Can Vertical Integration by a Monopsonist Harm Consumer Welfare?*

by

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First Draft: 15th October, 1998
This Version: 6th February, 2004

Vertical integration by a monopsonist is generally believed not to harm consumers. This paper demonstrates, in a natural economic setting, that this conventional wisdom may not hold. We model one-on-one bargaining between a monopsonist and independent suppliers when the set of suppliers cannot be expanded easily ex post and show that a vertically separated monopolist is vulnerable to hold-up. Without integration, we demonstrate that a bottleneck monopsonist has an incentive to encourage more upstream entry than would arise in a pure neoclassical monopoly. Having more suppliers mitigates the hold-up power of any one. This, however, distorts the cost structure of the industry toward greater industry output and, hence, lowers final good prices. Vertical integration mitigates the hold-up problem faced by the monopsonist. It allows it to generate and appropriate a greater level of industry profits; at the expense of consumers. *Journal of Economic Literature* Classification Number: L42

Keywords. Monopsony, bargaining, vertical integration, consumer welfare

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* This paper was previously circulated with the title "Extending Market Power through Vertical Integration." The authors would like to thank Tim Bresnahan, Stephen King, Preston McAfee, Lars Stole, Jeff Zwiebel, two anonymous referees and the editor for helpful comments. Responsibility for all errors remains our own.
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I. Introduction

In recent times, questions of how competition policy makers should respond to issues arising from monopsony or buyer power have gained increased prominence. In Europe and the United States, competition authorities have examined the buying power of supermarket and other retail chains (EC, 1999; OECD, 1999; FTC, 2001). A similar set of concerns has arisen in the context of health care policy (Pitofsky, 1997; Ellison and Snyder, 2001). In general, the focus has been on the consequences of growing monopsony power (through consolidation, mergers and buyer groups) and consequent wholesale price changes rather than what other actions firms with monopsony power might pursue.

While there is some controversy regarding the overall welfare consequences of increased monopsony power, there appears to be a general consensus in the literature that the actions of bottleneck monopsonists – such as vertical integration and exclusive dealing – can only be welfare enhancing for final consumers (Rey and Tirole, 2003). Consider vertical integration – the focus of this paper. A downstream monopsonist who integrates backwards into upstream supply will do so to increase its own profits. As it controls the means by which inputs get translated into goods for final consumers, the only way it can improve its profits is by lowering its own costs. If cost reduction involves any reduction in marginal costs, that will lower final good prices and enhance consumer surplus even where there is a downstream monopolist. Inefficient vertical integration that either reduces the investment incentives of suppliers or forecloses on them will only be undertaken if it reduces the input costs of the monopsonist. Consequently, it must involve some beneficial reduction in double marginalisation or improvement in the bargaining position that overwhelms any other efficiency costs. As such, even if there is an overall reduction in welfare, the monopsonist and its consumers will always benefit.[1]

For this reason, research into the competitive detriments of backwards integration has focussed on the case of duopsonists or oligopsonists who compete with each other downstream. In that case, vertical integration can raise a rival's costs and thereby harm

[1] This literature is surveyed by Perry (1989) who also provides the seminal paper in the area demonstrating how vertical integration by a monopsonist reduces the double marginalisation problem while also allowing

downstream competition (Salop and Scheffman, 1983; Ordover, Saloner and Salop, 1990; Hart and Tirole, 1990; Choi and Yi, 2000; Chen, 2001; and de Fontenay and Gans, 2002).[2] In these models, the use of vertical integration is not so much a leverage of buying power but a means of consolidating and leveraging upstream market structure downstream. The basic idea is that by foreclosing on an upstream firm, other non-integrated downstream firms are left vulnerable to the exercise of upstream market power. As such, these are really theories of how vertical integration harms consumer welfare as a result of monopolistic rather than monopsonistic forces per se.[3]

The purpose of this paper is to demonstrate that it is possible that vertical integration by a monopsonist into upstream supply can lead to a reduction in consumer welfare in the downstream market. We do this in a setting with standard assumptions regarding the nature of upstream costs and where inputs supplied by upstream firms are homogenous and play no unusual role in downstream production or final good demand. Consumer harm arises because vertical integration enables a change in upstream market structure in such a way that industry marginal costs are higher than they would be in the absence of integration. They are higher precisely because integration allows the monopsonist to foreclose on some upstream suppliers. What is significant here is that the monopsonist finds this profitable. This is because the changes in upstream market structure allow it to capture greater inframarginal rents.

At the heart of our model is a treatment of bilateral negotiations between the monopsonist and independent suppliers based on the model of Stole and Zwiebel (1996) – hereafter SZ. In contrast to much of the literature, we provide an environment where upstream firms have some degree of bargaining power in negotiations with the monopsonist even when there are many of them. Specifically, we suppose that supply contracts can be renegotiated more often than there can be changes in upstream market structure (either through entry or integration). Consequently, failure to reach an agreement with one upstream firm is costly to the monopsonist as it improves the bargaining position of the remaining suppliers.

We demonstrate that a non-integrated monopsonist, anticipating on-going

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it to appropriate a greater share of industry rents (Perry, 1978).

[2] A similar literature exists for exclusionary contracts (Segal and Whinston, 1999; Gans and King, 2002).

[3] The basic forces studied in these models are also present when there is a single upstream firm (see the surveys of Perry, 1989 and Rey and Tirole, 2003).

negotiations with upstream suppliers, has an incentive to deal with more of these than would arise if it were a textbook monopsonist holding all the bargaining power with those firms. By integrating some upstream units, the monopsonist can assure itself of supply regardless of the outcome of negotiations with independent upstream firms. This improves its bargaining position and allows it to commit to not purchase from as many upstream firms; shifting the industry supply curve to the left to the ultimate harm of consumers. Put simply, integration allows the monopsonist to reverse the incentives for over-capitalisation that would otherwise exist upstream. In this sense, vertical integration plays a supply assurance role distinct from that considered elsewhere; allowing the bottleneck firm to assure itself of low prices rather than cause a reduction in supply available to other firms.[4]

While we provide a novel treatment of the incentives and consequences of vertical integration by a monopsonist, some of the insights from the bargaining game as well as the consequences of vertical integration are present in related work. For instance, Inderst and Wey (2003) and Bjornerstedt and Stennek (2002) consider a closely related model of bilateral oligopoly where both upstream and downstream firms have bargaining power. Neither of these models is used to study vertical integration focussing instead on the effect of horizontal integration and the distribution of input prices respectively. Chemla (2003) demonstrates that vertical integration can allow the upstream firm to mitigate that bargaining power and hence, to reduce downstream competition (see also Rey and Tirole, 2003). His ‘negotiation’ effect is similar to that identified in this paper but his particular bargaining model does not give rise to an explanation for integration by a monopsonist.[5]

The outline for the paper is as follows. In section II, we set up the model structure and main assumptions. Section III then considers the outcomes of multi-agent bargaining. We demonstrate that negotiated outcomes result in *ex post efficiency, that is, efficiency in*

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[4] The literature on supply assurance (Carlton 1979; Bolton and Whinston, 1993) focuses on exogenous variability in supply and how vertical integration may allow downstream firms to reduce the impact of this variability on their own production. Specifically, in contrast to our paper, the aim of vertical integration is to increase the supply of the input to the integrated firm rather than reduce it, as is the case here.

[5] Specifically, Chemla’s bargaining model is more stylised with the division of rents between the monopolist and downstream firms parameterised. We comment on his model below. Most closely related to our model here is our companion paper (de Fontenay and Gans, 2002). That paper employs a bargaining model (a generalisation of the SZ framework) and applies it to vertical integration when there are two upstream and two downstream firms. In contrast to the present paper, that paper does not consider the effects vertical integration may have on market structure and instead considers how upstream competition impacts on the incentives and welfare consequences of integration.

production and sale decisions, given the entry and investment decisions of all agents. Second, the monopsonist purchases from enough independent firms to appropriate all of the industry rents. This latter implication directly leads to the over-production result studied in Section IV. However, in that section, we also demonstrate how this creates an incentive for vertical integration that leads to lower industry output and higher prices compared with the vertical separation case. We also demonstrate that consumers are better off as vertical integration becomes more costly for the monopsonist. A final section concludes and offers suggestions for future research.

II. Basic Set-Up

We consider the case of a monopsonist who buys a homogenous input from upstream suppliers. For simplicity, we assume that the downstream firm has no production costs. An upstream firm, *i*, can produce q_i units of the input at cost $c(q_i)$. We assume that $c(.)$ is convex for any $q_i > 0$ with $c'(0) = 0$ and $c(0) > 0$. We assume that all costs can be recovered if the firm exits the industry prior to producing anything. Thus, while there are fixed costs these are not sunk; essentially representing the opportunity cost of making capital resources available in the industry. The assumption of fixed costs assists us in characterising an interior solution below while the absence of sunk costs simplifies exposition by avoiding some additional terms. Relaxing either assumption would not change the qualitative results in this paper. Initially, we assume that upstream costs are the same regardless of whether a unit is integrated or not.

Each input is converted on a one-to-one basis into units of the final good. If Q is the total quantity produced downstream, the market price for the final good is determined by $P(Q)$, a non-increasing function.

Our cost assumptions imply that all independent upstream firms will produce the same output. Let N be the number of independent upstream units; and I the number of integrated upstream units. For notational simplicity, for a given N and I, let $Q^*(N,I)$ be the level of output that maximises industry profits and $\Pi(N,I)$ their maximised level. Industry profit is maximised at N^m, resulting in price (P^m) and quantity (Q^m); the neoclassical monopoly levels of pricing and output.

Our model has the following stages:

1. The monopsonist designates N potential independent firms that it will purchase from and chooses a number I of integrated units.

2. The monopsonist engages each firm in bilateral negotiations over input supply.

3. Production begins.

Stage 1 embodies an important assumption: while the monopsonist has some choice over the pool of potential firms at the beginning of the game, it cannot expand the pool ex post — although, as we will demonstrate, it can reduce this pool. Essentially, it cannot easily replace the initial set of firms. This gives those firms some hold-up power in stage 2 negotiations.[6]

The stage 2 bargaining game requires specification and discussion. The monopsonist and upstream firms can reach supply agreements specifying non-linear prices. Without loss of generality, we examine bargaining over supply from j specifying a quantity, q_j, and lump-sum transfer $\tilde{p}_j$ paid to j. We assume that upstream firms cannot observe the prices and quantities agreed upon by other upstream firms but they can observe whether there has been a breakdown in supply relationships from a specific upstream firm.[7]

We assume that the monopsonist and each supplier engage in one to one bargaining of the form modelled by SZ; suitably adapted to deal with the issue of variable quantities. Specifically, taking the number of independent upstream firms as given, bargaining takes place sequentially between the monopsonist and an order of upstream firms. The order in which pairs bargain in every situation, or the probability of each

[6] This assumption is also present in Chemla (2003) and has a similar rationale. Basically, upstream firms require specific information in order to supply to the monopsonist. This information cannot be easily assimilated ex post. Thus, the monopsonist can only deal with firms that have become suitably 'qualified' initially (see also, de Fontenay and Gans, 2003a). The number of qualified firms is assumed to be common knowledge.

[7] The incomplete information in our bargaining game – namely, that upstream firms are not aware of prices and quantities agreed upon in other negotiations that they did not participate in – is common in the literature. Similarly, SZ implicitly assumed that prices were unobservable, so that prices were not a function of the bargaining order, and that agents held *passive beliefs* regarding the prices agreed upon in earlier negotiations. Under passive beliefs, an agent's beliefs about the outcomes of other negotiations are not revised by an unexpected price offer. In the vertical contracting literature, a similar assumption is made regarding quantities agreed upon by other negotiating pairs (see McAfee and Schwartz, 1994). We adopt the passive beliefs assumption here with respect to both prices and quantities as a means of reducing the set of possible equilibrium outcomes. de Fontenay and Gans (2003b) provide a complete proof and also explore weak belief requirements.

order, is common knowledge. Each pair of negotiators agrees to price and quantity pairs that satisfy the Nash bargaining solution.[8] Therefore, each pair splits the surplus resulting from an agreement relative to their disagreement payoffs. Those payoffs are, in turn, determined by a key assumption in SZ that, following a breakdown, all supply agreements are subject to unilateral renegotiation by upstream firms. This assumption that supply agreements are not binding on upstream firm, when combined with the monopsonist's inability to replace them, gives suppliers some bargaining power.[9] This is a key assumption driving some of the results below and so we return to explore it in Section IV.

III. Bargaining Outcomes

Working backwards, we consider first the outcomes of the bargaining game specified above. In particular, we focus upon both the surplus generated in the industry as well as the distribution of that surplus.

Ex Post Efficiency

For a given upstream market structure (N, I), in equilibrium, the monopsonist and independent firms agree to an output allocation that maximises industry profits; that is, total surplus is $\Pi(N,I)$. Efficiency arises even though bargaining is one-on-one between the monopsonist and each independent firm. The simple intuition is that the assumption of passive beliefs means that each negotiation takes place taking the outcomes of other negotiations as given (including those following a breakdown). Given this, the outcome of each negotiation is given by the Nash bargaining solution; maximising bilateral surplus. As the quantities that achieve this are the same as those that maximise overall surplus (given N and I), the overall outcome is efficient.[10]

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[8] SZ argue that pairwise negotiations can themselves be given a non-cooperative justification using the model of Binmore, Rubinstein and Wolinsky (1986). There are some subtle issues that arise in applying this when there are variable quantities. These are resolved in de Fontenay and Gans (2003b).

[9] Thus, we do not employ the common assumption in the vertical relations literature that the bottleneck firm has all of the bargaining power. Chemla (2003) also considers a situation where the bottleneck firm does not have all of the bargaining power. It is easy to show, however, that Chemla's bargaining model does not translate to the monopsony setting (he deals with an upstream monopolist) as a monopsonist ends up appropriating all surplus (as suppliers compete to supply it) and so cannot benefit from vertical integration.

[10] The efficiency of the outcome here is common to other models of sequential vertical contracting where

It is important to emphasise that the efficiency achieved here is ex post; i.e., it takes $N + I$ as given. As $c'(0) = 0$, but there are fixed supplier costs, if a supplier is to remain active, it is worthwhile having them supply a positive quantity. As a result, $Q^*(N + I + 1) > Q^*(N + I)$, as greater supplier numbers imply lower industry marginal cost for a given total output level. As we demonstrate below, it is precisely because the monopsonist does not solely care about $\Pi(N, I)$ in determining industry structure at Stage 1 that ex ante efficiency is not achieved.

Distribution

Turning to distribution, given our assumption of passive beliefs, SZ show that each firm receives its Shapley value in the underlying cooperative game. In the context here, this value takes a simple form with a payoff (*v*) to the monopsonist of:

$$v(N, I) = \tfrac{1}{N+1} \sum_{i=0}^{N} \Pi(i, I) \quad (1)$$

an average of industry profits under each possible industry structure (i = 1, …, N).[11] This payoff drives the monopsonist’s choice of N in stage 1. Note that the marginal return to an additional upstream supplier in the industry is:

$$v(N, I) - v(N-1, I) = \tfrac{1}{N(N+1)} \left(N\Pi(N, I) - \sum_{i=0}^{N-1} \Pi(i, I) \right) \quad (2).$$

Importantly, at the neoclassical optimum ($N = N^m$ and $I = 0$):

$$v(N^m, 0) - v(N^m - 1, 0) = \tfrac{1}{N^m(N^m+1)} \left(N^m \Pi(N^m - 1, 0) - \sum_{i=0}^{N^m-1} \Pi(i, 0) \right) > 0 \quad (3).$$

Thus, the monopsonist has a greater private incentive to expand the number of upstream firms relative to what would be the case in the neoclassical benchmark. The intuition is that, for a given I, by expanding the number of independent firms (N), the monopsonist reduces the bargaining position of any one. This is the central insight of SZ.

Further, as demonstrated by SZ, (2) provides a sharp characterisation of the number of firms that will be chosen by the monopsonist; namely, setting (2) to zero

firms in the non-bottleneck sector do not take decisions that impose direct externalities on other firms in that sector (Rey and Tirole, 2003). These types of externalities arise naturally when the bottleneck is upstream rather than downstream and downstream firms operate in the same market. In that situation, the above bargaining game would not lead to maximised industry profits but instead would generate an outcome consistent with oligopolistic behaviour (de Fontenay and Gans, 2002).

[11] For a derivation, see our working paper (de Fontenay and Gans, 1999).

yields:

$$v(N+1, I) - v(N, I) \doteq 0 \Rightarrow \Pi(N, I) \doteq \tfrac{1}{N+1}\sum_{i=0}^{N} \Pi(i, I) \qquad (4).$$[12]

In other words, the maximised profits accruing to the monopsonist equals the total level of profits generated in the industry.[13] Thus, the monopsonist would choose enough independents that it appropriates all of the rents created in the industry. Interestingly, the monopsonist does not have to commit to purchase from this number of independents, as under free entry independents would enter until their rents were zero—the same number of independents as is chosen by the monopsonist.[14]

IV. The Strategic Role of Integration

We now turn to investigate the strategic role of vertical integration. (4) means that, regardless of the degree of integration, the monopsonist will designate sufficient numbers of independents so that it earns the entire value of industry profits through one-on-one negotiations with them. Ex post efficiency means that the realised level of industry profits will be efficient given the number of available independent and integrated units. In this environment, it can be demonstrated that the monopsonist purchases from 'too many' independent upstream firms; thereby, reducing overall industry profits below their neoclassical monopoly levels. Integration, however, can mitigate this overproduction; in particular, it is profitable for the monopsonist to have its own units, in the process, reducing industry output and raising prices towards neoclassical monopoly levels.

Non-Integration Outcome

It is useful to begin by describing the equilibrium outcome when there are no

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[12] Throughout the paper, the operator, $\doteq$, refers to equality within integer rounding over the function's argument. That is, $y(N) \doteq z(N)$ indicates that $y(N) - z(N) > 0 \geq y(N+1) - z(N+1)$.

[13] As the monopsonist's negotiated profits are an average of industry profits, for $N < \tilde{N}$, increasing the number of independents increases this average even though the increment to industry profits might be falling. It is only where for $N > \tilde{N}$ that this average lies above the margin industry profit increase and falls as the monopsonist adds additional independents.

[14] If upstream firms must incur sunk investment costs, then the free entry condition limits the number of entering upstream firms to be less than the amount the monopsonist wishes to purchase (as the monopsonist wishes to extract all ex-post profits).

integrated units. Rent appropriation implies that: $v(\tilde{N},0)=\Pi(\tilde{N},0)$. Because it is maximising an "average" industry profit rather than profit per se the monopsonist is supplied by more firms than the number for which marginal industry profit equals zero. Therefore we have:

Proposition 1 (Overproduction). *In the absence of integration, consumer surplus is higher than the neoclassical monopoly outcome as* $\tilde{N} \geq N^m$ *and* $\tilde{Q} \geq Q^m$.[15]

Even though the monopolist is *able* to choose a contract that implements Q^m downstream and hence generate monopoly profits in the industry, its *incentives* are biased towards increasing the number of firms upstream (and at least compensating them for fixed costs) so as to avoid being held up by any one. While substitutability across firms mitigates some of this hold-up power, it does so imperfectly. As such, the monopsonist chooses an upstream industry structure that increases the number of firms and hence, given the convex (variable) costs, it reduces the (industry) marginal cost at a given level of industry output. This means that, not only does the monopsonist spread output over more independent firms; it has an incentive to increase volume; thereby lowering price and overall industry profit. Hence, the upstream segment is effectively *overcapitalised*. The result is a more competitive industry structure.

The Choice and Effect of Integration

Overproduction is a particularly costly means of reducing the bargaining power of upstream firms. In contrast, if the monopsonist were to have some integrated upstream units, *thereby avoiding hold-up issues associated with renegotiation with those units*, it would never face a situation (after multiple breakdowns in negotiations) of having to negotiate with just a few firms on a steep portion of its profit function. In effect, by acquiring units, the monopsonist ensures some demand that independents can never threaten to remove.

By integrating, the monopsonist can credibly reduce the pool of independents it sells to. In particular, (2) is decreasing in *I* making the choices of *N* and *I* substitutes for

[15] The proof (omitted) utilises the insight of (3) to show that the number of upstream firms is greater than the neoclassical optimum and, as a consequence, the industry marginal cost of the neoclassical monopoly outcome is lower. Hence, the profit maximising output for the higher *N* is above the neoclassical level.

the monopsonist.[16] Integrating more firms reduces the number of independent suppliers for two reasons. First, the integrated capacity substitutes partly for that of independents. Second, and most importantly, the presence of integrated units diminishes the bargaining position of independents. The price paid to independent firms is falling in *I; in other words, if the composition of firms includes more independents, the negotiated transfer to upstream firms is smaller*. This effect is so strong that the number of independents falls by more than the increase in integrated firms, and therefore the *total* number of upstream firms falls.[17]

Given that integration involves no cost, the monopsonist is able to increase industry profits by integrating more upstream units. Indeed, it will do so until there is complete integration.

Proposition 2 (Integration). *When integration is costless,* $\tilde{I} = N^m$ and $\tilde{N} = 0$. *Consumer surplus is the same as the neoclassical monopoly outcome.*[18]

Thus, vertical integration is an instrument whereby the monopsonist is able to commit to a reduced level of upstream entry and production with its consequence reduction in the industry supply curve and decrease in industry output and consumer surplus. Note, however, that while consumer surplus is necessarily lower, the welfare implications of integration are ambiguous. Specifically, the presence of significant fixed costs could mean that total surplus (consumer and producer) under non-integration may be lower than surplus generated under complete integration.

Costly Integration

The above analysis assumes that integration involves no additional private or social costs. At first blush, one might think that adding such costs to our model would reinforce the results that vertical integration by a monopsonist would be harmful to consumers. We demonstrate here that this is not the case and, indeed, that when integration is costly, consumers are better off.

Suppose that, compared with independents, integrated upstream units operate with

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[16] That is, take $I' > I$, then $N\left(\Pi(N,I') - \Pi(N,I)\right) < \sum_{i=0}^{N-1}\left(\Pi(i,I') - \Pi(i,I)\right)$ as there is diminishing marginal returns to the additional of upstream firms (industry profits are concave).

[17] This is demonstrated formally in the proof of Proposition 3 below.

[18] The proof is straightforward. As integration is costless but the monopsonist can appropriate all rents from integrated firms, it will be able to credibly choose the neoclassical optimal industry structure and commit

an additional fixed cost of Δ.[19] Given this, we can demonstrate that consumers are always better off for $\Delta > 0$ than when $\Delta = 0$.

Proposition 3. *Consumer surplus is necessarily higher than when* $\Delta = 0$ *as* $N^m \le \tilde{N}(\tilde{I}) + \tilde{I}$ *and* $Q^m \le Q^*(\tilde{N}(\tilde{I}), \tilde{I})$.

PROOF: The proof requires a demonstration that starting from a point where $\Delta = 0$, that an increase in integration costs, leads to a reduction in *I* that is made up by an increase in *N*.

Consider a switch from an equilibrium with (*N*, *I*) to a situation where we move to (*N* + 1, *I* – 1) where $\Delta > 0$. First, we want to show that the marginal return to an additional independent is strictly positive; implying that the monopsonist would choose a number of independents greater than *N* + 1 if it could only have *I* – 1 integrated units. That is, suppose not:

$$\tfrac{1}{N(N+1)}\left(N\Pi(N,I) - \sum_{i=0}^{N-1}\Pi(i,I)\right) \doteq 0 \text{ and } \tfrac{1}{N+1}\sum_{i=0}^{N}\left(\Pi(i,I) - \Pi(i,I-1)\right) \doteq 0$$

$$\Rightarrow \tfrac{1}{(N+1)(N+2)}\left((N+1)\Pi(N+1,I-1) - \sum_{i=0}^{N}\Pi(i,I-1)\right) \le 0$$

$$\Rightarrow (N+1)\Pi(N+1,I-1) - \sum_{i=0}^{N}\Pi(i,I-1) \le N\Pi(N,I) - \sum_{i=0}^{N-1}\Pi(i,I)$$

$$\Rightarrow (N+1)\Pi(N+1,I-1) - \sum_{i=0}^{N}\Pi(i,I-1) \le (N+1)\Pi(N,I) - \sum_{i=0}^{N}\Pi(i,I)$$

$$\Rightarrow \underbrace{\tfrac{1}{N+1}\sum_{i=0}^{N}\left(\Pi(i,I) - \Pi(i,I-1)\right)}_{\doteq 0} \le \underbrace{\Pi(N,I) - \Pi(N+1,I-1)}_{<0}$$

A contradiction

At a point where $\Delta = 0$, we know that $\tilde{N} = 0$ and $\tilde{I} = N^m$. Increasing integration costs to a point where $\tilde{I} = N^m - 1$ will lead to $\tilde{I} + \tilde{N} \ge N^m$ by the above. As the mix of upstream firms is more efficient and upstream costs are convex, this implies that $\tilde{Q} > Q^m$. As integration costs increase further, reductions in *I* are at least made up for by increases in *N*, completing the proof.

Two insights drive this proposition. First, we observed earlier that $v(N,I) = \Pi(N,I)$; implying that the monopolist chooses *I* that maximises industry profits; internalising any profit impacts from a changing level of integration. Second, given this, the monopsonist will always find it profitable to deal with some independent suppliers (for productive efficiency reasons) and not achieve the neoclassical optimum. Consequently, with costly integration, the number of upstream firms is greater and total industry quantity higher

not to be supplied by independent firms.

[19] This assumption is made for simplicity. The cost could easily have a variable component so that total costs increase with output. As for interpretation, this cost could be a simple transaction cost (Williamson, 1985) that arises within integrated firm but that is not otherwise present. Alternatively, it could be a loss in the efficiency of output that arises because upstream managers do not own the assets they work with (Bolton and Whinston, 1993; Hart, 1995).

than would be achieved if integration were costless.

Thus, costly integration weakens concerns about consumer harm that might result from vertical integration by a monopsonist.[20] This is because the monopsonist internalises the industry profit impacts of any resulting productive inefficiencies. Conversely, if integration was productively efficient (that is, $\Delta < 0$), one could not infer that consumer welfare would unambiguously rise.

Renegotiation

In the absence of costless integration, the monopsonist chooses a number of suppliers that leads to a more competitive industry outcome than would arise in a neoclassical monopoly. The reason for this is that, following a breakdown, upstream suppliers can, at their own discretion, renegotiate supply agreements. This gives them hold-up power that the monopsonist chooses to suppress by expanding their number. As it solves this hold-up problem in a potentially less costly manner, there is a motive for integration.

In reality, the non-binding nature of supply contracts can arise when there is imperfect enforceability. This type of contractual incompleteness giving rise to hold-up is a common assumption in the property rights literature on firm boundaries (Hart, 1995). In addition, it is consistent with our assumption that the monopsonist cannot write agreements prior to the determination of industry structure. In other words, we are envisaging a short-run price formation process rather than negotiations over long-term supply contracts. This is an appropriate structure in environments in which price contracts are renegotiated more frequently than the market structure changes.[21]

However, it is not necessary to adopt an assumption that supply contracts are completely non-binding to achieve this result. All that is required is an environment where (i) upstream firms can appropriate some surplus and (ii) their ability to appropriate surplus is diminished if there are more of them. For instance, imagine that there was only some positive probability that, following a breakdown, a supplier could renegotiate contract terms. So long as that the supplier’s ability to appropriate rents in renegotiation

[20] Nonetheless, it remains the case the no integration at all results in the highest consumer surplus.

[21] This arises in the supply of cable television channels (Waterman and Weiss, 1994; Chipty, 2001), supply of goods to supermarkets (Scott-Morton and Zettelmeyer, 2000; Chitagunta, Bonfrer and Song, 2002) and agricultural processing (de Fontenay, 1997).

is smaller if the monopsonist is being supplied by more upstream firms, Propositions 1 will continue to hold. Moreover, to the extent that integrated firms do not face renegotiation options, integration will be an alternative to over-capitalisation upstream.

But even if all contracts were binding, a similar outcome could occur. For instance, following Inderst and Wey (2003), we could allow pairs to negotiate binding contracts contingent upon the market structure that eventuates. That is, each pair would negotiate price and quantity terms that would take place if all other upstream firms agreed to supply the monopsonist but also terms that would arise if there were breakdowns and exit. Inderst and Wey argue that it would be bilaterally optimal for parties to write flexible contracts in this manner. As the expected payoffs in contingencies depend upon the number of suppliers, allowing for contingent contracts can be shown to lead to a Shapley value outcome whereby Propositions 1 and 2 continue to hold.

Not allowing for renegotiation or contingent contracts means that in sequential negotiations there will be a first mover advantage and hence, a more complicated solution, but otherwise the qualitative characteristics of Propositions 1 and 2 would remain. First, consider a situation where there are two (symmetric) suppliers with the monopsonist negotiating with 1 prior to 2. In this situation it is not difficult to show[22] that (i) when there are two non-integrated suppliers, the monopsonist will choose to negotiate with them both and produce too much relative to the neoclassical optimum and (ii) when the monopsonist has an integrated supplier it will choose the neoclassical optimum. However, the non-integrated case, involves asymmetries in the inputs supplied by each supplier and in their payoffs. This makes a simple extension to the *N*-firm case far more cumbersome than the model in this paper.

V. Conclusions

Previous models of vertical integration by a monopsonist, despite demonstrating in some cases a potential reduction in overall welfare because of changes in supply conditions or investment incentives, have found integration to be to the benefit of consumers. The reason is that, by definition, a monopsonist controls how inputs get transformed into economic value from consumers and cannot generate more than one downstream monopoly rent from this channel. Instead, vertical integration – whether it is efficient or not – is believed to result in reduced costs for the monopsonist, a proportion of which are passed on to final consumers.

This paper's contribution is to demonstrate, in a natural economic environment, that the monopsonist and consumer's interests regarding vertical integration may not be aligned. Specifically, the monopsonist may have an incentive to vertically integrate to avoid a pro-competitive tendency it would otherwise have to encourage upstream entry and lower industry marginal-costs (and with it final goods prices) as a means of improving its bargaining position. Vertical integration is another means of depressing the bargaining power of upstream firms.

One alternative way of generating a similar type of consumer harm would be if we relaxed our assumption that consumers were indifferent as to the source of upstream supply. For instance, in the context of retailing, each upstream firm may supply a differentiated brand so if an integrated retailer reduces the number of brands on offer or alternatively substitutes its own inferior store brand, consumers have face a loss in their welfare. Empirically, Scott-Morton and Zettelmeyer (2000) and Chitagunta, Bonfrer and Song (2002) find that supermarket chains develop 'store brands' partially to improve their bargaining position with respect to independent suppliers.

This mechanism of potential consumer harm may also be of relevance in cable television. In studies of the U.S. cable industry (where the bottleneck is downstream), Waterman and Weiss (1994) and Chipty (2001) demonstrate that the number of channels on local networks that are owned by channel providers is less than on independently owned networks.

Basically, our paper demonstrates that competition policy-makers might indeed have reason to be concerned regarding backwards integration by a monopsonist. The concerns are greatest when such integration leads to foreclosure or exit of suppliers with convex costs or who provide differentiated goods in the eyes of consumers. Such issues will exacerbate any concerns that may also exist regarding the effect of integration on investment incentives.

[22] The calculations are available from the authors.

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