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Cross Holding and Imperfect Product Markets[†]

by

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Abstract

We consider a two stage game where two firms first take positions in each other's equity (cross holding) and next compete in an imperfect product market. When the firms' products are substitutes, the optimal cross holding involves a short position in the competitor's equity, resulting in an equilibrium with larger quantities produced, lower firm and industry profits, and higher consumer surplus than an equilibrium where short-selling is prohibited. This provides a new rationale for short selling that does not rely on capital market imperfections, such as taxes or private information. In contrast, when two firms' products are complements, a long position in the competitor's equity is optimal, yielding higher quantities and lower prices which results in higher consumer welfare, and higher firm and industry profits.

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On August 6th 1997, Microsoft announced the purchase of $150 million of non-voting preferred stock of Apple Computer Inc.[1] The Justice Department has initiated a review of this transaction to ensure its compliance with antitrust laws. We investigate whether the Justice Department concern, that cross holdings without voting rights may reduce product market competition, is warranted. Cross holding is defined as one firm's equity position (long or short) in another firm. When firms compete in a sequential game where they first choose a level of cross holding and then compete in a Cournot duopoly, we find that the interaction between cross holdings and product markets is always beneficial to consumers and therefore need not concern regulators. When the firms' products are complements equilibrium cross holdings entail long positions of the rival's equity. These positions result in higher quantity, lower price, and higher profits for each firm in the product market. The results of our model are consistent with the observed investment strategy of Microsoft since the products of Apple and Microsoft are complements. In contrast, when the firms' products are substitutes, optimal cross holdings involve short selling of the competitor's equity. This provides a new rationale for short selling, where by shorting the rival's equity a firm can commit to a more aggressive product market stance. Intuitively, this arises because the firm not only benefits from its own operating profits, but also explicitly benefits, through its short position, when its rival has lower operating profits. In equilibrium a prisoner's dilemma arises, both firms take short positions in their rival, and this leads to higher overall

[1] Recently, Microsoft also purchased a 10% share of the Web Audio company, Progressive Networks Inc., and purchased shares in two video companies: 5% of VDO Net Corp. and the complete takeover of Vxtreme, Inc. See Wall Street Journal, Tuesday August 19, 1997.

quantity, lower prices, and lower profits relative to the product market equilibrium when no cross holding is permitted.

There are three common explanations of the prevalence of short selling: taxes, information based trading, and entry deterrence. First, an investor who has accumulated a capital gain on an equity position will have to pay taxes when the shares are sold. If, however, the investor takes an off-setting short position then the current capital gain is secured while tax payments are deferred.[2] Second, short sales might be based on private beliefs or private information to profit from a decreasing stock price, see Asquith and Meulbroek [1994]. For instance, if an insider has private information that the future value of the stock will be less then the current market value, then the investor can make profits from shorting the stock at the current price. Short selling based on private beliefs contributes to market efficiency.[3] However, short selling based on insiders' private information can lower market liquidity. Under the Securities and Exchange Act of 1934, Rule 10b-5 bars insider trading in a firm's stock based on material information that has not been publicly disclosed and Section 16 forbids short selling by insiders.[4] Current regulation, however, does not prevent informed insiders from short selling equity of a competitor.[5] For example, shorting a competitor's equity would be profitable if an insider receives favorable private

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[2] This strategy is called "shorting against the box", see Scholes and Wolfson [1992]. New legislation in 1997 has made this strategy illegal.

[3] See Diamond and Verrecchia [1987]

[4] In addition, Section 16 bars "shorting against the box" by insiders unless the insiders deliver their own stock. See Afterman [1995]. The new regulations past in 1997 make shorting against the box illegal even if insiders deliver their own stock.

[5] Another concern with short selling is the incentive for disseminating materially false or unverifiable negative reports. In 1987, an investigation by the American Stock Exchange found no evidence of manipulation of non-insider short sellers and, furthermore, the SEC has never brought any action against short sellers. A 1991 Report of the Committee on Government Operations expresses concern "that the SEC's policing of the fairness of the market in this respect may not be adequate."

information that is detrimental to the competitor.[6] Third, short selling a potential competitor's stock may decrease the profitability of entry and thus encourage possible entrants to remain inactive in the market.[7] We provide a new rationale for short selling: when firms' products are substitutes then short selling the rival's equity commits a firm to a more aggressive stance in the product market.

We contribute to the existing literature on cross holdings in two additional respects. First, previous analyses have excluded the possibility of short selling. This leads Flath [1991] to conclude that the unique subgame perfect outcome has zero cross holdings when the products are perfect substitutes. We find that short selling would be optimal in the case considered by Flath [1991]. Furthermore, we identify complements as the necessary and sufficient condition under which long equity cross holdings are optimal. Second, previous papers compare the product market equilibrium of no cross holding for either firm to the unilateral deviation of each firm holding positive equity positions in the rival. These papers find when each firm has long equity positions in the competitor, and the products are substitutes, the result is less quantity, higher price, higher profits, and lower consumer surplus relative to the product market equilibrium obtained when there are no cross holdings.[8] This result; however, is not an Nash equilibrium in cross holding choice. For instance, if one firm deviates from positive cross holding to zero cross holding it will increase its profits. Our paper solves for the Nash equilibrium cross holding of each firm, and we find that when the products are substitutes the equilibrium cross holding involves short sales. The resulting product market equilibrium exhibits higher quantity, lower price,

[6] See Hansen and Lott [1995].
[7] op. cit.

lower profits, and higher consumer surplus compared to the equilibrium when cross holdings are zero.

1. The Model

We consider a game, without uncertainty, where two all-equity firms each make two decisions in sequence. Although we consider only two firms in the model, the results generalize to industries with n firms, as long as each firm faces a downward-sloping demand curve.[9] The managers make decisions to maximize the equity value of the firm.[10] In the second stage the firms observe the outcome from the first stage, and in each stage the firms move simultaneously.

In the first stage each firm can choose to take a position in the rival's equity. Let α_i (i=1,2) denote firm i's equity position in its competitor. These positions are disclosed and the shares are purchased or sold in a competitive, full information capital market, so there is no profit or loss associated with the firm's equity position. We abstract from the control rights of (long) equity positions and consider only silent interests.[11] Without loss of generality, we assume that there is no discounting between the stages. This insures that the value of the equity position at the end of the game will equal the purchase price of the position in stage 1. These assumptions allow us to focus on the strategic effect of the

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[8] In R&D-partnerships, see Reynolds and Snapp [1986] and Farrell and Shapiro [1990].
[9] This means that the industry must have some barrier to entry. The results will not apply to a perfectly competitive industry (i.e., an industry where the firm's are price takers).
[10] We assume that the firms have no debt, and ignore any moral hazard problem that can arise through a shareholder - manager conflict. Thus, maximizing share value is commensurate to maximizing firm value.
[11] When shares have voting rights, long equity positions can facilitate collaboration (Perotti [1992]) and deter takeovers (Nyberg [1995]).

equity position on the product market; that is, the only reason for equity positions in our model is their effect on both firms' quantity choice in the product market.

In stage 2 the firms play a Cournot game choosing quantities q_i, i=1,2. At the end of stage 2 prices are determined and profits are realized. Each firm has access to a constant return to scale technology for production with marginal cost, C>0.[12] The inverse demand function for firm i is:

$$p_i = A - q_i - Bq_j$$

where p_i is the unit price for firm i's product and A and B are constants. A captures the general level of demand for the market, and B, $|B| \leq 1$, describes the relation between the two firms' products.[13] If B> 0 the firms' products are substitutes, and if B < 0 the firms' products are complements. When the firms' products are substitutes, B>0, then an increase in the rivals production causes the price the firm receives to decrease, as more customers purchase from the competition. When the firms' products are complements, B<0, then an increase in the rivals production causes the price the firm receives to increase, as more customers purchase from the competition and thus the demand for the complimentary product increases.

The strategy of each firm consists of a position of cross holding for stage 1, and a quantity for stage 2 which is a function of the equity positions chosen in stage 1. Sequential subgame perfect equilibrium strategies are determined. This equilibrium concept ensures that in stage 1, each firm makes the equity position decision correctly

[12] It is not necessary for our results that the firms have the same marginal costs, or that marginal cost is constant. The main results of the paper remain if marginal cost is increasing and if the firms have access to different production technology, this however, complicates the exposition of the model.

anticipating the rival's choice and the corresponding subgame equilibrium outcome of the product market stage. Equilibrium strategies are determined using backward induction; thus, we must first ascertain the firms' optimal quantity decisions given each possible level of cross holdings, and then solve for the equilibrium cross holdings.

2. Product Market Equilibrium

In the product market, both firms choose quantities simultaneously. The equity positions of each firm, α_i (i=1,2), is taken as given. Each firm chooses a quantity to maximize the value to its shareholders. The shareholders of firm i receive all the operating profits of firm i plus α_i of the operating profits of firm j. Let π_i represent the operating profits of firm i. Then:

$$\pi_i = (p_i - C)q_i = (A - q_i - Bq_j - C)\, q_i.$$

Firm i's total shareholder value, SV_i, is

$$(1) \qquad SV_i = \pi_i + \alpha_i \pi_j.$$

Firm i chooses its quantity to maximize equation (1). Taking the first order condition of equation (1) and solving for the optimal q_i results in the following reaction curve for firm i:

$$(2) \qquad q_i = \frac{(A - C)}{2} - \frac{(1 + \alpha_i)Bq_j}{2}.$$

Solving the two corresponding reaction functions simultaneously yields the optimal quantity as a function of each firm's equity position:

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[13] $|B| \leq 1$, means that a change in own firm output has more effect on the price the firm receives than a change in the competing firm's output.

(3) $$q_i = \frac{(A-C)[2-(1+\alpha_i)B]}{[4-(1+\alpha_i)(1+\alpha_j)B^2]}.$$

The second order conditions for an optimum holds.

Lemma 1: If B = 0 cross holdings have no effect on the product market equilibrium.

This can easily be seen by examining either equation (2) or equation (3). If B=0 the products are unrelated, and both firms have monopoly power in their product market. The optimal quantity, in this case, is for each firm to produce the monopoly output in their respective market regardless of the equity positions established in stage 1. Unsurprisingly, a firm gains no strategic advantage from trade in the equity of firms which produce unrelated products. For the remainder of the paper we assume that $B \neq 0$.

Theorem 1: If B>0, then an increase in α_i causes a decrease in q_i and an increase in q_j. If B<0, then an increase in α_i causes an increase in q_i and an increase in q_j.

Theorem 1 states how the product market equilibrium is affected by a change in one firm's equity position. The impact of a change in cross holdings on the product market depends on whether the products are substitutes or complements. When firm i increases its cross holding, α_i, the firm increases the weight it puts on the rival's profits when making its output market decisions. When the products are substitutes (B>0) then firm i will want to decrease its quantity, which has a positive effect on the profits of firm j (see figure I). When the products are complements (B<0) then firm i will want to

increase its quantity, which also has a positive effect on the profits of firm j (see figure II). In both cases the added profitability of firm j will induce it to increase its quantity.

3. Equity Market Equilibrium

Prior to the product market stage, both firms are allowed to trade in each others stock. Each firm chooses an equity position in the rival firm simultaneously. These positions are announced and procured in a competitive capital market. Each firm chooses its equity position, correctly anticipating the choice of the rival firm and with full knowledge of how the two equity positions chosen will affect the product market decision of each firm. Again, the firm maximizes total shareholder value. In this case the shareholder value is,

(4) $SV_i = \pi_i + \alpha_i\pi_j$ - Cost of equity position,

the operating profit of the firm, plus the fraction α of the counterpart firm's operating profits, minus the cost of acquiring the equity position in the counterpart firm. Recall that the cost of acquiring the equity position is equal to the stage 2 payoff of the equity position, because there is no uncertainty, no discounting, and we are assuming perfect capital markets.[14] Thus, in stage 1, the firm chooses its equity position to maximize operating profits:

(5) $SV_i = \pi_i = (A-q_i - Bq_j-C)q_i$.

In stage 2, the quantity that each firm chooses will satisfy equation (3). Substituting equation (3) and the corresponding optimal quantity for firm j into equation (5), taking the first order condition and solving, yields the following reaction function for equity position:

[14] See Grossman and Hart [1980].

$$(6) \qquad \alpha_i = \frac{(1+\alpha_j)(2-B)B}{(-4+2B+B^2)+\alpha_j(2B+B^2)}.$$

Solving the two corresponding reaction functions simultaneously yields the optimal equity position for each firm[15]:

$$(7) \qquad \alpha_i = \frac{-B}{2+B}.$$

Theorem 2: If the products are substitutes (B>0), then the optimal level of cross holdings consists of a short position in the competitor's equity. If the products are complements (B<0) then the optimal level of cross holdings consists of a long position in the competitor's equity.

This can easily be seen by examining equation (7) and recalling that |B|<1. Straight-forward substitution and differentiation yields the following results.

Theorem 3: In equilibrium, each firm produces

$$(8) \qquad q_i = \frac{(A-C)[2+B]}{4(1+B)}.$$

Furthermore, $dq_i/dB = -(A-C)/4[1+B]^2 < 0$, $dp_i/dB = -(A-C)/4 < 0$, and $d\pi_i/dB < 0$.

4. Discussion

With the exception of Hansen and Lott [1995], the previous literature has not considered short selling, that is, they only consider $\alpha \geq 0$. Theorem 2 demonstrates that the sequential Nash equilibrium involves short selling, $\alpha < 0$, if and only if the

products are substitutes, $B > 0$. When short sales are allowed, we find that quantities produced are higher, prices are lower, and profits are lower than when short selling is prohibited.[16] This arises because by shorting the competitor's equity, a firm commits itself to a more aggressive product market stance, i.e., an increased quantity. This is the new rationale for short selling developed in this paper. There is no uncertainty, private information, or taxes in this model, which eliminates the classic reasons for short selling. Short sales in this model are used solely as a commitment to a more aggressive output market position. This commitment causes the rival to decrease production which increases the firm's profit. In equilibrium, however, a prisoners' dilemma arises where both firms commit to a more aggressive output stance leaving both firms with lower profitability. Furthermore, consumer surplus is enhanced by the firm's short selling. Consequently, short selling should not (necessarily) be prohibited.

When $B < 0$, the Nash equilibrium involves long positions in the competitor's equity, $\alpha > 0$. In this case, the resulting Nash equilibrium has higher quantity, lower price, and higher profits. Therefore, consumer surplus is higher.

We are now ready to compare our findings to the existing literature which analyzes perfect substitutes. Flath [1991] finds that in Cournot markets, zero cross holdings must arise as a Nash equilibrium. We have demonstrated that this result relies on the prohibition of short selling and, in addition, the result does not generalize to cases where the products are complements. The past literature confines its analyses to the case where $B=1$ and finds that positive cross holdings are anti-

[15] This results in a second order polynomial with two roots where the second root, $\alpha_i = (2/B) - 1$, is a minimum.

competitive, that is, cross holdings lead to higher profits and lower consumer surplus. However, positive cross holdings can not be supported as an equilibrium in these models. We show that a Nash equilibrium with positive cross holdings only arises when products are complements. Under these conditions, positive cross holdings are beneficial to consumers since they lead to lower prices, higher quantities, and thus, higher consumer surplus. Therefore, existing regulation that restricts cross holdings can be detrimental to consumers.

Our results also have implications for the findings of Hansen and Lott [1995] who analyze short selling as a deterrent to entry. *If* managers can adjust the equity position after entry has occurred, our equilibrium with strictly positive profits to both firms would result.

Even though it seems natural to consider whether the amount of short selling predicted by our model is consistent with empirically observed short selling, such a comparison is problematic for four reasons. First, as mentioned by the Report of the Committee on Government Operations, it is difficult to measure the extent of short selling since the short sellers cannot be identified by the exchanges.[17] Second, a position in deep in the money put options on the competitor's stock has qualitatively the same effect as short selling in our model.[18] Third, if the manager's compensation depends on the stock price then the manager would want to short the competitor's equity when the

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[16] The proofs of these comparisons are in the Appendix.

[17] The Report calculated the number of firms on the NYSE, AMEX, and NASDAQ that during 1986-1990 had short interest in their stock exceeding a given percent of the total shares outstanding. 695, 280, and 45 firms had more than 5, 10 and 20 percent of short interest respectively. An alternative, indirect measure of the importance of short sales is that every month, The Wall Street Journal reports the number of shares that have not yet been returned to the lender for NYSE, AMEX, and NASDAQ.

products are substitutes. That is, (long or short) cross holdings may be taken by the firm or by the manager of the firm. Finally, our results can be interpreted as a rationale for relative performance evaluation, that is, instead of a firm allowing the manager to short sell, the shareholders could simply include the competitor's profits with negative weights in the manager's compensation.

5. Conclusion

This paper identified a new role for cross-holdings: a firm can commit to a more aggressive stance in the product market by taking equity positions in its competitor. We demonstrated that when two firms' products are substitutes, the optimal equity position involves short selling. By short selling, the firm benefits from its competitor's low performance which prompts the firm to compete more aggressively. In equilibrium, however, both firms behave more aggressively which results in lower profits than would have arisen if short sales were not allowed. Consequently, consumers would be worse off in our model if the firm's were prevented from short selling. Along similar lines, we found that optimal cross holdings involve long positions in the competitor whenever the firm's products are complements. In this case, both firm profits and consumer welfare are higher than they would have been if long equity positions were not allowed. Our policy implication is in contrast to common alternative explanations of cross holding which suggest that cross holdings are detrimental to consumers and firms' equity transactions should therefore be monitored and regulated. It is worthwhile stressing

[18] In fact, any position which produces a negative delta on the rival's stock would generate the same effect as short selling.

that our argument in favor of cross holding is extremely simple: it does not rely on either uncertainty, private information, or taxes. Furthermore, our model suggests a direct relation between the degree of substitutability of products and the effects on the industry and firm profitability from cross holdings.

Our analysis has natural extensions. First, a model that incorporates multiple motives for short selling would enable an investigation of the relative magnitude and possible interactions between different effects. In such a framework, the trade-off faced by regulators is (i) weighing the losses incurred by uniformed investors trading with insiders, against (ii) the benefits of increased product market competition caused by short selling. Absent either effect, one might be led to erroneous policy recommendations.

Second, for many firms both debt and equity instruments are traded, which allows for cross holding in multiple securities. A model which permits firms to hold a portfolio of its rival's securities could discern which instrument works most effectively as a commitment in the product market.

Third, the availability of cross holding may mitigate the over investment problem otherwise associated with imperfectly competitive product markets. When each firm can make an investment, which lowers marginal cost, before competing in the product market, firms invest "too much" there by committing the firm to a more aggressive product market stance (Brander and Spencer [1983]). If firms can take equity positions in the rival prior to the investment decision, then cross holdings can be used as

commitment in the product market, rather than investment, and thus cross holdings help mitigate the over investment problem.[19]

Finally, firms might use short positions in other firms for hedging purposes.[20] Suppose that there is a common risk factor, having a similar effect on a firm and its rival, that can not be hedged inexpensively through other securities. Under these conditions, the competitor's equity serves a cost effective hedging instrument with low basis risk. Therefore, the benefits from hedging can be achieved through cross holdings.

[19] Clayton [1997] shows that debt also mitigates the over investment problem described in Brander and Spencer [1983].

[20] In reviewing annual reports, we have found firms that report short positions in equity as a liability in their balance sheets where the notes of the annual reports explain that these short positions are taken as a hedge.

6. Appendix

First, we solve the model for the case where no cross holdings are allowed, that is, $\alpha_i = \alpha_j = 0$, indexing the corresponding equilibrium values by superscript 0. Substituting into equation (3) yields the quantity $q_i^0 = \frac{(A-C)}{[2+B]}$ and price $p_i^0 = A - (1+B)\frac{(A-C)}{[2+B]}$. Next, we prove that prices are always lower or, equivalently, quantities are always higher, when cross holdings are allowed.

$$A - (1+B)\, q_j = p_i < p_i^0 = A - (1+B)\, q_j^0$$

$$\Leftrightarrow \quad \frac{(A-C)[2+B]}{4(1+B)} = q_j > q_j^0 = \frac{(A-C)}{[2+B]}$$

$$\Leftrightarrow \quad [2+B]^2 > 4(1+B)$$

$$\Leftrightarrow \quad B^2 > 0$$

which is true. Finally, we identify conditions under which firm profits are higher when short selling is allowed that when it is not allowed:

$$\frac{(A-C)^2[4-B^2]}{16(1+B)} = \pi_i > \pi_i^0 = \frac{(A-C)^2}{[2+B]^2}$$

$$\Leftrightarrow \quad (4-B^2)[4+4B+B^2] > 16\,(1+B)$$

$$\Leftrightarrow \quad 16 + 16B + 4B^2 - (4B^2 + 4B^3 + B^4) > 16 + 16\,B$$

$$\Leftrightarrow \quad B^2\,(4B + B^2) < 0$$

$$\Leftrightarrow \quad B < 0$$

Figure I

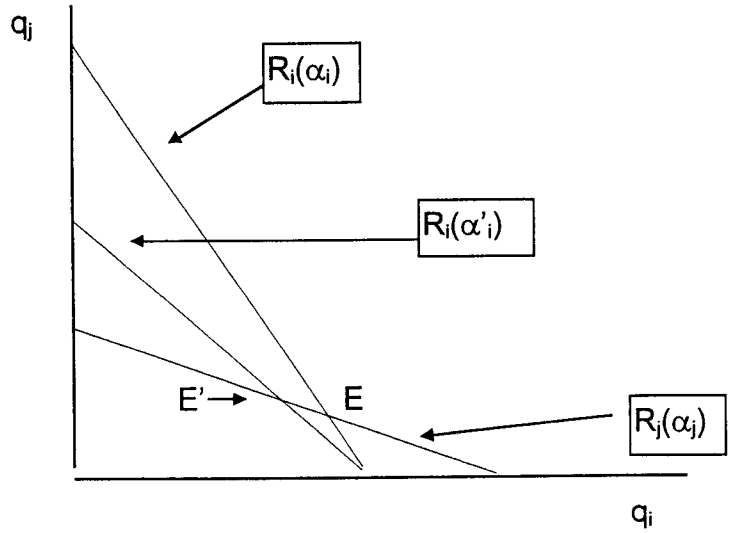

Figure 1 presents the output market reaction functions for each firm when the products are substitutes, B>0. $R_j(\alpha_j)$ is the reaction function of firm j, for an arbitrary amount of cross holding, α_j. Likewise, $R_i(\alpha_i)$ is the reaction function for firm i given cross holdings of α_i. This graph shows how the reaction function of firm i changes when it increases cross holdings from α_i to α'_i. When firm i increases its cross holdings, it increases the weight it puts on the competitor's profits when choosing its own quantity. This causes it to compete less aggressively and moves the output market equilibrium from E to E', which results in lower output from firm i and higher output from firm j.

Figure II

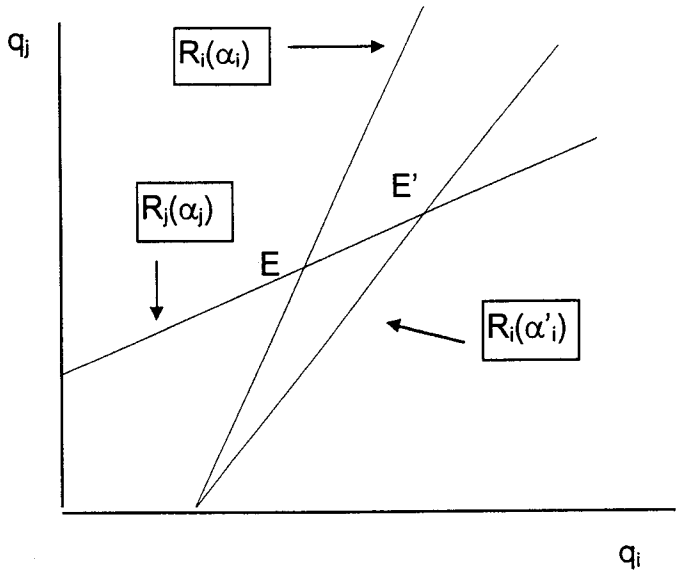

Figure 2 presents the output market reaction functions for each firm when the products are complements, B<0. This graph shows how the reaction function of firm i, $R_i(\alpha_i)$, changes when it increases cross holdings from α_i to α'_i. When firm i increases its cross holdings it increases the weight it puts on the competitors profits when choosing its own quantity. When the firms' products are complements, this causes the firm to increase its production, which has a positive effect on the rival firm's profits. The equilibrium moves from E to E' which results in higher output from both firms.

References:

Afterman, Allan B. 1995. SEC Regulation of Public Companies. Prentice-Hall, Englewood Cliffs, NJ 07632.

Asquith, Paul, and Lisa K. Meulbroek. 1996. An Empirical Investigation of Short Interest. Harvard Business School Working Paper 96-012.

Bohren, Oyvind, Jorgen Haug, and Dag Michaelsen. 1997. Consolidation Policy and Managerial Discretion: Accounting for Intercorporate Shareholdings. Research Report 3-97, Norwegian School of Management.

Brander, James A., and Barbara J. Spencer. 1983. Strategic commitment with R&D the symmetric case. *Bell Journal of Economics* 14: 225-235.

Bresnahan, Timothy F., and Stephen C. Salop. 1986. Quantifying the Competitive Effects of Production Joint Ventures. *International Journal of Industrial Organization* 4: 155-175.

Clayton, Matthew J. 1997. Debt, Investment, and Product Market Competition. New York University, Working Paper.

Committee on Government Operations. 1991. Short-Selling Activity in the Stock Market: Market Effects and the Need for Regulation (Part 1). U.S. Government Printing Office, Washington, D.C.

Diamond, Douglas W., and Robert E. Verrecchia. 1987. Constraints on Shortselling and Asset Price Adjustment to Private Information. *Journal of Financial Economics* 18: 277-311.
Journal of Finance

Farrell, Joseph, and Carl Shapiro. 1990. Asset Ownership and Market Structure in Oligopoly. *RAND Journal of Economics* 21: 275-292.

Fershtman, C., and K. Judd. 1987. Equilibrium Incentives in Oligopoly. *American Economic Review* 77: 927-940.

Flath, David. 1989. Vertical Integration by Means of Shareholding Interlocks. *International Journal of Industrial Organization* 7: 369-380.

Flath, David. 1991. When is it Rational for Firms to Acquire Silent Interest in Rivals? *International Journal of Industrial Organization* 9: 573-583.

Flath, David. 1992. Horizontal Shareholding Interlocks. *Managerial and Decision Economics* 13: 75-77.

Grossman, Sanford J., and Oliver D. Hart. 1980. Takeover Bids, the Free-rider Problem, and the Theory of the Corporation. *Bell Journal of Economics* 11: 42-64.

Hanna, Mark. 1968. Short Interest: Bearish or Bullish? - Comment. *Journal of Finance* 23 (June): 520-523.

Hansen, Robert G., and John R. Lott, Jr. 1995. Profiting from Induced Changes in Competitors' Market Values: The Case of Entry and Entry Deterrence. *Journal of Industrial Economics* 18: 261-276.

Khanna, Tarun, and J. Moon. 1994. Asset Complementarity, Interfirm Product Market Arrangements, and Equity-based Alliances. Harvard Business School Working Paper 94-010.

Khanna, Tarun, and J. Moon. 1995. Product Market Considerations in Private Equity Sales. Harvard Business School Working Paper 95-056.

Nyberg, Sten. 1995. Reciprocal Shareholding and Takeover Deterrence. *International Journal of Industrial Organization* 13: 355-372.

Perotti, Enrico. 1992. Cross-Ownership as a Hostage Exchange to Support Collaboration. *Managerial and Decision Economics* 13: 45-54.

Reitman, David. 1994. Partial Ownership Arrangements and the Potential for Collusion. *The Journal of Industrial Economics* 17 (3): 313-322.

Reynolds, Robert J., and Bruce R. Snapp. 1986. The Competitive Effects of Partial Equity Interests and Joint Ventures. *International Journal of Industrial Organization* 4: 141-153.

Scholes, Myron S., and Mark A. Wolfson. 1992. Taxes and Business Strategy: A Planning Approach. Prentice Hall, Englewood Cliffs, NJ 07632.

Seneca, Joseph J. 1967. Short Interest: Bearish or Bullish? *Journal of Finance* 22 (March): 67-70.

Seneca, Joseph J. 1968. Short Interest: Bearish or Bullish? Reply. *Journal of Finance* 23 (June): 524-528.