Vertical Mergers and the Nature of the Firm

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1. Introduction

What are the benefits of vertical integration? To understand why firms sometimes vertically merge, we need to look at two issues: (i) contractual relations between upstream and downstream firms, and (ii) the mechanics of decision-making within a vertically integrated firm. In particular, we need to consider why there may be obstacles to efficient contracting in the absence of integration, and in what areas of decision-making these obstacles are likely to arise. We also need to consider how control over business decisions is reallocated following vertical merger. These questions are linked to work on the nature and boundaries of the firm.

2. Contractual limitations and the nature of the firm

A firm may be defined as the basic unit for organising production, which performs the crucial role of linking labour and product markets. Reasons why the supply of the products of labour tends to become organised in this way include specialisation, economies of scale, economies of scope and the reduction of search costs. These reasons also indicate what the firm *consists of*, beyond an abstract point of trade between workers and consumers. The reduction of search costs, for example, is achieved by means of the firm's reputation and location, one of a class of intangible assets belonging to the firm, which may also include the names of its products ('brands') and other forms of goodwill.

Since the production of goods or services typically uses tangible assets in addition to labour, the firm will also have access to assets used in production. These may include the premises where work takes place, and/or where trade is carried on with consumers. Search costs arising from information asymmetries relate not only to the interaction between workers and consumers, but also to the interaction between different types of worker, once specialisation of function comes into play within a single firm. This suggests that another 'asset' which the firm controls is the *organisational structure* which makes the necessary co-ordination possible.

The work of Sanford Grossman, Oliver Hart and John Moore has helped to confirm this identification of the firm with control over business assets. The assets in question may be assets required for production or, more abstractly, intangibles such as goodwill without which workers would find it difficult to

trade with consumers. Specifically, control over assets is identified with 'residual decision rights' — those rights which have not been explicitly contracted away. Grossman and Hart (1986) point out that

> control or ownership is never absolute. For example a firm that owns a machine may not be able to sell it without the permission of the lenders for which the machine serves as collateral; more generally, a firm may give another firm specific authority over its machines. However, ownership gives the owner all rights to use the machine that he has not voluntarily given away or that the government or some other party has not taken by force. (p.694)

The crucial characteristic which distinguishes the firm's workers from *external* parties with whom the firm contracts for supplementary inputs is the dependence of workers on the firm's assets, rather than their legal relations with the firm. Thus workers who are notionally self-employed may be *de facto* employees if they need to employ assets over which the firm has control. The relationship between a firm's control over assets and its control over workers is explained further in Hart and Moore (1990).

> We suppose that the sole right possessed by the owner of an asset is his ability to exclude others from the use of that asset. ... [C]ontrol over a physical asset in this sense can lead indirectly to control over human assets. For example, if a group of workers requires the use of an asset to be productive, then the fact that the owner, party 1 say, has the power to exclude some or all of these workers from the asset later on (i.e. he can fire them selectively) will cause the workers to act partially in party 1's interest. (p.1121)

3. Reasons why vertical separation may be suboptimal

Say that vertical separation can under certain circumstances lead to suboptimal outcomes. We need to ask why it is not possible for firms to to use contracts rather than merger to eliminate these inefficiencies. First, consider the question of production decisions. It has been argued that these may be sufficiently complex such that they cannot be specified completely *ex ante*.

> [It] may be difficult, if not impossible, to describe precisely the input characteristics required in the future even though these characteristics might be easily described ex post. If a contract for future delivery only vaguely describes the characteristics of the good to be delivered, the supplier may have strong incentives ex post to deliver an ineffective input. Then, despite the presence of the contract, the parties will essentially be left to bargain over the procurement of the input that is really needed. For instance, IBM may not be

> capable of describing what sort of microchip it wants Intel to deliver five years from now for a computer that it is currently developing, even though in due time it will be able to describe its needs precisely. In this case, IBM may not gain much from writing a long-term future delivery contract with Intel. (Bolton and Whinston 1993, p.127)

Secondly, it has been argued that cost and income streams cannot necessarily be transferred by contract because of the difficulties of *verifying* such streams. Hart and Tirole (1990) point to the weakness of any agreement which attempts to contract away all or part of an owner's return stream, such as a compensation package for a manager based on observed profits, or other types of profit-sharing.

> Profit-sharing may be difficult to implement in the absence of integration … because independent units can divert money and misrepresent profits. … [C]onsider an independent unit, A, that has signed a profit-sharing agreement with firm B. One way A can misrepresent and divert its profits is by purchasing an input at an inflated price from another company in which A's owners have an interest. It may be hard for B to write an enforceable contract ex ante to prevent such a diversion, even though B may be well aware of the practice ex post (the information that the input is overpriced is observable but not verifiable). On the other hand, if A and B are integrated, B can refuse ex post A's manager's request to spend company resources on the expensive input, thus effectively blocking the transaction. This is because B now possesses residual rights of control over company A's resources by virtue of integration. (pp.206-207)

These points help explain why there may be advantages to vertical integration which cannot be duplicated even by sufficiently complex contracts between separated upstream and downstream firms.

4. Intra-firm relations

The traditional view of the firm is of a unitary entity with a single set of objectives. Neoclassical analysis assumes that the maximisation of profit is the sole objective of the firm, and does not typically look behind the veil of the firm to consider how the interests of individual human agents generate this objective. More recent analysis of firm behaviour has taken account of the separation of ownership and control, by applying principal-agent analysis to the delegation of corporate control by shareholders to managers, and in turn from managers to other employees lower in the hierarchy.

The view of the firm as representing the internalisation of contractual transactions goes back to Coase (1937) and has been developed by a number of other writers, most notably Oliver Williamson. In a sense, any firm other than the simplest will typically represent a vertical structure, in that workers of different kinds provide a variety of inputs to production which itself may take place in several sequential stages. Williamson has called this view of the firm, in which organisational structure is seen as providing an alternative to vertical contracting, the 'markets and hierarchies approach'.

The markets and hierarchies approach attempts to identify a set of environmental factors which, together with a set of related human factors, explain the circumstances under which complex contingent contracts will be costly to write, execute and enforce. Faced with such difficulties, and considering the risks that simple (or incomplete) contingent claims contracts pose, the firm may decide to bypass the market and resort to hierarchical modes of organisation. Transactions that might otherwise be handled in the market are thus performed internally, governed instead by administrative processes.

The presence of hierarchical or divisional complexity clearly raises the question of whether the pursuits of the firm such as profit-maximisation can be considered on a unitary basis or whether each component of the firm has to be considered separately. It is tempting to suppose that, in spite of different divisions having different objectives, some sort of consensus objective emerges when these are combined. However, empirical studies suggest that this rarely occurs in practice.

5. The internal dynamics of the firm

One response to the problem which these organisational ramifications raise for the 'black box' view of the firm is to regard the concept of 'firm' as merely a helpful theoretical construct. In that case, we could argue that while the presence of a vertically integrated structure creates problems for the assumption that the firm is a single profit-maximising entity, these problems are not different in nature from those which have been identified as applying to *any* firm. So long as profit-maximisation continues to be used as the basis for modelling competitive behaviour, therefore, it is appropriate to use it to analyse any given firm, to some extent regardless of its precise organisational structure. However, conclusions about vertical merger derived from models

predicated on this assumption may be misleading, given how crucial the question of intra-firm relations is to an understanding of the effects of vertical integration. The issue therefore deserves a certain amount of attention.

Legally, a firm which takes over another firm gains the right to control that firm. Control here means the power to make decisions about all the activities of a firm, including production, pricing, investment and so on. Some of these powers may of course be delegated, so that in practice decisions about the activities of a firm which is taken over are often left with the management of that firm. In spite of agency problems arising from delegation, it might be thought that an integrated firm would behave much as a single firm would.

Contrary to this, some models of vertical integration have tried to incorporate some of the insights of agency models of the firm by suggesting that the allocation of control rights is different in a firm which is the product of a vertical merger than in one which is not. In the model of Grossman and Hart (1986), it is only the right to control the firm's *assets* which is transferred by acquisition, interpreted as control over production decisions. The target continues to make autonomous decisions about *investment* because of the hierarchical structure of the integrated business and because investment choices are non-contractible.

> It should be stressed that we assume that separate managers are needed to choose [investments for the two firms or divisions] under any ownership structure (p.706)
>
> ex ante investments … cannot be specified in the contract either because they are too complex to be described or because they stand for nonverifiable managerial effort decisions. (p.697)

The benefits from each firm's investment and output choices are also assumed to continue to pass to each independent manager without aggregation; again because of non-contractibility, in this case of profit streams.

> After investment decisions are made ex ante and [the two output levels have been chosen] manager i receives benefit B_i. This benefit is again supposed to be nonverifiable and hence noncontractible. That is, B_i is a private benefit, accruing directly to firm i's manager, that does not show up in firm i's accounts. For example, B_i might stand for managerial perquisites or effort. A consequence of B_1 and B_2's not being verifiable is that it is impossible to write in the [initial] contract that firm 1, say, should transfer its benefit B_1 to firm 2. (ibid., p.698)

Thus, while all three elements of a firm's objective function – investment levels, output levels and profit streams – are non-contractible in Grossman and Hart's (1986) model, control over output is the only one of these three which is posited to pass from target to acquirer on integration. The intuition for this is unclear, but may be based on the relationship between ownership and control over assets. However, the equation of 'control over assets' with 'control over output decisions', to the exclusion of control over investment decisions or control over profit streams, is questionable. Grossman and Hart explain the identification of control over output with residual control rights as follows.

> The [output decisions] represent rights of control over firm i's assets, which are assumed to be ex ante noncontractible ... we have in mind a situation in which it is extremely difficult to think about and describe in advance how the production allocation should depend on the 'state of the world' ... Since [a firm's output decision] is ex ante noncontractible, it qualifies as a residual right of control, and our assumption is that the owner of firm i has the right to choose it (ibid.)

Grossman and Hart do not explain why control over investment, being non-contractible ex ante, is not also a residual control right and therefore transferred with ownership of the firm. There is little argument to support the claim that the acquiring firm does not obtain full benefit of the acquired firm's profits, an assumption which seems in conflict with commercial reality.

Without adequate justification, it is hard to avoid the impression that the hypothesis of selective transfer of control is an ad hoc solution to the problem of why there are limits to vertical integration, designed to generate predicted ineffiencies within a vertically integrated firm. The following quote could be interpreted as confirming that suspicion.

> It may be useful to comment briefly on the motivation for our assumption that a_i, q_i, and B_i are all ex ante noncontractible. We shall see in the next section that, if either the a_i's or the q_i's are ex ante contractible, the first-best can be achieved under any ownership structure, and so the degree of integration of the firms is irrelevant. [...] Hence, in order to develop an interesting theory of ownership, it is necessary to assume that the a_i's, q_i's and B_i's are all at least partly noncontractible. (ibid, p.700)

There are several reasons why Grossman and Hart's definition of vertical integration is unusual. First, the production choices of the integrated firm merely serve as the threat point for the Nash bargaining outcome: hence

vertical integration does not allow the integrating firm to internalise the full benefits of its choice of production variables. This resembles renegotiation of an initial contract concerning vertical control, rather than integration. Second, it assumes that investment decisions cannot be directly affected by vertical integration, a departure from the transaction cost literature which views vertical integration as a means to alleviate opportunism and the resulting underinvestment.

Pace Grossman and Hart, I believe that the correct way to view a vertical merger is that full control over the target's assets is transferred to the acquirer. This means that all production decisions and investments decisions should be regarded as under the control of a single entity, and that all cost and revenue streams should be seen as accruing to the same single entity. This perspective seems, indeed, to be shared by Hart in a later paper on vertical integration (Hart and Tirole 1990) in which he acknowledges that the residual control rights perspective is in fact consistent with the traditional view of merger as representing *full* integration of control rights and benefits.

While there are agency problems within a vertically integrated firm, these can, as Hart and Tirole themselves note, be resolved by appropriate incentive schemes.

> ... diversion problems are not completely eliminated by integration. In particular, if [firm B] owns [firm A], B can use its residual control rights to divert money from A. However, as long as B diverts on a proportionate basis from both units A and B – and as long as this diversion is less than 100 percent – A's subordinate manager can be given a compensation package that is some fraction of A's and B's joint profit. Given this, A's subordinate manager will have an incentive to choose pricing and trading policies that are in the interest of the company as a whole.
>
> Another argument can be given as to why a merger reduces conflicts of interest over prices and trading policies. Under integration, a subordinate manager will act in the interest of the parent company, since otherwise he or she will be dismissed. But the pressure on the manager of an independent unit to act in the interest of another independent contractor is to sever the whole relationship with the unit (the contractor cannot fire the unit's manager alone). (ibid., p.207)

6. Conclusion

The above discussion supports the idea that a vertically integrated firm should be regarded as a single entity with full control over investment and output decisions, and that this is what gives rise to the benefits that can flow from vertical merger. In theory, behaviour which generates the overall optimal outcome could be duplicated in the case of two separate firms, if these are bound to each other by means of sufficiently complex contracts. In practice, the limitations of contracts are likely to mean this is often not possible.

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