trading is prohibited.

Lemma 1 *Suppose that insider trading is prohibited. Suppose also that*

$$H, h > 1 > c, \frac{h}{2} > p_{11}, \tag{7}$$

$$1 - \frac{1}{2}[\frac{h}{2} + (1-\epsilon)h] > K > F > 1 - (1-\epsilon)h, \tag{8}$$

and

$$2K < \frac{1}{2} + \epsilon. \tag{9}$$

Then in the unique SPNE firm B issues neither equity nor short-term debt (i.e. $\alpha = D_1 = 0$); instead, it issues a long-term debt that matures at date 2 with a face value of

$$D_2 = \frac{2K}{\frac{1}{2} + \epsilon} < 1, \tag{10}$$

and it always adopts the new technology at date 1. Moreover, in equilibrium, only firm B produces at date 2. In case firm B deviates by issuing no debt, then the public investors would refuse to finance its project, for if they did, then firm B would not produce at date 2 any way.

Proof. First note that $F < K$, and hence having borrowed debt with face value D_2, it is always a dominant strategy for entrepreneur B to adopt the new technology at date 1, and a dominant strategy to produce. Rationally expecting this, firm A chooses to produce nothing. The zero-profit condition for the competitive public investors gives rise to the explicit expression of D_2. In case firm B issues equity only (i.e. $\alpha > 0 = D_1 = D_2$), then since $p_1 1 < \frac{h}{2} < (1-\epsilon)h$, it is optimal for firm A to commit to produce 1 unit, which forces firm B to produce nothing. But then it is a dominant strategy for firm B to give up the new technology, which implies a negative NPV for investors ($F < K$). This completes the proof.‖

The idea that capital structure can be used as a commitment for imperfectly competitive firms to affect the subsequent competitive outcomes was first emphasized by Brander and Lewis (1986). In the preceding Lemma, firm B commits to an ex-post suboptimal (from the perspective of the value of the firm) reaction function that arises from the presence of debt: if firm B were equity-financed, it would choose not to produce under the new technology, but it would always choose to produce under the new technology given the presence of the long-term debt. The latter is the well-known *asset substitution effect*, an incentive problem associated with the use of debt, which says that the use of financial leverage encourages equityholders' risk-seeking behavior; see Jensen and Meckling (1976). In our model, the new technology raises the riskiness of unit cost of production, and for equityholders to fully benefit from enhanced earnings riskiness, they must expand output. Thus the firm's reaction function shifts upward because of the presence of debt and the adoption of the new technology, which then forces firm A to concede in its output decision (because outputs are strategic substitutes). With firm A lowering its output level, firm B actually gains from the asset substitution effect brought about by the long-term borrowing in state g (and it also gains on average over the two date-1 states).

Lemma 2 *Suppose that insider trading is prohibited. Suppose also that*

$$H, h > 1 > c, \frac{h}{2} > p_{11}, \tag{11}$$

$$K > F, 1 - \frac{1}{2}[\frac{h}{2} + (1-\epsilon)h] > 1 - (1-\epsilon)h, \tag{12}$$

and

$$2K < \frac{1}{2} + \epsilon. \tag{13}$$

Then in the unique SPNE firm B issues neither equity nor debt and it produces nothing.

Proof. It is clear that no date-1 financial contract $\{\alpha, D_1, D_2\}$ can satisfy both the investors' and entrepreneur B's individual rationality constraints, given that

$$K > F, 1 - \frac{1}{2}[\frac{h}{2} + (1-\epsilon)h]. \tag{14}$$

Thus firm B is unable to raise the needed K dollars in the first place, and so it must produce nothing in equilibrium. ‖

Having considered the equilibria for the case where insider trading is prohibited, now we switch attention to the case where entrepreneur B can engage in insider trading after the new technology is adopted, output decisions are made, and unit cost is privately observed. For simplicity, we shall consider the case where $d = \frac{1}{2}$; that is, the liquidity traders are always active in the stock market.

Lemma 3 *Suppose that insider trading is allowed and that firm B has adopted the new technology at date 1 and produced 1 unit of the good at date 2. If $D_1 = D_2 = 0$, then in the PBE where all market makers behave identically entrepreneur B's profit from stock trading, denoted by π_T, is such that,*

$$\pi_T = \begin{cases} \frac{hl}{4}, & \text{if } \omega = g; \\ \frac{(1-\epsilon)hl}{1+2\epsilon}, & \text{if } \omega = b, \ \tilde{h}_b = 0; \\ \frac{\epsilon hl}{3-2\epsilon}, & \text{if } \omega = b, \ \tilde{h}_b = h. \end{cases} \tag{15}$$

Proof. We consider only the case $\omega = b$, and the case $\omega = g$ can be analogously proved. Given that $\omega = b$, the probability for the event that a buy order is executed is $\epsilon(1 - \frac{1}{2}) + (1-\epsilon)\frac{1}{2}$, and the probability for the event that a sell order is executed is $\epsilon\frac{1}{2} + (1-\epsilon)(1 - \frac{1}{2})$. Hence the probability for the event that $\tilde{h}_b = 0$ conditional on a buy order being executed is $\frac{(1-\epsilon)}{1+2\epsilon}$, and the probability for the event that $\tilde{h}_b = h$ conditional on a sell order being executed is $\frac{\epsilon}{3-2\epsilon}$. Since the market makers adopt the same strategy, the bid

price must equal the expected value of $l\pi_B$ conditional on the event that a sell order being executed, and the ask price must equal the expected value of $l\pi_B$ conditional on the event that a buy order being executed. Now, since entrepreneur B's optimal trading strategy is to buy l shares in state $\tilde{h}_b = 0$ and to sell l shares in state $\tilde{h}_b = h$, the assertions follow. ‖

Unlike Lemmas 1-3, our next Lemma shows that all-equity financing can become optimal if insider trading is allowed.

Lemma 4 *Suppose that insider trading is allowed, and that the following conditions hold:*

$$(1-\frac{h}{2})+\frac{hl}{4(1-\alpha^*)} > F > 1-(1-\epsilon)h+\frac{\epsilon(1-\epsilon)hl}{1-\alpha^*}[\frac{1}{1+2\epsilon}+\frac{1}{3-2\epsilon}], \quad (16)$$

where

$$\alpha^* = \frac{K+\frac{\beta}{2}\cdot\frac{hl}{4}}{\frac{1}{2}(1-\frac{h}{2})+\frac{F}{2}} < 1, \quad (17)$$

with the exogenous parameter β being such that, when insider trading occurs at date 2, a fraction β of the insider's trading profit comes from the date-0 equityholders' trading losses.

Then in one PBE firm B issues no debt; instead it offers a fraction α^* of equity to raise the K dollars from the public investors. Then the new technology is adopted at date 1 and firm B produces at date 2 if and only if the state is g. Also, entrepreneur B engages in insider trading only in state g.

Proof. Suppose that a fraction α^* of equity has been given to outside investors at date 0. Then at date 1, given that

$$(1-\alpha^*)(1-\frac{h}{2})+\frac{hl}{4} > (1-\alpha^*)F, \quad (18)$$

it is optimal for entrepreneur B to adopt the new technology and produce the unit in state g; and because

$$(1-\alpha^*)F > (1-\alpha^*)[1-(1-\epsilon)h]+[\epsilon(1-\epsilon)hl][\frac{1}{1+2\epsilon}+\frac{1}{3-2\epsilon}], \quad (19)$$

it is optimal for entrepreneur B to liquidate the firm at date 1 in state b. Now, rationally expecting this, α^* is the fair price for the public investors to

contribute the K dollars that firm B needs at date 0:

$$\alpha^*[\frac{1}{2}\cdot(1-\frac{h}{2})+\frac{1}{2}\cdot F]=K+\frac{1}{2}\cdot\frac{hl}{4}\cdot\beta, \tag{20}$$

where recall that $\frac{hl}{4}$ is entrepreneur B's expected trading profit in state g, regardless of the realized unit production cost. It is easy to verify that no other financial structure $\{\alpha, D_1, D_2\}$ that satisfy the public investors' and entrepreneur B's date-0 individual rationality constraints can outperform the contract $\{\alpha^*, 0, 0\}$ from entrepreneur B's perspective. ‖

The intuition underlying the above Lemma is as follows. In order to best gain from insider trading, entrepreneur B must make sure that the true value of firm B varies greatly with his private information, which requires entrepreneur B to expand output. Thus like financial leverage, the opportunity of engaging in insider trading allows entrepreneur B to convince firm A that firm B's reaction function will be shifting upward. This forces firm A to concede in output decision, and therefore may benefit the outside equityholders of firm B. One possible drawback is that the outside equityholders may bear trading losses at date 2 because of insider trading, but under the stated conditions, that can be compensated by allowing them to hold a higher fraction of firm B's equity (i.e. a higher α^*).

Now we are ready to state our first main result, which shows that allowing insider trading may impact on firm B's captial structure.

Proposition 1 *Suppose that the following conditions hold so that Lemmas 1 and 4 hold true at the same time:*

$$H, h>1>c, \frac{h}{2}>p_{11}, \tag{21}$$

$$1-\frac{1}{2}[\frac{h}{2}+(1-\epsilon)h]>K>F>1-(1-\epsilon)h, \tag{22}$$

$$2K<\frac{1}{2}+\epsilon, \tag{23}$$

and

$$(1-\frac{h}{2})+\frac{hl}{4(1-\alpha^*)}>F>1-(1-\epsilon)h+\frac{\epsilon(1-\epsilon)hl}{1-\alpha^*}[\frac{1}{1+2\epsilon}+\frac{1}{3-2\epsilon}], \tag{24}$$

where

$$\alpha^* = \frac{K + \frac{\beta}{2} \cdot \frac{hl}{4}}{\frac{1}{2}(1 - \frac{h}{2}) + \frac{F}{2}} < 1, \tag{25}$$

with the exogenous parameter β being such that, when insider trading occurs at date 2, a fraction β of the insider's trading profit comes from the date-0 equityholders' trading losses.

Then, in case insider trading is prohibited, firm B issues only long-term debt at date 0, just as described in Lemma 1; and in case insider trading is allowed, firm B can do better by issuing equity only, as described in Lemma 4. That is, in the environment depicted by the above conditions, allowing insider trading results in firm B using less debt.

Proof. The assertions follow directly from Lemmas 1 and 4. ‖

Proposition 1 gives our main prediction about the connection between insider trading regulation and corporate financing. When insider trading is prohibited, a firm may resort to borrowing more in order to improve its competitive status in the product market, which however may be costly because equityholders may indulge too much risk when choosing competitive strategies. When insider trading is allowed, an all-equity firm can improve its competitive status in the product market simply by committing to taking advantage of the insider trading opportunity, and being all-equity financed, there will be no distortion in the equityholders' incentives in undertaking risky strategies. Hence debt financing is less preferred when insider trading is allowed.

Proposition 2 *Suppose that the following conditions hold so that Lemmas 2 and 4 hold true at the same time:*

$$H, h > 1 > c, \frac{h}{2} > p_{11}, \tag{26}$$

$$K > F, 1 - \frac{1}{2}[\frac{h}{2} + (1 - \epsilon)h] > 1 - (1 - \epsilon)h, \tag{27}$$

$$2K < \frac{1}{2} + \epsilon, \tag{28}$$

and

$$(1 - \frac{h}{2}) + \frac{hl}{4(1 - \alpha^*)} > F > 1 - (1 - \epsilon)h + \frac{\epsilon(1 - \epsilon)hl}{1 - \alpha^*}[\frac{1}{1 + 2\epsilon} + \frac{1}{3 - 2\epsilon}], \tag{29}$$

where

$$\alpha^* = \frac{K + \frac{\beta}{2} \cdot \frac{hl}{4}}{\frac{1}{2}(1 - \frac{h}{2}) + \frac{F}{2}} < 1, \tag{30}$$

with the exogenous parameter β being such that, when insider trading occurs at date 2, a fraction β of the insider's trading profit comes from the date-0 equityholders' trading losses.

Then, in case insider trading is prohibited, firm B ceases to operate at date 0; and in case insider trading is allowed, then firm B can do better by issuing equity only, as described in Lemma 4. That is, in the environment depicted by the above conditions, allowing insider trading results in firm B producing more, and more importantly, a debt capacity arises in equilibrium such that all feasible financing strategies must limit the use of debt.

Proof. The assertions follow directly from Lemmas 2 and 4. Only the last assertion calls for a remark. Lemma 2 shows that when there is too much short-term debt, firm B may be inefficiently liquidated at date 1 in state g, and when there is too much long-term debt, firm B may adopt the new technology at date 1 even in state b. Since $K > F$ and $K > 1 - \frac{1}{2}[\frac{h}{2} + (1-\epsilon)h]$, neither of these financing strategies can satisfy both the public investors' and entrepreneur B's date-0 individual rationality constraints. Hence for feasible financing strategies, D_1 and D_2 must both be small enough. ‖

Proposition 2 is consistent with the theory of Chen and Han (2006), where insider trading is shown to allow a firm suffering from an adverse selection problem to actually enjoy a higher firm value than its otherwise-identical counterpart which is not faced with the adverse selection problem. Here, as shown in Proposition 1, an all-equity firm can avoid the inefficiency associated with the use of long-term debt, and if the state-b inefficiency caused by the use of long-term debt is so severe that it makes such a financing strategy unacceptable to the public investors at date 0, then the only hope that firm B can raise the K dollars at date 0 and stay in business is to resort to equity financing. However, when insider trading is prohibited, equity financing does not help a weak firm enhance its competitive status in the product market, and hence firm B must stay out of business as shown in Lemma 2. Things differ when insider trading is allowed. In the latter case, relying mainly on equity financing is indeed optimal for firm B. Essentially, allowing insider trading raises the value of equity financing, thereby creating *one* financing

strategy for the firm, which is acceptable to the public investors. Thus, when insider trading is allowed, firm B can stay in business.

So far we have assumed that the date-1 cash flow is deterministic. Suppose instead that in state g, the date-1 cash flow is $F+\delta > 2F$. A similar reasoning as the one presented in the proof of Lemma 1 leads to the next Proposition.

Proposition 3 *Suppose that insider trading is prohibited. Suppose also that*

$$H, h > 1 > c, \frac{h}{2} > p_{11}, \tag{31}$$

$$\frac{1}{2}[1 - \frac{h}{2}] + \frac{1}{2}F > K > K - \delta > F > 1 - (1 - \epsilon)h, \quad \delta > F, \tag{32}$$

and

$$2(K - \delta) < \frac{1}{2} + \epsilon. \tag{33}$$

Then in one SPNE firm B issues no equity (i.e. $\alpha = 0$); instead, it issues a short-term debt that matures at date 1 with face value $D_1 = \delta$ and a long-term debt that matures at date 2 with a face value of

$$D_2 = \frac{2(K - \delta)}{\frac{1}{2} + \epsilon} < 1, \tag{34}$$

and it adopts the new technology at date 1 if and only if the date-1 state is g. Moreover, in equilibrium, at date 2 only firm B produces in state g and only firm A produces in state b.

Proof. The proof runs similarly as that for Lemma 1. Here, the date-1 stochastic cash inflow allows firm B to do better than in Lemma 1. By setting $D_1 = \delta > F$, the firm stops producing in state b at date 2, which is productively efficient. In state g, however, after repaying D_1 firm B still has enough cash at date 1 to commit to the new technology, which forces firm A to concede in output decision just as in Lemma 1. ‖

Proposition 3 highlights the role of short-term debt in our paper. Although long-term borrowing can be used to commit to an ex-post suboptimal reaction function, such a commitment may be too costly in certain states

(e.g. state b in Lemma 1). When the date-1 cash flow is positively correlated with the commitment value of the ex-post suboptimal (from the perspective of the value of the firm) reaction function, a properly chosen short-term debt can allow the long-term debt to have commitment value exactly in those states where production is profitable. This gives rise to a structure of debt maturity. Other things being equal, for example, the more volatile the date-1 cash inflow (i.e. the larger δ is), the more (respectively, the less) firm B should rely on short-term (respectively, long-term) borrowing.

Note that Proposition 3 is not inconsistent with Proposition 1. When insider trading is allowed, equity financing plus insider trading may perform just as well as the debt-financing strategy described in Proposition 3. Hence, the prediction is nonetheless that allowing insider trading may lead to less use of debt in firms' capital structures.

Although we have interpreted the problem of financial contracting as one of choosing the optimal capital structure, it is easy to see that with a moderate reformulation the problem can be re-interpreted as one of choosing optimal managerial contract. What matters here is how to design a contract for entrepreneur B, where the contract must induce entrepreneur B to adopt an ex-post suboptimal (from the perspective of the value of the firm) reaction function, which serves to force firm A's concession in output choice.

3 Can Insider Trading Facilitate Strategic Alliance?

Our next task is to investigate whether allowing insider trading may alter small firms' incentives to form a strategic alliance against a large rival. To this end, we shall consider an industry with three single-owner firms, labeled as firm 1, firm 2, and firm 3, producing probably heterogeneous goods. Firm owners are risk neutral. For constants d_j, $j = 1, 2, 3$, let firm j's inverse demand be, in the relevant range,

$$p_j = 1 - \sum_{h=1}^{3} d_h q_h, \tag{35}$$

where q_h is firm h's output choice. Firm 1's unit cost is known to be $c > 0$. To simplify the analysis, assume that $d_j = 1$ for all $j = 1, 2, 3$. (Thus the firms produce a homogeneous good.) Assume that firms 2 and 3 have unit costs of production, $\tilde{c}_2$ and $\tilde{c}_3$, which are identically and independently distributed and are equally likely to take the values 0 and $2c$.

Firms 2 and 3 can first decide whether to form a strategic alliance. A strategic alliance is defined as a random money transfer ϵ, which are equally likely to take values $e > 0$ and $-e$, such that the two firms agree that given q_2 and q_3, firm 2 pays firm 3 $q_2\epsilon$ and firm 3 pays firm 2 $q_3(-\epsilon)$, where $(\epsilon, \tilde{c}_2, \tilde{c}_3)$ are totally independent.[6]

As in Chen and Han (2006), we assume the following sequence of events.

- At date 0, all players first learn about whether there are insider trading restrictions. We assume that either there are no restrictions at all, or insider trading is completely prohibited.

- Firms 2 and 3 decide whether to form a strategic alliance, and their decision is public information.

- Then Firm 1 chooses q_1, and upon seeing q_1, firms 2 and 3 choose q_2 and q_3 simultaneously.

- Then owner of firm j privately sees the realization of $\tilde{c}_j$, $j = 2, 3$.

- Then the stock market opens, and the three firms' shares are traded under the quote-driven mechanism described in Section 2. We shall alter slightly the formulation of liquidity traders. Assume for simplicity that for $j = 2, 3$, there is exactly one public investor interested in trading firm j's stock. With probability a, this public investor is a liquidity trader, who is equally likely to buy or sell 1 share (we assume for simplicity that the trade size is exogenously given); with probability $1 - a$, the public investor is a speculator (referred to as the *speculative public investor*), who is considering whether to spend a cost $k > 0$ to study a piece of information. As in Black (1986), we shall assume that the speculative public investor mistakenly regards a noise as information:

[6] In practice, a consumer's purchasing from a member firm in the alliance may get coupons or discounts for his future consumption at another member firm, and those coupons or discounts may either raise or reduce that second member firm's revenue. For example, car rental at Hertz may allow the client to raise his flight mileage at some airlines company.

he believes that by spending k he can see the realization of ϵ, but what he sees is really something else independent of ϵ, $\tilde{c}_2$ and $\tilde{c}_3$, which, like ϵ, is equally likely to take the values e and $-e$. We shall refer to the speculative public investor as a noise trader if and only if he spends k. Once again, the public investor's order and the firm-owners' orders to a given security will compete each other, and exactly one order will be selected to trade with the market makers.

- The stock market closes, and the three firms' production costs and profits are realized.

Our first step is to characterize the trading gain for the owners of firms 2 and 3.

Lemma 5 *Suppose that insider trading is allowed. There exists a positive constant k^* such that the speculative public investor becomes a noise trader if and only if firms 2 and 3 form a strategic alliance and $k \leq k^*$. For $j = 2, 3$, given q_j, the owner of firm j enjoys the trading gain G_j if firms 2 and 3 form a strategic alliance and $k \leq k^*$, and he enjoys the trading gain g_j if they do not form a strategic alliance, where*

$$G_j = \frac{cq_j}{2}, \tag{36}$$

and

$$g_j = \frac{acq_j}{2}. \tag{37}$$

Proof. The presence of the positive constant k^* is obvious: if firms 2 and 3 form a strategic alliance, then according to what the speculative public investor believes, he can expect to make a positive speculative profit, which defines k^*. (The close-form expression of k^* is irrelevant to our subsequent analysis, but it is available from the author upon request.) In case firms 2 and 3 choose not to form the strategic alliance, then ϵ does not enter into the two firms' equity value, and hence it is optimal for the speculative public investor not to spend k.

Now if the two firms do form a strategic alliance, then the public investor will always be active, buying and selling one share with probability $\frac{1}{2}$ respectively; and if the two firms choose not to form the strategic alliance, then the public investor will be active if and only if he is a liquidity trader, who

will buy and sell 1 share with probability $\frac{a}{2}$. The assertions now follow; see the proof of Lemma 3 for details. ‖

Lemma 5 explains why allowing insider trading may encourage firms 2 and 3 to form a strategic alliance. Note that when insider trading is prohibited, forming the strategic alliance does not change the two firms' reaction functions in the product market, since the two firm owners are risk neutral by assumption, and ϵ has zero mean. When insider trading is allowed, but $a = 1$ (that is, the public investor trades for liquidity but not speculative reasons), again the two firms have no incentive to form the strategic alliance. The reason is that the two firm owners receive private information about their own unit costs, but not about ϵ, before the stock market opens. For insider trading to encourage the formation of a strategic alliance, the presence of noise traders is crucial in our theory. When the two firms decide to form a strategic alliance, a speculative public investor is encouraged to spend on information acquisition, which raises the level of noise trade facing the firm owners, and their trading gains as well. Moreover, the following Proposition will show that the increased amount of the firm owners' trading gains is linearly increasing in the firms' (common) output level. Hence forming a strategic alliance not only enhances the firm owners' trading profits, but it also forces firm 1 to concede in output choice.

Proposition 4 *If insider trading is prohibited, then in equilibrium each firm chooses output level* $\frac{1-c}{4}$*, and obtains an expected profit* $\frac{(1-c)^2}{16}$*. If insider trading is allowed, then in equilibrium firms 2 and 3 choose to form the strategic alliance, and then engage in insider trading in their own equity. The equilibrium output levels are*

$$q_1 = \frac{1}{4} - \frac{c}{2},\ q_2 = q_3 = \frac{1}{4}. \tag{38}$$

That is, allowing insider trading results in higher q_2 *and* q_3 *and a lower* q_1*.*

Proof. When insider trading is prohibited, firms 2 and 3 obviously cannot benefit from forming the strategic alliance; see the remark before the current Proposition. Being risk neutral, each firm j given its rival firms' output choices q_i and q_k, seeks to

$$\max_{q_j}(1 - q_i - q_j - q_k - c)q_j. \tag{39}$$

The unique Nash equilibrium is such that

$$q_1 = q_2 = q_3 = \frac{1-c}{4}. \tag{40}$$

When insider trading is allowed, firms 2 and 3's (common) payoff function becomes

$$\max_{q_j}(1 - q_i - q_j - q_k - c + \frac{ac}{2})q_j, \tag{41}$$

if they choose not to form the strategic alliance, and their (common) payoff function becomes

$$\max_{q_j}(1 - q_i - q_j - q_k - c + \frac{c}{2})q_j, \tag{42}$$

if they choose to form the strategic alliance. Thus the two firms will form the strategic alliance in equilibrium. The equilibrium output choices (q_1, q_2, q_3) now must solve the following system of equations:

$$\begin{cases} q_1 = \frac{1-q_2-q_3-c}{2} \\ q_2 = \frac{1-q_1-q_3-\frac{c}{2}}{2} \\ q_3 = \frac{1-q_1-q_2-\frac{c}{2}}{2} \end{cases} \tag{43}$$

which gives

$$q_1 = \frac{1}{4} - \frac{c}{2},\ q_2 = q_3 = \frac{1}{4}. \tag{44}$$

This completes the proof. ‖

As we mentioned above, firms 2 and 3's incentives to form a strategic alliance crucially depend on the presence of noise traders, of which the likelihood depends on the cost of information acquisition, k, and the configuration of public investors, denoted by a. When k and a are both large, a small transaction cost associated with the formation of the strategic alliance is enough to discourage the two firms from carrying out the cooperation. On the other hand, when k and a are both small, the gain from stock trading and the gain from committing to shifting upward the reaction function in the product market are both large, making the formation of a strategic alliance sensible so long as it is not too costly to do so.

Thus far the analysis gives an impression that the presence of noise traders is a necessity for insider trading to facilitate the formation of strategic alliance. The next proposition shows that the presence of potential hedging demand may work also.

Proposition 5 *Maintain all assumptions as in Proposition 4 except that with probability* $1-a$ *the public investor is a risk averse hedger (instead of a speculator), whose random endowment is highly correlated with* ϵ*, with the coefficient of correlation being equally likely to be* $\rho > 0$ *and* $1-\rho$*. (The hedger privately learns about the sign of the coefficient of correlation before stock trading.) If the hedger is sufficiently risk averse, his endowment is sufficiently risky, and* ρ *is sufficiently large,*[7] *the assertions in Proposition 4 hold. That is, allowing insider trading encourages firms 2 and 3 to form a strategic alliance, which results in firm 1 producing less and the rest two firms producing more.*

Proof. Suppose that the coefficient of correlation between the hedger's endowment and ϵ is ρ. Since the endowment risk is large, the hedger's optimal trading strategy is to buy 1 share of firm 2's stock and sell 1 share of firm 3's stock. On the other hand, if that coefficient of correlation is $-\rho$, then the hedger should optimally sell 1 share of firm 2's stock and buy 1 share of firm 3's stock. Before stock trading, the hedger is then expected to buy and sell 1 share of each of the two stocks with equal probabilities. This implies that for $j = 2, 3$, the gain from stock trading for the owner of firm j is G_j if firms 2 and 3 have formed the strategic alliance, and it becomes g_j if the opposite happened. Hence the same reasoning as in the proof for Proposition 4 implies the above assertions. ‖

We have assumed that $(\epsilon, \tilde{c}_2, \tilde{c}_3)$ are totally independent and there are no outside rational speculators who can become informed about those three random variables at a cost. Without these assumptions allowing insider trading need not facilitate the formation of strategic alliance. The reasons are as follows.

- Suppose that the above three random variables are correlated, and that firm owners' information about their unit costs of production are noisy. In this case, introducing ϵ into the profits of firms 2 and 3 may encourage the two firm owners to trade both firms' stocks, thereby reducing the gain from insider trading per unit of output. (This may happen because there will be more than 1 insider tading each stock, and competition between insiders tends to reduce the trading gain.)

[7] An example is that the hedger has a mean-variance utility function $E[w] - \delta \mathrm{var}[w]$, where w is his terminal wealth, and $\delta > 0$ measures his aversion toward risk.

- Next, maintain all previous assumptions but imagine that a financial analyst is able to spend a cost h to learn about the realization of ϵ. If the analyst decides to spend h and become informed about ϵ, then it can be optimal for him to trade both firm 2's and firm 3's stocks. When this happen, there will be two insiders trading firm j's stock, $j = 1, 2$, with the two insiders possessing heterogeneous information. Again, strategic alliance may attract noise traders (as in Proposition 4) or hedgers (as in Proposition 5), but now the competition from the second insider may reduce the firm owner's trading gain more than the benefit brought about by the noise traders or the hedgers. In such an event, allowing insider trading does not encourage firms 2 and 3 to form the strategic alliance.

4 Concluding Remarks

This paper has conducted an exploratory study regarding how insider trading regulation may affect product market competition, corporate financing decisions, the structure of debt maturity, and small firms incentives to form a strategic alliance.

We considered imperfectly competitive firms that engage in either Cournot or Stackelberg competition with at least one firm faced with an uncertainty in the marginal cost of production. We showed that, as in Brander and Lewis (1986), debt may be used to commit to a high-output reaction function in the product market when insider trading is prohibited, which however may cause productive inefficiency in certain states of nature. When insider trading is allowed, an all-equity firm faced with unit cost uncertainty can naturally commit to a high-output reaction function in the product market without incurring the agency costs associated with the use of debt. Hence insider trading restrictions may lead to excessive use of debt by firms faced with cost uncertainty.

We also demonstrated the relationship between insider trading regulation and viability of competitive firms. We showed that allowing insider trading may resurrect some firms which, because of the huge agency costs associated with debt, can only use equity financing. Allowing insider trading implies a commitment value of equity financing, and hence may make a negative NPV project become one with positive NPV.

We also identified conditions under which allowing insider trading may facilitate the formation of strategic alliance. It has been shown that if forming the alliance creates a new profit component that is independent of the original firm profit, and if this profit component cannot be privately observed before stock trading, then allowing insider trading does encourage small firms to form a strategic alliance. When those conditions fail, allowing insider trading may discourage the formation of strategic alliance.

This research has exhibited several limitations. Among the limitations, we have disregarded the possibility of information acquisition by outside speculators, and hence our theory cannot distinguish inside speculators and outside speculators, nor can we capture the latter's impact on informational efficiency, as was the focus of Fishman and Hagerty (1992) and Khanna, Slezak, and Bradley (1994). Our analysis cannot address issues concerning consumer welfare. Even with the simplifying assumption of quasi-linear preferences the welfare implications of our analysis remain ambiguous. These problems define the directions in which the current research can be further extended and improved upon.

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行政院國家科學委員會專題研究計畫成果報告

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一、中文摘要

本論文旨在探索管制內部人交易對產品市場競爭、公司融資決策、負債到期結構與小廠商組成策略聯盟之誘因的影響。本研究分析對象為從事 Cournot（產量）競爭或 Stackelberg（價格）競爭的不完全競爭廠商，且其中至少有一家廠商面臨邊際生產成本之不確定性。而本研究獲致與 Brander 與 Lewis(1986)一文相符之結果，即當禁止內部人交易時，儘管舉債可作為廠商承諾其於產品市場具備高產量反應函數的策略工具，卻會導致生產的不效率性。但當允許內部人交易時，面對單位成本具不確定性之無舉債廠商，卻無須負擔舉債相關代理成本，即可成功達成擁有高產量反應函數的承諾能力。因此，限制內部人交易會導致面臨成本不確定性之廠商舉債過度。且本文亦指出允許內部人交易有助於因舉債成本過高而僅能使用普通股融資之廠商在產品市場的存續。此外，允許內部人交易隱含著普通股融資具有提供承諾的價值，從而可使投資計畫的淨現值由負轉正。最後，本研究確認出允許內部人交易可促成策略聯盟的條件。結果顯示，當聯盟的形成能創造並提供所有聯盟成員一份與各成員原利潤相互獨立的新利潤，且各成員無法在股票交易前私下確知此份新利潤之實際大小時，允許內部人交易可促使小廠商組成策略聯盟。反之，當違反這些條件時，則會獲致相反之結論。

關鍵字：內部人交易、負債到期、承諾能力、產品市場競爭、最適資本結構、策略聯盟。

二、計畫緣起與目的

財務文獻早已認知到財務市場在風險與資源的分配(Arrow 1964; Debreu 1959; Duffie & Huang 1985)、新投資計畫獲利能力的資訊收集(Allen 1993; Khanna, Slezak, & Bradley 1994; Boot & Thakor 1997; Dow & Gorton 1997)和懲戒公司經理人自利行為(Scharfstein 1988; Stein 1988; Holmström & Tirole 1993)等議題上所扮演之效率性角色，但過往文獻卻也認為在無不確定性之狀態下，限制部分或甚至所有代理人進入財務市場有助於提升經濟上之效率性。舉例來說，在 Newbery(1984)所分析之經濟體中，限制所有進行經濟決策的人們進入新市場可造福大眾，這起因於同時在新舊兩市場交易會導致生產者喪失避險的機會，且新市場生產計畫的改變也將損害消費者的權益。另一方面，道德風險的相關文獻顯

示，允許風險趨避之公司經理人進入信用市場可能造成公司投資人與經理人福利的全面下降(Pareto dominated equilibrium)，而該經理人能任意在信用市場交易意味著主理人在設計最適經理人薪酬機制時，將面對新增之誘因相容限制式(Rogerson 1985; Chiappori, et al. 1994)。最後，立法者、市場參與者與法律及經濟領域之學者在是否應立法禁止內部人交易上持續爭論不休(Manove 1989; Laffont & Maskin 1990; Leland 1992; Fischer 1992; Fishman & Hagerty 1992; Khanna, Slezak, & Bradley 1994)，且對若不立法禁止時之強制性揭露資訊是否妥當亦無共識(Admati & Pfleiderer 2000, 1991, Fishman & Hagerty 1995)。實證資料指出，內部人持續享有高於調整風險後之標準的超額交易報酬(Seyhun 1986; Meulbroek 1992)，因此，美國證券與交易委員會(Securities and Exchange Commission, SEC)從1934年起開始著手進行內部人交易的管制。擁護內部人交易管制之支持者主張內部人交易會降低證券市場的流動性(Glosten 1989)、提供經理人不當誘因(Easterbrook 1985)，並產生讓投資者對資本市場喪失信心的不公平感(Brudney 1979)。而內部人交易管制的早期批評者則認為儘管內部人交易會產生社會成本，但公司股東有足夠誘因去自行限制內部人交易而無須動用公權力加以管制(Carlton & Fischel 1983)，且允許內部人交易可增進證券市場的資訊效率性(Manne 1966)，從而能透過效率的證券價格引導出效率的資源分配，終使社會受益。

本研究有二大目的：先運用一探索性研究探討管制內部人交易對產品市場競爭、公司融資決策與負債到期結構的影響，再分析允許內部人交易將如何改變小廠商組成策略聯盟之誘因。

三、結論與討論

本研究分析對象為從事 Cournot（產量）競爭或 Stackelberg（價格）競爭的不完全競爭廠商，且其中至少有一家廠商面臨邊際生產成本之不確定性。獲致之重要結果如下：

結論一：限制內部人交易會導致面臨成本不確定性之廠商舉債過度。

本研究指出，當禁止內部人交易時，儘管舉債可作為廠商承諾其於產品市場具備高產量反應函數的策略工具，卻會導致生產的不效率性。但當允許內部人交易時，面對單位成本具不確定性之無舉債廠商，卻無須負擔舉債相關代理成本，即可成功達成擁有高產量反應函數的承諾能力。由此可知，限制內部人交易會導致面臨成本不確定性之廠商舉債過度。

Brander 與 Lewis(1986)率先強調資本結構能作為不完全競爭廠商影響後續競爭出相的承諾力量。而本文則指出，遭逢強力競爭對手的廠商可藉由長期負債誘使股東採用生產單位成本具風險性的新科技[1]，並獲致伴隨生產成本具風險性而來的所有好處，接著股東便針對產品市場中的競爭對手將自身之反應函數向上移動。而由於產量具策略替代性，故此舉迫使競爭廠商在低成本狀態時在產量決策上讓步，從而提升獲利。但在高成本狀態時，因競爭對手讓步而提升產量所帶來的獲利，卻未必超過廠商受限於單位成本無隨機性之舊科技下的利潤。無論在何種狀況中，廠商都展現出在產品市場上面對

[1] 這是因為使用財務槓桿會鼓勵股東從事高風險之行為，也就是有名的「資產替代效果」（可參見Jensen與Meckling (1976)一文）。

強勁敵手時會舉債更多的傾向，以及採用單位生產成本具風險性之新科技的機會。然而，當允許內部人交易時，廠商可透過採行無舉債而全由普通股融資的財務策略獲利更豐。股東可根據其對隨機單位成本的知識從事內部人交易，而這項機會也提供股東足夠的誘因去採用新科技，並遵守在產品市場向上移動廠商反應函數的然諾。而廠商之所以能從中獲利，乃是因為在無舉債的財務結構下，即可避免舉債融資時必定面臨之資產替代性問題，故不會做出有損公司價值的產量擴張決策。歸納上述，廠商在允許內部人交易時舉債較少，意即管制內部人交易會導致公司融資時舉債過度之結果。

結論二：允許內部人交易有助於因舉債成本過高而僅能使用普通股融資之廠商在產品市場的存續。

結論二關注於管制內部人交易與小廠商生存間之關係。如同結論一之說明，允許內部人交易可為遭遇強勁對手之廠商在進行普通股融資時增添額外的價值，並創造單位生產成本具風險性之新科技的使用機會。倘若廠商僅能透過舉債或發行普通股這兩種方式來融資，且舉債融資涉及過高的生產不效率性，則小廠商是否能順利融資並持續經營的關鍵，便是普通股融資是否能幫廠商贏得產業中更有利的競爭地位，而允許內部人交易正可達此成效。當允許內部人交易時，普通股融資可幫助廠商向競爭對手承諾高產量的反應函數，從而替投資計畫增值。而當禁止內部人交易時，普通股融資的承諾力量消失，而可能導致廠商難以在產品市場中生存。由此可知，允許內部人交易有助於因舉債成本過高而僅能使用普通股融資之廠商在產品市場的存續。

結論三：當短期現金流入量變異性越大時，廠商對短期負債相較於長期負債的依賴越深。

結論三旨在考量公司負債的到期結構。本研究分析廠商短期現金流入量與長期成本效率性呈現正相關的經濟體，從而指出兩種最適的負債結構。首先，當禁止內部人交易且允許廠商於低成本狀態時在產品市場承諾具備高產量反應函數時，廠商必須透過足夠之短期負債來減緩在高成本狀態時長期負債所引發之資產替代性問題。再者，若允許內部人交易，則廠商可能宜依舊維持上述負債結構，或轉為主要依賴普通股融資而僅進行小額度的長、短期負債。故可得當短期現金流入量變異性越大時，廠商對短期負債相較於長期負債的依賴越深之結論。

結論四：當聯盟的形成能創造並提供所有聯盟成員一份與各成員原利潤相互獨立的新利潤，且各成員無法在股票交易前私下確知此份新利潤之實際大小時，允許內部人交易可促使小廠商組成策略聯盟。反之，當違反這些條件時，則會獲致相反之結論。

結論四確認出允許內部人交易可促成策略聯盟的條件。此結論之意涵為，參與策略聯盟可使每位成員創造一份隨機的新收入，而此可轉變為投資者面臨先天風險時的重要避險工具，抑或被雜訊交易者視為寶貴的資訊。在上述兩種狀況中，都能提升成員廠商之所有人從內部人交易獲致的好處，且可讓成員向產品市場中未參與策略聯盟的廠商承諾一高產量的反應函數。而徹底禁止內部人交易將使這些效益蕩然無存，因此，允許內部人交易在此環境下能鼓勵小廠商組成策略聯盟。然而，值得注意的是，當策略聯盟所創造的新利潤與廠商原有利潤呈現隨機性相關關係，或是財務分析師能花錢在股

票交易前搶先得知新利潤的實際大小時，允許內部人交易反而會降低小廠商組成策略聯盟的誘因。

四、計畫成果自評

本研究已完成專案計畫書中所設定之目標。本研究之目的包括先運用一探索性研究探討管制內部人交易對產品市場競爭、公司融資決策與負債到期結構的影響，再分析允許內部人交易如何改變小廠商組成策略聯盟之誘因。而本研究透過模型建構與推導所獲致之數項重要結論，已針對管制內部人交易如何產品市場競爭、公司融資決策、負債到期結構與小廠商組成策略聯盟之誘因的相關議題深入剖析並提出具體看法。儘管本研究尚未將外部觀測者對資訊效率性的影響以及消費者福利分析納入考量，但整體而言，本研究仍完成預期達成之研究目標並產生相當貢獻，且提供後續研究者明確之延伸方向。

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