

VALUE-BASED BUSINESS STRATEGY

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This paper offers an exact definition of the value created by firms together with their suppliers and buyers. The "added value" of a firm is similarly defined, and shown under certain conditions to impose an upper bound on how much value the firm can capture. The key to a firm's achieving a positive added value is the existence of asymmetries between the firm and other firms. The paper identifies four routes ("value-based" strategies) that lead to the creation of such asymmetries. Our analysis reveals the equal importance of a firm's supplier and buyer relations. Cooperative game theory provides the underpinnings of the analysis.

1. INTRODUCTION

The term *value* crops up frequently in discussions of business strategy. It is therefore natural to ask: What exactly is the meaning of value in the business context? This paper proposes an answer to this question, and uses it to provide a foundation for the formulation of business strategies.

In defining value, we begin by following Porter (1980) in considering a vertical chain extending from suppliers of resources to firms, through firms, to buyers of products and services from firms. Value is created by such a vertical chain of players as a whole. In particular, our definition of value creation depends on the characteristics of all three categories of player in the chain—suppliers, firms, and buyers.

Once a precise definition of value creation is in place, the next step is to determine how value is divided up among the different players in the chain. From the perspective of an individual player, such as a firm, the question becomes: How much value can that player expect to capture? This is a central question in business strategy. Our

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answer relies on the concept of the "added value" of a player. This is defined as the value created by all the players in the vertical chain minus the value created by all the players except the one in question.¹

The concept of the added value of a player is significant in that there are important circumstances in which it places an upper bound on the amount of value that player can capture. A necessary (though not sufficient) condition for a player to capture value is, then, that the player have a positive added value.

If possession of a positive added value is the key to value appropriation, we must next determine how a player comes to have a positive added value. In particular, how can a firm come to have a positive added value? The answer is that the firm must enjoy a favorable asymmetry between itself and other firms. We identify four routes that lead to the creation of such asymmetries, terming each a "value-based" strategy for the firm.

In addition to yielding prescriptive implications for strategy formulation, our analysis is undertaken with three other, related goals in mind. First, by going against common usage (which has firms creating value by themselves) and, instead, defining value creation in terms of complete chains of suppliers, firms, and buyers, we mean to emphasize the importance of firms' adopting an external focus—one that is oriented towards the buyers they serve and the suppliers they rely upon.

Second, by treating buyers and suppliers symmetrically, we mean to emphasize the importance of suppliers in particular. This is in distinction to the focus on buyers that typifies discussions of business strategy. Specifically, meeting the needs of buyers often seems to be viewed as sufficient for the creation of value. Suppliers enter the picture only inasmuch as the firm is enjoined to control its costs so as to profit from meeting buyers' needs.² This asymmetric treatment of buyers and suppliers is unsatisfactory at a conceptual level. And it does not sit well with the importance that has been attached recently to the issue of supplier relations [see, for example, Shapiro (1985) and Clark and Fujimoto (1991, Ch. 6)]. Our approach is designed to remedy these deficiencies.

Third, the underpinnings of our analysis come from a perhaps unfamiliar discipline, *cooperative game theory*. This theory is well suited

1. The term "value added" is often used to mean something like this. Since value added already has a precise—and different—meaning in accounting, we prefer to use a distinct term in the strategy context.

2. This view is widespread in the business-strategy literature. To give just one example, Rappaport (1992, p. 85) speaks of "... a company's ... ability to create value in excess of the cost of producing it."

to the analysis of business strategy, and we wish to promote its use in this direction. To date, most attempts at developing economic foundations for business strategy have drawn on ideas from industrial organization economics. The latter subject has, in turn, looked increasingly to *noncooperative* game theory for its analytical method. [See Shapiro (1989) for a crisp statement of the current state of affairs.] But use of a particular noncooperative game model involves making very precise assumptions about the moves and countermoves available to the players. This is awkward when studying situations which are unstructured, as many business situations are. By contrast, cooperative game theory employs a notion of "free-form" interaction between players, which corresponds nicely to the active search for value creation and appropriation opportunities that characterizes business situations. It is cooperative game theory that underlies what we do in this paper.³

The organization of the rest of the paper is as follows. Section 2 introduces our formal definition of value creation. Section 3 discusses the division of value. Section 4 extends the basic definition of value creation to more general settings. Section 5 introduces the concept of the added value of a player. Section 6 discusses value-based strategies. Section 7 considers various conceptual aspects of our analysis. Section 8 reviews related literature. Section 9 concludes.

2. VALUE CREATION

Firms acquire resources, such as capital, labor, and raw materials, from suppliers and transform these resources into products and services,⁴ which are then sold to buyers. Figure 1 depicts this vertical chain of activities in schematic form.

To define the value created by this vertical chain of players, we begin with the simplest possible case, that of just one supplier, one firm, and one buyer. (The case of several players at each stage of the chain is treated in Sec. 4.) The definition then has two ingredients: the "willingness-to-pay" of the buyer and the "opportunity cost" of the supplier. The value created by the chain of players is defined as

3. The terms "cooperative game theory" and "noncooperative game theory" are standard, but can be misleading. They suggest that there is no place for conflict, competition, and the like in the former, and no place for cooperation in the latter. This is not true. Cooperative game theory can be used to study "unbridled" competition (see Sec. 8), while noncooperative game theory can be used to study the emergence of cooperation. Rather, as indicated, the distinction is between how much specificity about possible plays of the game is required.

4. From now on, the term "product" will be used to mean either product or service.

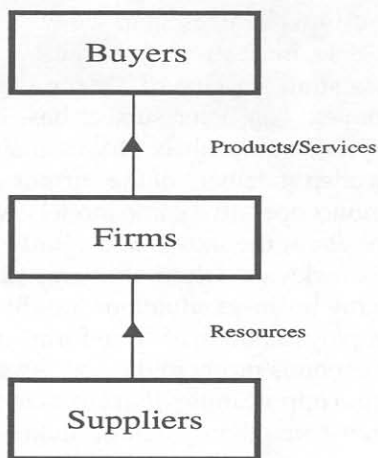


FIGURE 1

the first minus the second:

value created = willingness-to-pay – opportunity cost.

Of course, this definition is incomplete until the terms on the right-hand side have themselves been defined. We begin with willingness-to-pay. This is found by performing the following thought experiment. The buyer is interested in acquiring a certain quantity of product from the firm. Imagine that the buyer is first simply given this quantity of product free of charge. The buyer must find this situation preferable—typically, in fact, strictly preferable—to the original status quo. Now start taking money away from the buyer. If only a little money is taken away, the buyer will still gauge the new situation (product minus a little money) as better than the original status quo. But as more and more money is taken away, there will come a point at which the buyer gauges the new situation as equivalent to the original status quo. (Beyond this amount of money, the buyer will gauge the new situation as worse.) The amount of money at which equivalence arises is the buyer's willingness-to-pay for the quantity of product in question.

Although this definition looks quite abstract, in some contexts it can, in fact, be made very concrete. For example, the willingness-to-pay of an industrial buyer for a piece of capital equipment may come down to the savings in the buyer's operating costs that installation of the new equipment would afford. Assessing the willingness-to-pay of consumers for household products is often harder. But whether

easy or difficult to calculate, willingness-to-pay is always an ingredient in value creation.

The other ingredient is opportunity cost. This is defined in an analogous—though reverse—fashion to willingness-to-pay. The firm is interested in acquiring a certain quantity of resources from the supplier. The thought experiment this time consists in taking this quantity of resources away from the supplier and giving the supplier money in return. The amount of money that leads the supplier to gauge the new situation (money minus resources) as equivalent to the original status quo defines the supplier's opportunity cost.

As with willingness-to-pay, the general definition of opportunity cost is quite abstract, but becomes very tangible in some contexts. Consider, for example, a potential employee of a firm: the employee's opportunity cost may come down to the highest alternative compensation that person can secure.

Notice that in defining value creation, we go beyond the firm's actual outlays to its suppliers (the firm's measured costs) to the opportunity costs of its suppliers. This is necessary if the analysis is to treat buyers and suppliers symmetrically.⁵

There has deliberately been no mention yet of the actual price paid by the buyer for the firm's product, or of the actual price received by the supplier for providing resources to the firm. Such prices will be thought of as reflecting the outcome of bargaining between the firm and the buyer and between the firm and the supplier (see Sec. 3).

On the other hand, in arriving at their willingness-to-pay and opportunity-cost numbers, the buyer and supplier were assumed to have access to well-defined prices elsewhere in the economy. (Witness the examples of the industrial buyer calculating operating-cost savings and the potential employee contemplating alternative compensation packages.) The assumption of given prices outside the vertical chain, but not inside, reflects our focus on the bargaining problem between the identified players (supplier, firm, and buyer). Loosely speaking, the bargaining problem outside the game under consideration is imagined to have already been solved.⁶

5. Interestingly, our emphasis mirrors the view of a school of economic thought which argues that the conception of cost which should underlie economic analysis is exactly opportunity cost. For a discussion see Buchanan (1969), who also supplies a very nice definition: "The employment of resource services in any manner involves a cost to the resource owners; this cost consists in their own evaluation of forgone alternatives, an evaluation made at the moment of commitment. This is the 'true' opportunity cost that comes to be embodied in the market process" (op. cit., p. 95).

6. In this sense, our analysis is like the "partial equilibrium" mode of economic analysis. But the similarity ends there, since the notion of equilibrium plays no part in what we do. See also Section 7.1.

3. VALUE APPROPRIATION

Now that the value created by a vertical chain of players has been defined, the next question is: What determines how much value each player will appropriate?

The answer is that bargaining between the players determines the division of value. Bargaining between the supplier and the firm determines the price the supplier receives for providing resources to the firm or, equivalently, the cost to the firm of acquiring those resources. Similarly, bargaining between the firm and the buyer determines the price the buyer pays for the firm's product or, equivalently, the price the firm receives for selling its product. Figure 2 depicts the division of value.

Here the line segment as a whole represents the value created by the vertical chain of players. The top portion of the line segment represents the amount of value captured by the buyer, namely the buyer's willingness-to-pay for the firm's product minus the price paid to the firm. The middle portion of the line segment represents the amount of value captured by the firm, namely the price received from the buyer minus the cost of acquiring resources from the supplier. Finally, the bottom portion of the line segment represents the amount

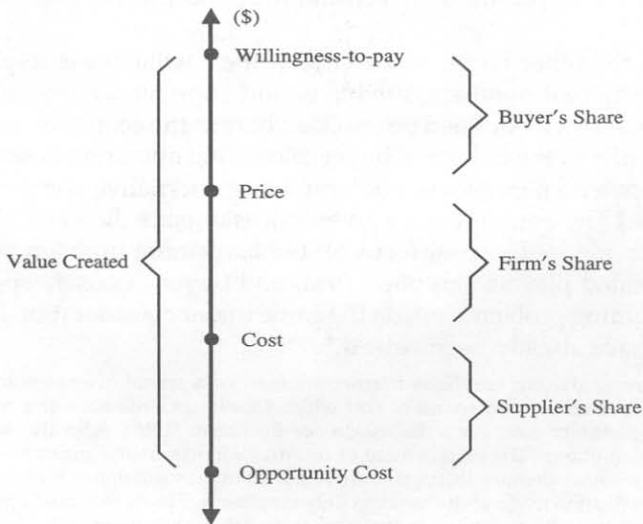


FIGURE 2

of value captured by the supplier, namely this same cost minus the supplier's opportunity cost.

Exactly what division of value will result from the bargaining between buyer and firm and between firm and supplier will depend on how "tough" a bargainer each player is—how persistent, how good at bluffing, and so on.

4. VALUE CREATION WITH MANY PLAYERS

Often, there are several players at each stage of the vertical chain. A firm typically has competitors, and the industry consisting of the firm and its competitors usually faces a number of buyers and a number of suppliers.

Before we can tackle the question of the division of value in this more general setting, we must revisit our definition of value creation. The basic approach is unchanged: value is created by the chain of players as a whole, and willingness-to-pay and opportunity cost remain the key ingredients of the definition. But some care is needed in extending the earlier approach.

To see what is involved, consider a situation in which there are two firms in the game, one making a "standard" product and the other a "premium" product. To define a buyer's willingness-to-pay for the premium product, it seems that we must first determine the price of the standard product. For, this price will affect how much money the buyer will be prepared to give up to acquire the premium product. But the price of the standard product will reflect the outcome of bargaining between players in the game (Sec. 3). This suggests that the definition of value creation cannot be separated from the issue of value appropriation—which, if true, would seem to make analysis very awkward.

The solution, roughly speaking, is to distinguish between what is "inside" and what is "outside" the game. More precisely, the buyer's willingness-to-pay for the premium product is to be defined with respect to opportunities elsewhere in the economy (that is, outside the game). Thus willingness-to-pay is found by performing a thought experiment similar to that in Section 2, with one important twist. As before, the buyer is given the product in question (here the premium product); in return money is taken away, and the point of "indifference" is found. The twist is that it is assumed that the money taken away could not have been spent on the standard product (since the latter is inside the game). This gives an unambiguous definition

of willingness-to-pay—one that does not depend on the outcome of bargaining in the game.⁷

The situation with opportunity cost is similar. A supplier's opportunity cost of providing resources to a firm is also defined with respect to opportunities outside the game.

Having extended the definitions of willingness-to-pay and opportunity cost to the more general setting of many players, it remains to come up with a suitable extension of the earlier definition of value creation. Again, some care is needed here. To see why, it will be helpful to consider a stylized example of a game between suppliers, firms, and buyers.

EXAMPLE 1: *Consider a game between two suppliers, two firms, and one buyer. Each supplier can transact with at most one firm, and vice versa. The buyer can transact with at most one firm. Each supplier has an opportunity cost of \$10 of providing resources to a firm. The buyer has a willingness-to-pay of \$100 for the first firm's product, and a willingness-to-pay of \$150 for the second firm's product.⁸*

We know that a definition of value creation in this game should be couched in terms of willingness-to-pay and opportunity cost. There is no question as to what number to use for opportunity cost—a figure of \$10 is obviously appropriate. But there is a question as to which number to use for willingness-to-pay—\$100 or \$150? (It would clearly be incorrect to use both numbers, since the buyer is interested in transacting with one firm only.) The natural answer is that the \$150 figure should be chosen, since the arrangement in which the buyer transacts with the second firm (and the second firm transacts with either supplier) leads to the largest “pie.” The value created by the players in the game is then $\$150 - \$10 = \$140$.

More generally, value creation in games with many players is to be calculated using the willingness-to-pay and opportunity-cost numbers just as before, with the extra step that the calculation is to be done for flows of resources from suppliers to firms and of products from firms to buyers that lead to the largest answer.

7. The assumption that the buyer does not have access to the standard product is made solely for the purpose of defining willingness-to-pay. In the actual game, there are two firms offering two products, and the buyer does indeed have a choice as to which product to purchase. In general, the thought experiments involving buyers and suppliers are undertaken in order to define the “parameters” of the game; they do not describe how the game actually unfolds.

8. Naturally, willingness-to-pay and opportunity cost here are defined with respect to opportunities outside this five-player game.

5. VALUE APPROPRIATION WITH MANY PLAYERS

Having defined value creation for the case of several players at each stage of the vertical chain, we are now ready to ask: What determines how much of that value each player will appropriate?

As in Section 3, the answer is that bargaining determines the division of value. But there is now an important new dimension to the bargaining. In Section 3, bargaining was "one-on-one"—between supplier and firm and between firm and buyer. Now, with more players in the game, bargaining is typically "many-on-many." Firms will try to play one supplier off against another, buyers will try to do the same with firms, and so on. Where will this lead?

The answer is that, under an important assumption identified below, it must lead to a situation where each player captures an amount of value which is no greater than that player's "added value," defined as

added value of a player

= value created by all players

– value created by all other players.

That is, the added value of a player is equal to the value created by all the players in the vertical chain minus the value created by all the players in the vertical chain except the one in question.

To see why added value places an upper bound on the amount of value a player can appropriate, suppose to the contrary that some player were able to capture more value than this. Then the total amount of value captured by the remaining players would have to be less than the value created by those players.⁹ But this means that the remaining players would have missed out on a favorable deal that they could have struck among themselves. We rule out this last possibility by assumption, since we wish to capture the notion that players—suppliers, firms, and buyers—actively seek out any and all profitable opportunities.

To reinforce these ideas, consider again Example 1. The added value of each player is readily calculated. The added value of either supplier is \$0, as is that of the first firm. The second firm has an added value of \$50, and the buyer has an added value of \$140. The assertion is that bargaining between the players must lead to an outcome in

9. Note that the total amount of value captured by all the players—the one in question and the others—must sum to the overall value created. The assertion in the text follows from this fact together with the definition of added value.

which the suppliers and the first firm capture no value, the second firm captures some amount of value between \$0 and \$50, and the buyer captures the remainder (between \$140 and \$90). What rules out, say, the second firm's capturing \$55 of value? If it did, the remaining players (suppliers, first firm, and buyer) would be capturing in total \$85 ($= \$140 - \55). But the remaining players can create \$90 of value among themselves. So, irrespective of how the \$85 was being split among them, there would be a deal that these players could make among themselves which would lead to each of them capturing strictly more value than before. The assumption is that there are no unexploited opportunities of this sort.

That all favorable deals are identified and sought out by the players is obviously critical if added value is to play a central part in the analysis. We refer to this as the assumption of "unrestricted bargaining." And we make the assumption because it captures the active deal-seeking aspect of the marketplace.¹⁰

In general, the added-value measure provides a partial, rather than a complete, answer to the question of how value is divided. Witness the analysis of Example 1, where calculation of added values significantly narrowed down the range of possible outcomes, but did not dictate a unique split of the pie. In effect, the situation was reduced to one where the second firm and the buyer find themselves bargaining over a "residual" pie of \$50. How this will be split between the two players will depend on how tough a bargainer each player is (cf. the discussion at the end of Sec. 3).¹¹

Sometimes, though, knowing the players' added values is sufficient to pin down the exact division of value. This is so if the sum of the added values of all the players in the game equals the overall value created. In this case, the added-value measure gives exactly the amount of value each player captures.¹² Notice that this condition is not satisfied in Example 1: the sum of the players' added values is \$190 ($= \$50 + \140), which exceeds the overall value created of \$140.

Whether it gives part or all of the answer to the question of the division of value, added value is an important measure. It is an indica-

10. The possibility that there are "frictions" which prevent all favorable deals from being exploited is also very real. See Section 7.2 for further discussion of this point.

11. For the game of Section 2, with just one supplier, one firm, and one buyer, the added value of each player is equal to the overall value created by all the players in the chain. In this case, then, there is no narrowing down of outcomes at all. The "residual" bargaining problem is no different from the original bargaining problem.

12. To see why, suppose to the contrary that some player captured less value than this. Then, since the added values sum to the overall value created, there must be at least one other player capturing more. But this is impossible under unrestricted bargaining.

tor of a player's "chances" of capturing value. More precisely, under unrestricted bargaining, having a positive added value is a necessary (though not sufficient) condition for a player to appropriate a positive amount of value.

6. VALUE-BASED STRATEGIES

This section discusses ways in which a firm can try to capture value. Following the analysis of the previous section, achieving a positive added value is taken to be the path to value appropriation. Our approach accordingly has two steps. First, we establish a benchmark situation in which the firm has zero added value. Then, with this situation as a starting point, we discuss how the firm can achieve a positive added value.

The benchmark situation is one in which the firm has a large number of competitors that are "identical" to it. (Identical competitor means another firm that commands the same willingness-to-pay on the part of buyers and the same opportunity cost on the part of suppliers as does the firm in question.) Intuitively, we would not expect the firm to be able to capture any value in such circumstances. Analytically, this is a consequence of the firm's having a zero added value. The following stylized example makes the idea clear.

EXAMPLE 2: Consider a game between four suppliers, three firms, and two buyers. Each supplier can transact with at most one firm, and vice versa. Similarly, each buyer can transact with at most one firm, and vice versa. Each supplier has an opportunity cost of \$10 of providing resources to a firm. Each buyer has a willingness-to-pay of \$100 for a firm's product.

The value created by the players in this game is $\$(100 - 10) \times 2 = \180 . The added value of each supplier is \$0, as is that of each firm. It follows that none of these players captures any value. Each buyer has an added value of \$90. Since the sum of the players' added values equals the overall value created, each buyer must in fact capture \$90 of value. All this is very intuitive. The firms are on the long side of the market with buyers, and each therefore has zero added value. This is despite the fact that the firms are on the short side of the market with suppliers. The upshot is that having sufficiently many competitors to be on the long side of just one market (not both) is enough for a firm to have zero added value.

Given the benchmark, it is evident that for a firm to have a positive added value it must be "different" from its competitors. That is, it must enjoy a favorable asymmetry between itself and other firms.

In the following stylized example, a firm attains a positive added value as a result of enjoying a favorable asymmetry between itself and its competitors in terms of buyer willingness-to-pay.

EXAMPLE 3: Consider a game between four suppliers, three firms, and two buyers. Each supplier can transact with at most one firm, and vice versa. Similarly, each buyer can transact with at most one firm, and vice versa. Each supplier has an opportunity cost of \$10 of providing resources to a firm. Each buyer has a willingness-to-pay of \$100 for the product of the first or second firm, and a willingness-to-pay of \$150 for the product of the third firm.

The value created by the players in this game is $$(150 - 10) + $(100 - 10) = 230 . The added value of each supplier is \$0, as is that of the first and second firms. Accordingly, none of these players captures any value. The third firm has an added value of \$50, while each buyer has an added value of \$90. Since the sum of the players' added values equals the overall value created, the third firm and each of the buyers will capture their respective added values of \$50 and \$90. Notice, in particular, that the third firm is able to capture value by virtue of the asymmetry between it and its competitors.

In the preceding example, buyers have a higher willingness-to-pay for one firm's product than for other firms' offerings. Favorable asymmetries can also arise on the supplier side. Specifically, suppliers may have a lower opportunity cost of providing resources to one firm than of providing them to other firms. Notice that each of these asymmetries can come about in either of two ways. An asymmetry in willingness-to-pay may arise because the firm finds a way to raise the willingness-to-pay of buyers for its product. Or it may arise because buyers end up with a lower willingness-to-pay for other firms' products. A favorable asymmetry results in either case. Similarly, an asymmetry in opportunity cost may arise because the firm finds a way to lower the opportunity cost of suppliers of providing resources to it. Or it may arise because suppliers end up with a higher opportunity cost of providing resources to other firms. Again, a favorable asymmetry results in either case.

We call each of these routes to enjoying a favorable asymmetry a "value-based" strategy for the firm. The four value-based business strategies just identified are depicted in Figure 3.

We discuss each type of strategy in turn.

In the top left box is the strategy of raising the willingness-to-pay of buyers for the firm's product. This is the classic differentiation strategy. It involves the firm's finding ways to meet the needs of buyers better than do other firms. This strategy is well known and well understood, and so we do not dwell on it here.

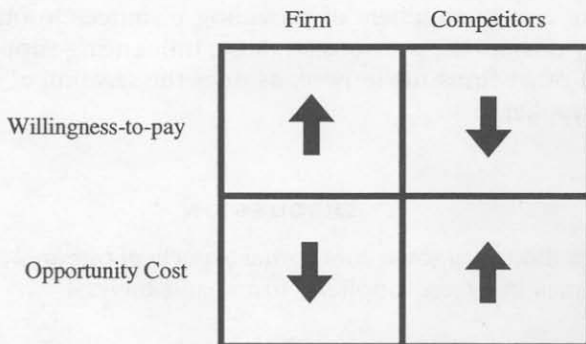


FIGURE 3

In the bottom left box is the strategy of lowering the opportunity cost to suppliers of providing resources to the firm. One way the firm can do this is by reducing a supplier's costs of doing business with it. This type of value-based strategy, the existence of which follows logically from our analytical approach, thus has close connections with the sorts of ideas that have been emphasized recently in writings on supplier relations (cf. the references cited in the Introduction). It is also closely related to the consulting prescription, currently in vogue, that firms should establish "value-managed partnerships" with their suppliers.

Other ways in which the firm can lower suppliers' opportunity costs are found in the area of human resource management. An example is offering employees nonsalary benefits which other firms cannot readily match.

In the top right box is the strategy of lowering the willingness-to-pay of buyers for other firms' products. In its most literal form, this strategy might include negative advertising ("bad-mouthing" competitors). A more subtle variant involves the creation of switching costs for buyers. These are present if existing buyers of a firm find buying from a competitor in the future less attractive than buying from the same firm again—say, because of retraining costs associated with switching to use of a competitor's product. This says exactly that buyers have a lower willingness-to-pay for the products of competitors than for those of the original firm.¹³

Finally, in the bottom right box is the strategy of raising the

13. The presence of switching costs raises additional issues. In particular, if buyers recognize that they will incur switching costs in the future, their original purchase decisions may be affected. See Klemperer (1987, 1990) for further analysis.

opportunity cost to suppliers of providing resources to other firms. This largely mirrors the previous strategy. Influencing suppliers' perceptions of other firms fits in here, as does the creation of switching costs for suppliers.

7. DISCUSSION

This section discusses some conceptual aspects of our analysis of bargaining games between suppliers, firms, and buyers.

7.1 UNRESTRICTED BARGAINING

Analysis of our supplier-firm-buyer bargaining games took place in two steps. First, the size of the overall pie was defined under an assumption of "maximal" flows of resources from suppliers to firms and of products from firms to buyers (Sec. 4). Then, possible divisions of the pie were delimited under an assumption of unrestricted bargaining (Sec. 5). From this it might appear that two separate principles—one of "maximal" flows and one of unrestricted bargaining—were at work. Alternatively expressed, the processes of value creation and value appropriation were treated as distinct in our analysis, and as occurring one before the other.

In fact, the assumption of "maximal" flows can be thought of as an implication of that of unrestricted bargaining. To see this, refer back to Example 1. There, the assertion that the buyer would transact with the second firm rather than with the first followed from the assumption of "maximal" flows. But the assertion also follows from the principle of unrestricted bargaining. Suppose that some deal were (tentatively) struck between the first firm and the buyer: then, regardless of the details of the deal, the second firm would be able profitably to tempt the buyer away. The reason is simply that the second firm and the buyer (together with a supplier) create \$140 of value, while the first firm and the buyer (again together with a supplier) can create only \$90 of value. So the second firm would be able both to offer the buyer a better deal and to capture some value itself.

Pursuing this line of argument leads to the realization that the two processes of value creation and value appropriation, while treated as distinct in this paper, are in fact intertwined. Both are expressions of the single underlying principle of unrestricted bargaining. The reason we did not develop the analysis from this principle alone is that the approach of first defining the size of the overall pie and then asking how it will be divided up is a more accessible one.

7.2 FRICTIONS

The concept of added value played a central role in our analysis because under unrestricted bargaining it places an upper bound on how much value a player can capture (Sec. 5). But, while the assumption of unrestricted bargaining is very natural and also establishes an important baseline, there are situations in which it is inappropriate.

Indeed, there are sometimes "frictions" in the marketplace that prevent every favorable deal from being sought out. That is, bargaining is restricted. If so, the added-value measure loses its special status. And some players may then be able to capture more than their added values.

Examples of this type of situation can be found in the area of market entry. Often, a potential entrant finds that it has an unfavorable asymmetry with respect to an incumbent (say, in terms of commanding a lower willingness-to-pay on the part of buyers). If, in addition, the incumbent has sufficient capacity to serve the entire market, the entrant will find itself with a zero added value. Nevertheless, entrants are sometimes able to enter and capture value in such situations. One way to do so, which has been dubbed the "judo economics" strategy (Gelman and Salop, 1983), is to choose a sufficiently small capacity that the incumbent decides to cede some buyers to the entrant to avoid getting drawn into a competition that would spoil the whole market. The analytical apparatus of this paper tells us that the judo economics strategy can succeed only if there is some friction in the market. Specifically, the incumbent must be unable to make different deals with different buyers—perhaps because of contractual arrangements with buyers,¹⁴ or for regulatory reasons, or because doing so is simply impractical.

The issue of frictions in the marketplace that serve to restrict bargaining seems deserving of further analysis.

7.3 BOUNDARIES OF THE GAME

At several points it has been necessary to distinguish between what is "inside" and what is "outside" the game. Thus Sections 2 and 4 emphasized that the willingness-to-pay of a buyer in the game or the opportunity cost of a supplier in the game is to be calculated with respect to opportunities outside the game. These latter opportunities include, as far as buyers are concerned, alternative products available outside the game or, as far as suppliers are concerned, alternative

14. Such as a "most-favored-nation" clause, which requires a firm to offer a buyer terms as favorable as those extended to any other buyer (Gelman and Salop, *op. cit.*).

uses of resources outside the game. That is, the definitions of willingness-to-pay and opportunity cost appealed, at least implicitly, to the existence of firms outside the game offering buyers and suppliers these alternative opportunities.

In all this, the question naturally arises: Does it matter where the boundary of the game is drawn—which players are designated as inside, which as outside? The hope is that it does not matter, in other words that the analysis is invariant to where the boundary is drawn. This is indeed the case, although some care is needed in framing an exact statement of invariance. A rough statement follows. Start with some choice of boundary—certain players inside, others outside. Next, choose a particular solution, along the lines of the analysis of Section 5, to the bargaining problem between the players inside the game. Next, redraw the boundary of the game in some fashion so that certain players that were previously inside the game are now outside. Focus on the players remaining inside the game. The conclusion is that assigning each of these players the amount of value that player captured under the chosen solution to the original bargaining problem constitutes a solution to the bargaining problem between these remaining players.¹⁵

7.4 SHAREHOLDER VALUE MAXIMIZATION

It is frequently suggested that the appropriate corporate objective is shareholder value maximization. The objective imputed to the firm in this paper is maximal value appropriation, with value defined as in Sections 2 and 4. Which, then, is the correct objective?

The answer depends on the perspective adopted. If the firm is thought of as an "entrepreneurial" endeavor, the second objective is the more meaningful one. In this case, shareholders are viewed as suppliers (of capital), and payments to them should be treated as deductions from the residual value accruing to entrepreneurship. If, on the other hand, the firm is viewed as the vehicle of shareholder-owners, the first objective comes into play. But, in fact, the two objectives can be made to coincide in this case, provided the second is somewhat modified. Specifically, payments to shareholders should no longer be treated as deductions from firm value appropriation, but

15. Technical note: This is a (rough) statement of "consistency" of the solution to the bargaining problem. As will be discussed in Section 8, the formal solution concept underlying the analysis of this paper is that of the core of a TU ("transferable utility") game in characteristic function form. The appropriate consistency property was established by Aumann and Dreze (1974).

the opportunity cost of the shareholders' capital should be deducted.¹⁶

8. RELATED LITERATURE

This section reviews related literature and identifies the intellectual roots of this paper.

We have followed Porter (1980) in analyzing the firm as a "conduit" between owners of resources and buyers of products and services. Porter's notion of a "generic" strategy is also relevant to this paper. Porter recognizes that while firms' strategies may differ greatly in their details, any such strategy can usefully be thought of as belonging to one or another of a small number of categories of "generic" strategy. The value-based strategies identified in this paper are generic strategies in Porter's sense. The benefits of analysis that abstracts from the fine detail of supplier-firm-buyer interactions are further spelled out below.

The notion of added value, which was central to this paper, also appears in Davis and Kay (1990). They seek to construct an indicator of corporate performance that "measures the net value which is contributed to the economy by the existence of the firm" (op. cit., p. 10). Davis and Kay propose the term "added value" for such a measure, and our use of the term is consistent with this.¹⁷

As indicated in the Introduction, much recent work on providing economic foundations for business strategy has employed the paradigm of industrial organization (IO) economics. And the analytical tool that has come to be used most often in IO is noncooperative game theory, which is a formal apparatus for studying strategic interaction. Use of a particular noncooperative game model does, however, require the specification of a complete "protocol"¹⁸ for the situation in question. Exact assumptions have to be made as to when different players get to move, what information they have at their disposal

16. There is a potential further complication in this case. It has been pointed out in a number of papers that if the information available to a firm's managers and owners differs, shareholder value maximization may not lead to maximal value appropriation. See, for example, Brandenburger and Polak (1992) and the references cited there.

17. In their operational definition of added value, Davis and Kay include an estimate of the opportunity cost of the capital employed by the firm. But, perhaps for reasons of tractability, they use the firm's actual outlays on labor and other inputs rather than the opportunity costs of the suppliers of those inputs. Likewise, they use the firm's actual revenues rather than the willingness-to-pay of buyers. Hence their estimates of added value are likely to understate the true numbers.

18. In the terminology of Kreps (1990, p. 92).

when they do move, and so on.¹⁹ Situations that come with a natural protocol of this type are well suited to noncooperative analysis; other situations are not. Those studied in this paper, which involve free-form, active deal-seeking behavior by players, are of the latter variety.

Accordingly, this paper finds its intellectual roots elsewhere, in cooperative game theory. Aumann (1987, p. 463) supplies a useful definition: "Cooperative theory starts out with a formalization of games . . . that abstracts away altogether from procedures. . . . It concentrates, instead, on the possibilities for agreement." The specific analytical tool underlying our approach is the "core," a central concept of cooperative game theory that expresses mathematically the idea of unrestricted bargaining (cf. Sec. 5).²⁰

Our application of cooperative game theory has an extensive pedigree. Edgeworth's 1881 study of how prices can be thought of as emerging from bargaining between market participants rests—at least implicitly—on the idea of the core. Von Neumann and Morgenstern (1944) devoted a substantial part of their book to the development of cooperative game theory, and worked through a number of examples in monopoly and oligopoly using cooperative theory. They also expressed the hope that a general theory of competition could be built along such lines. More recently, Shapley and Shubik have written extensively on cooperative analysis of market interactions [see Shubik (1982, 1984) and the references cited there].²¹

The field of business strategy has long relied on the use of frameworks rather than more formal modes of analysis. As Porter (1991, pp. 97–98) discusses, this reflects, at least in part, a desire to develop a general theory of strategy freed from the constraints of excessive

19. The procedural specificity demanded by noncooperative techniques has been commented on by several people. Aumann (1987, p. 463) observes that "the results of a non-cooperative analysis depend very strongly on the precise form of the procedures." Kreps (1990, p. 94) notes that "[noncooperative] game-theoretic techniques require clear and distinct 'rules of the game'." And Camerer (1991, p. 137) warns that application of noncooperative game theory to business strategy "generates customized models of local settings rather than general regularities." Sutton (1991), also mindful of the sensitive dependence of noncooperative analyses on the game specification, identifies regularities which hold across a broad range of games. He goes on to conduct empirical tests of these regularities.

20. Technical note: We have made use of certain defining conditions of the core of a TU game in characteristic function form. For mathematical details see, for example, Owen (1982, Ch. VIII). It is possible to identify a (significant) class of supplier-firm-buyer games, which includes Examples 1 through 3 in this paper, for which the core is always nonempty. (The proof is an extension of the argument showing that the "assignment" game always has a nonempty core. On the latter see Owen, *op. cit.*, pp. 153–155.) Nonemptiness of the core ensures that there is a well-defined solution to the bargaining problem.

21. We should also mention McDonald (1975), who uses game theory, cooperative game theory in particular, to illuminate a number of business episodes.

specificity. In this light, it is perhaps no surprise that cooperative game theory turns out to be an appropriate tool for studying business strategy.

In economics, the work of Makowski and Ostroy was an important influence on this paper. [See, for example, Ostroy (1980), Makowski (1980), and Makowski and Ostroy (1991).] Makowski and Ostroy place bargaining at the center stage of market interactions. They also offer "numbers-free" definitions of perfect and imperfect competition that are closely related to ideas in this paper. Recall from Section 5 that if the sum of the players' added values equals the overall value created, the bargaining problem becomes completely determinate. Makowski and Ostroy would term this a perfectly competitive situation. An imperfectly competitive situation, by contrast, is one in which the sum of the players' added values exceeds the overall value created; often, the bargaining problem is then indeterminate. Notice that with Makowski's and Ostroy's terminology, Example 1 in the paper exhibits imperfect competition, while Examples 2 and 3 exhibit perfect competition.²²

9. CONCLUSION

This paper has provided exact definitions of (1) the value created by vertical chains of suppliers, firms, and buyers, and (2) the added value of a particular player in such a vertical chain. It was shown that, under conditions of unrestricted bargaining, the added-value measure imposes an upper bound on how much value a particular player can capture.

Focusing on firms, the key to a firm's achieving a positive added value was seen to be the existence of a favorable asymmetry between the firm and its competitors. Four routes (value-based strategies) that lead to the creation of such asymmetries were identified.

The underpinnings of what we have done in this paper come from cooperative game theory, which we believe provides a natural foundation for the analysis of business strategy.

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22. The sum of the players' added values cannot be less than the overall value created if the core is nonempty. This follows from the fact that added value places an upper bound on how much value a player can capture. Cf. footnote 20.

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