

Ownership and control rights in Internet portal alliances, 1995-1999

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This paper examines the structure of more than 100 alliances by Internet portals and other firms between 1995 to 1999 from a contract theory perspective. Models of incomplete contracts frequently invoke unforeseen contingencies, the cost of writing contracts, and the cost of enforcing contracts in justifying the assumption of incompleteness. The setting in which Internet portals formed alliances was rife with these sorts of transaction costs. We argue that these alliances can be viewed as incomplete contracts and find that the division of ownership and the allocation of control rights are consistent with the incomplete contracting literature.

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We thank Mark Edwards of Recombinant Capital and Seth Segel of Media Metrix for access to their organizations' data and a number of practitioners for helpful discussions. Drew Fudenberg, Robert Gibbons, Richard Gilbert, Oliver Hart, Dale Jorgenson, Ariel Pakes, Robert Porter (Editor), Jean Tirole, two anonymous referees, and seminar participants at Berkeley, Columbia, Harvard, the National University of Singapore, Ohio State, the University of Southern California, and the January 2001 IDEI conference on the Economics of Software and the Internet provided helpful comments. Harvard Business School's Division of Research provided financial support.

1. Introduction

The theory of incomplete contracts is central to the modern theory of the firm. This perspective has generated powerful insights about the boundaries of organizations, the organization of activities within a firm, and about the design of relationships between firms (Hart, 1995; Aghion and Tirole, 1997; Hart and Moore, 1999). In this paper, we look for support for predictions of two incomplete contract models. The first is the standard Grossman-Hart-Moore property rights framework, which predicts that assets in a bilateral relationship should be owned by the party whose marginal effort has the greatest impact on project success. The second is Aghion and Tirole's (1994) model of contracting for innovations, which suggests that in addition to these concerns, relative bargaining power is an important determinant of the allocation of property rights.

Our analysis tests these predictions in a relatively new contracting setting. We examine alliances entered into by Internet portals from 1995 through 1999. As Tirole (1999) points out, theorists who develop incomplete contract models generally justify the assumption that contracts are incomplete by invoking unforeseen contingencies, the cost of writing contracts, and the cost of enforcing contracts. In the Internet environment, the turbulence of the competitive landscape, the uncertainty about the future value of decisions, the perceived need for speed in decision-making, and the existence of new but poorly understood measures of performance and effort correspond well with the assumptions that lead theorists to build incomplete contracting models. This provides a strong rationale for viewing these transactions through an incomplete contracting lens.

Using this theoretical lens, we examine a set of over 100 alliance contracts between Internet portals and other firms. Although we extensively analyze a large number of features of these agreements in a separate paper (Elfenbein and Lerner, 2002), we restrict our analysis here to the issues suggested by viewing these agreements as incomplete contracts.

We find that the structure of the alliance contracts provides significant support for the predictions of incomplete contract theories. In our analysis, two major conclusions emerged:

- The division of ownership displayed a pattern consistent with the predictions of the incomplete contracting literature, such as Grossman and Hart (1986). The ownership of critical elements such as the web site address and the customer data was typically assigned to the party whose effort was most critical to the success of the agreement.
- The allocation of control rights appeared most sensitive to the bargaining power of the two contracting parties. The theoretical literature often does not make a clear distinction between the division of ownership and control. In the portal agreements, however, control was assigned in a somewhat different manner than ownership: most critical appears to be the relative financial and product market strength of the two parties. This division of control was consistent with Aghion and Tirole (1994).

The plan of this paper is as follows. In Section 2, we examine the causes and consequences of contractual incompleteness, paying particular attention to the theoretical models that we will test. Section 3 discusses portal alliances and aspects of the contracting environment that lead us to believe that the incomplete contracting perspective is relevant to their analysis. In Section 4, we describe the creation of the data set. Section 5 presents the analysis, and Section 6 concludes.

2. Contractual incompleteness and its consequences

Formal—*i.e.*, written—contracts form the basis for many business relationships. Contracts frequently define the quality, quantity, and timing of a good or service to be exchanged between two parties, specific investments to be made to support the delivery of these goods and services, and the

distribution of gains from the transaction. Furthermore, contracts frequently specify penalties if specific commitments are breached.

Information conditions, however, constrain the design of contracts. Some actions may be neither observable nor verifiable, making contractual terms that specify them unenforceable. Under these conditions, it may not be possible to design a contract that elicits the optimal behavior from the contracting parties based only upon observable and verifiable variables. Contracts are then said to be incomplete. The actual information conditions that preclude writing complete contracts based on observable measures is a matter of some theoretical debate. As Tirole (1999) notes, the assumption of contractual incompleteness is generally accompanied by an invocation of transaction costs, specifically unforeseen contingencies, the cost of writing contracts, and the cost of enforcing contracts. In particular, Tirole emphasizes how the indescribability of future contingencies can introduce information problems and can make it impossible to write an *ex ante* contract based on observable measures that correctly represents the parties' *ex ante* preferences.

Beginning with Grossman and Hart (1986) and Hart and Moore (1988), numerous contracting models consider settings in which the inability to observe effort and enforce agreements creates severe problems.¹ This approach has come to be known as the property rights approach. In the property rights setting, one or both parties make a relationship-specific investment in assets that are critical to the production process. These assets could be machines, land, software, patents, copyrights, or any other relationship-specific, but alienable, property. Ownership of the assets confers upon the owning party residual rights of control over the assets, *i.e.*, ownership confers decision rights over all uses of the assets that are not specified in the contract or that are not enforceable by a court. The owner of the assets gains bargaining power from asset ownership that enables him to appropriate a majority of the surplus that results from the project. When allocated efficiently, the incentives provided by ownership will induce the owning party to make decisions that maximize—or come close to maximizing—the returns from the

project. This conclusion is quite different from that of traditional studies of interactions between principals and agents (e.g., Holmström, 1979), which generally conclude that the incentives offered the contracting parties (cash flow rights) are critical, but not the allocation of ownership rights.

The *ex ante* allocation of ownership, then, with its accompanying residual rights of control over the productive asset, is performed to maximize the *ex post* gains from trade. It is possible, however, to restrict the set of residual control rights granted to the asset owner by including a number of *specified* control rights in the contract. Specified control rights have garnered little attention in the literature, but are commonly used in practice. Specified control rights may take many forms, including restrictions on the nature of investments into the productive asset and restrictions on how the asset can be used once investments have been sunk.² Specified control rights place boundaries on the set of decisions that contracting parties can make and thus serve a similar role to ownership in the property rights approach in creating incentives. Empirical analyses of contracting should, therefore, analyze the allocation of specified control rights in addition to ownership.

Under certain circumstances, *ex ante* allocation of ownership and specified control rights may not maximize *ex post* surplus. Aghion and Tirole (1994) analyze one such circumstance. They analyze an R&D alliance between a research unit and a customer in which liquidity constraints can prevent the ownership of an innovation from being allocated efficiently. In their basic model, the authors assume that the research unit is without financial resources of its own, cannot borrow any funds, and has no ability to commercialize the innovation itself. As a result, it turns for financing to a customer, a firm that cannot make the discovery independently. The success of the research project is an increasing function, though at a decelerating rate, of both the effort provided by the research unit and the resources provided by the customer. Developing a contract between the two parties is challenging. While the ownership of the product can be specified in an enforceable contract, and the resources provided by the customer may also be so specified, uncertainty precludes writing a contract for the delivery of a specific innovation.

Similarly, an enforceable contract cannot be written that specifies the level of effort that the research unit will provide.

Aghion and Tirole consider two polar cases: when the research unit has the *ex ante* bargaining power³, and when the customer does. When the research unit has the bargaining power, the ownership of the research output will be efficiently allocated. If the marginal impact of the research unit's effort on the innovative output is greater than the marginal impact of the customer's investment, then the research unit will receive the property rights. If not, the research unit will transfer ownership to the customer in exchange for a cash payment. This result is similar to that of Grossman and Hart (1986).

When the customer has the bargaining power, however, a different pattern emerges. If it is optimal for the customer to own the project, it will retain the project. If, however, it would maximize innovation for the property rights to be transferred to the research unit, the surplus-maximizing outcome will not be achieved. In particular, the customer will be willing to transfer ownership, but the cash-constrained research unit will not have enough resources to compensate the customer. As a result, an inefficient allocation of the property rights occurs, with the customer retaining the rights to the invention. The key insight for this paper from the Aghion and Tirole model is that the division of assets and specified control rights may be responsive to a concern other than those that maximize joint surplus, namely relative bargaining power.

3. Portal alliances and the contracting environment

The first portals—which we define as Internet sites that provide (directly or indirectly) a broad array of services and linkages to users—began operations in 1994, shortly after the introduction of the World Wide Web and the widespread diffusion of the Internet browser. Many of these sites, such as Yahoo!, originated as classified collections of links to other web sites. Others, such as Lycos, began as

search engines, enabling users to locate web sites on certain topics or featuring specific phrases. While many portals were new entrants, others had previously operated proprietary on-line services (for instance, America Online). Although subscribers to these proprietary services initially had access only to the features developed for the service itself, these firms increasingly began providing Internet access and created portals of their own. Finally, producers of browser software developed portals to take advantage of their products' placement on the typical computer's desktop.

Beginning in 1997, portals began adding a broad array of materials to their sites. These included content, such as stock prices and news headlines, as well as services, such as on-line auctions and personal e-mail. Portals generated revenues principally through the sale of banner advertisements and alliance partnerships. In addition to the direct compensation that portals received for the advertisements, promotions, and other services they provided to alliance partners, alliances also benefited portals by increasing the appeal of the portal's site by deepening its content and extending its features. These new features, which the portal had neither the time nor skills to develop itself, could attract new users and could also encourage more frequent or longer visits by existing users, thereby providing more opportunities to display ads.⁴

Alliances were also useful for the partner firms, whether they were content, service, or technology providers. Many Internet sites struggled during this period to acquire a sufficient user base. In many segments of the Internet industry, analysts predicted that there would be a substantial shake-out, in which only one or two leading firms would survive and emerge as profitable. Portal alliances were one method of attracting users. In addition, alliances enabled partners to rapidly test their business models and to acquire customer data. Furthermore, signing an alliance with a leading portal firm offered an important signal of quality for financiers, especially venture capitalists. Even if they were executed on relatively unattractive terms, alliances could thus be beneficial for the partners as well as for the portals.

Alliance contracts were negotiated against the backdrop of a highly uncertain and volatile environment. Although projected to grow exponentially, the volume of demand for on-line goods and services and the exact nature of this demand were highly uncertain. During this period, pundits coined the phrase “Internet time” and stressed speedy decision making; this suggests that the opportunity cost of bargaining over additional contractual provisions may have been high. Furthermore, although portal alliances were considered by many to be essential to survival in the on-line environment, the value of the agreements themselves was highly uncertain and was a subject for debate among contemporaneous observers. This uncertainty surrounding the development of the Internet industry evokes the unforeseen, indescribable contingencies behind the assumptions used to justify incomplete contracting models.

Portal alliances as incomplete contracts

The property-rights approach maps relatively neatly onto the setting of portal alliances. Contracts between the portal and its partner specified actions or relationship-specific investments that were intended to generate commercial value for both firms. Types of specific investments included custom software, tailored content, a promotion campaign, or a co-branded website for the portals’ users. These investments frequently created tangible assets, for example, the software code that generated the co-branded site, the copyrighted content that users read, or the infrastructure that delivered products or services to customers.

Three types of assets were common to the majority of the alliance contracts: the servers used by the alliance, the uniform resource locator (or URL), and the customer data. These assets provided good proxies for the assets created for the alliance. For example, ownership of the servers on which the alliance technology was hosted provided the owner with considerable residual control rights over the technology itself. Ownership of the URL enabled the owner to record credit for traffic on his site⁵ and also to re-direct the site traffic to another location if the relationship ended or broke down. Ownership of customer data enabled the owner to control the customer relationship, which the owner could continue to

profit from after the alliance broke down, by continuing to market directly to these customers or by selling their customer list. While it is conceivable that contracts could have specified many of the potential decision rights regarding these assets *ex ante*, it seems unlikely that all possible future decisions could be specified in a contract, especially given the commercial uncertainty in the Internet arena. As long as some decision rights over the assets were not specified in the contract, ownership provided incentives for the owning party to invest in the relationship, because he would retain the assets if the relationship broke down.⁶

Ownership of the alliance assets would not provide important incentives for the alliance parties if all investment and effort decisions could be specified in a contract and verified by a court. They would also not be particularly interesting if parties' non-contractible effort decisions had little impact on the value of the alliance. Our examination of the portal alliance contracts and discussions with alliance managers at several major portals lead us to believe that both parties' effort decisions were likely to impact the value of the alliances and that many of these effort decisions were non-contractible.

There were several ways in which the effort decisions made by portals could influence the value of the agreement for one or both parties. In many cases specifying these effort decisions in a contract was difficult, if not impossible. Three examples are provided below:

- Portals' ongoing efforts to upgrade and expand their sites could change the value of an agreement for the partner. A telling example involves an alliance partner that purchased a position of prominence on the health content area of a major portal. Subsequently, this portal designed a new content area focused on the health needs of the elderly which, presumably, would take some traffic away from the main health area. In the end, the portal offered the alliance partner a right of first refusal for prominent ads on this new area and a half-price rate for the first six months; but this was an unanticipated expenditure for the alliance partner.

- Portals could affect alliance performance by using individual customer information and data about aggregate behavior patterns. Sophisticated portals possessed technology that enabled them to direct traffic towards certain alliance partners and not others. This technology allowed the portal to change the position of links and banner ads depending on what information it had about the individual user (and based on its overall information about traffic patterns and usage). For example, a user who typically searched for music information could be presented with ads for music-related web sites, even if he were browsing the portal's health information.
- Portals' internal operations were typically organized by content area—such as sports, finance, or health—which were managed by one or two individuals. These managers made decisions about the design of their content area and had editorial discretion over the placement of banner advertisements and links. They also made daily decisions about how partner content was incorporated into the site.

Although it seems possible, in theory, to contractually specify several of portals' effort decisions, our observations of the contracts themselves suggest that efforts to do so were limited. Some contracts did specify the position of links on a web page, limited the total number of advertisements on a page, and imposed restrictions on the placement of links with respect to competitors' links. Such provisions, however, were present only in a small minority of contracts. These and other more thorough attempts to specify portals' effort decisions contractually were likely limited by monitoring and enforcement issues.

Partner firms' effort decisions, too, could impact the performance of the alliance, and many of these decisions also were not fully contractible. In many alliances, the quality of the partner's technology or co-branded website might be particularly difficult to specify. In content agreements, partner firms controlled the frequency and quality of updates. In integrated technology or service agreements, uptime and reliability were major issues. If partners did not invest sufficiently in servers to host the alliance technology, performance would suffer. In sales agreements, the speed of order fulfillment, customer service response times, and other factors could greatly affect the user's experience. In some cases,

contracts provided for renegotiation or termination of the alliance if the partner firm were not among the top three to five websites in its category (as measured by an independent auditor). Some attempts to contract on technical performance measures of the alliance partner were made, but again, contracting on these technical performance measures was rare and not uniformly applied.

Finally, in many alliances both parties had opportunities to behave opportunistically in competing for customers. Portals would gain more if users were returned to the portals' sites and, when the two parties shared the proceeds of product sales, if repeat purchases were made through the alliance site rather than through the partner site. Partners, on the other hand, would benefit if returning users would bypass the portal site and access them directly. Occasionally, some of these issues were addressed directly in the contract. For example, nearly 40 percent of the contracts included some provision relating to return traffic,⁷ but in many cases the parties found it too difficult or costly to negotiate and enforce such terms in their agreement.

In summary, the effort decisions of both parties were likely to have a substantial impact on the value of the alliances. Many of these effort decisions were not included in the alliance contracts themselves, either because they were actually non-contractible or because the parties simply neglected to include them.⁸ Thus, in the absence of the ability to write complete contracts based on performance and effort, asset ownership likely provided important incentives to the contracting parties.

In addition to asset ownership, which provides residual control rights, we examine *specified* control rights in our analysis. We feel that this is justified for two reasons. First, specified control rights are important in the design of portal alliances. Second, as discussed in section 2, specified control rights narrow the scope of residual control rights. In this sense, they act in a similar manner to asset ownership—they restrict what the other party can do with the relationship specific assets. Because specified control rights act as restrictions on residual control rights (as does ownership in property rights

theory), we feel justified in examining control rights through the lens of models that emphasize ownership.

4. Data Set

To undertake the analysis, we identified a set of 106 contracts between portals and other firms entered into between 1995 and 1999. These contracts were identified primarily from Recap/IT, a consulting firm that maintains a database of contracts involving Internet, technology, and telecommunications firms. Publicly traded Internet firms, like other concerns, are required by the U.S. Securities and Exchange Commission (SEC) to file material documents. Internet companies tend to interpret this requirement conservatively, and often file alliance contracts. Recap/IT identifies alliances from press releases, analyst reports, and reviews of SEC filings. Their database includes links to the filings of these firms detailing each agreement. A random sample of contracts from this database was chosen. We reviewed these documents carefully to identify the key features of these agreements.

Supplemental financial information was gathered from Compustat and Worldscope on the financial position of the contracting firms in the quarter prior to the signing of the contract. Information about the contracting parties' web traffic, including the reach of the websites⁹, the number of days per visitor per month, and the number of minutes per visitor per month were collected from Media Metrix for the month in which the agreement was signed. A more detailed discussion of data collection process is provided in Elfenbein and Lerner (2002).

Table 1 summarizes the sample of agreements used in this analysis. In Panel A, the date of the agreements is tabulated. The agreements were concentrated in the second half of the period under study. This reflected the acceleration in the level of Internet activity during the last half of the 1990s.

Panel B summarizes the relative effort required in the alliance. We examined five activities that frequently were required after the agreement was signed: the development of material for the site (whether content, services, or technology), the maintenance and hosting of the site, the provision of customer service, order fulfillment, and billing. We coded these as +1 if the portal was required to make the greater effort on this dimension, -1 if the partner was required to do so, and 0 if the effort was jointly shared or not required by the agreement. While the sum of these five effort measures ranged from +5 to -5, in most cases, the bulk of the post-agreement effort was required of the partner.

Panel C presents the traffic on Internet sites of the two parties in the month before the signing of the agreement. In making these calculations, we compiled all properties owned by the contracting firm: for instance, the usage data for an alliance signed by Disney in 1999 would include information about visits to ABC.com. Not surprisingly, portals' sites were visited by more users, more frequently, and for longer than partners' sites.

Panel D considers the relative financial health of the two parties. There was a great deal of variation, which reflected the fact that we examined the financial health of the entire corporate entity if it had 100% ownership of the contracting firm. For instance, in a transaction involving Snap.com, the financial information of its parent, General Electric, was recorded. The relationship between selected contract provisions is presented in Table S1 of the online supplement.¹⁰

5. Analysis

In the analyses, we tested the predictions of the property rights theory and of Aghion and Tirole (1994) by examining the relationship between contractual allocation of effort, ownership, control, and the financial and product market strength of the two parties. For each observation we focused on four independent variables: the date of the agreement, the relative effort required of the two parties, the

relative traffic on the two parties' Internet sites (as measured through the sites' reach), and the relative financial strength of the contracting parties (as measured through revenues in the prior four quarters). To construct the measures of relative bargaining power, we divided the sample into three groups: the observations in which the portal was visited at least three times more often or had three times greater revenues than the partner, those where this held for the partner, and intermediate cases.¹¹ This approach was taken because it was unclear that a distinction between a portal that was visited five times more frequently (or had five times more sales) than the partner and one that was visited ten times more frequently (or had ten times more sales) was very meaningful. In the cases where site visitation (or revenue) data were missing, we assumed that the other party had greater reach (or revenues). We corroborated this assumption by examining the reported site visits (or revenues) once the partner began to be reported by Media Metrix (or revealed its financial position in later SEC filings).

One potential problem that the analysis faced was non-independence of the observations. In particular, a number of portals appeared frequently in the sample. While the alliance agreements of the portals were certainly not identical, we suspected that there might have been common elements across the agreements of each portal. In the regression analyses, we addressed this concern by calculating heteroskedastic-corrected standard errors (grouped by each major portal) where permitted. We also included dummy variables in many regressions for each of the seven portals most frequently represented in the sample (America Online, Excite, iVillage, Lycos, Microsoft Network, Netscape, and Yahoo!) to control for the presence of portal-specific effects.

A second issue, namely signaling, could present a problem for our analysis if it systematically affected the structure of the contracts in our sample. Over this period, investors typically responded favorably to the announcement of alliances. Although signing a new alliance might be used as a signaling device by the partner to boost its stock market valuation, it is not clear that particular allocations of ownership and control rights would change the value of the signal. If the partner was interested in

signaling its quality to the market, announcing a contract that had a large payment associated with it would be likely be more effective than sacrificing ownership or control rights, which would be more difficult for financial markets to interpret. We believe, therefore, that while signaling may have motivated the formation of some of the alliances in our sample, it is unlikely to introduce a systematic bias into our analysis.

Ownership

We began by considering the ownership of the agreement. Ownership, a critical concept in the theoretical depictions of incomplete contracting discussed above, was manifested in three ways across the alliances. Each of the three types of assets described in Section 3—URLs, servers, and customer data—were examined. For each asset, we coded the variable as +1 if ownership was assigned to the portal, -1 if assigned to the partner, and 0 if there was joint ownership or the ownership provision was not applicable.¹²

Table 2 analyzes the allocation of ownership. A seemingly unrelated regression (SUR) employing an ordered logit specification enabled us to look at the determinants of ownership of the individual assets. Ownership did not display a significant pattern across time, nor did it display a consistent relationship with the relative traffic or revenues of the two parties. Asset ownership was, however, highly sensitive to who provided the greatest effort in the alliance. In the basic specification, coefficients on effort in each of the three SUR equations are significant at the $p < .05$ level, and the coefficients are jointly significant at the $p < .01$ level. In addition to statistical significance, the results suggest that relative effort is an economically meaningful determinant of ownership structure as well. At the mean of the independent variables, a one standard deviation change in relative effort changed the allocation of the URL from 0 to +1 and the allocation of the servers from -1 to 0. In a second specification, controlling for deal type, the allocation of ownership of servers and customer data remained

highly sensitive ($p < .01$) to the effort required by the contract, and the allocation of the URL was nearly significant in a two-sided test ($p = .12$). Overall, the division of ownership was quite consistent with the predictions in incomplete contracting literature, such as Grossman and Hart (1986).

We report only the results of the seemingly unrelated regression analysis. Univariate analyses are displayed in Table S2 of the online supplement, and several specifications of ordered logit regressions using the sum of the three ownership provisions as the dependent variable are displayed in Table S3 and S4. These regressions investigated alternative measures of relative financial strength and relative product market strength, as well as attempting to control for portal effects and the different types of technology embodied by the alliance. The basic result—that asset ownership is positively related to the relative effort of the two parties—holds throughout each of these analyses. A more detailed explanation of each analysis can be found in the online supplement.

Control

We then identified twelve major aspects of the governance of the agreements that were common to the set of agreements we analyzed. The first set were control rights that could be assigned to either party (at least in theory). First, the lines-of-business that one of the parties could engage in were sometimes restricted. One of the parties may have reserved the right to approve all content that the other prepared as part of the agreement, to post a set of standards to which the other party had to conform, or to determine the “look and feel” of the site. One of the parties may have been required to mention the other (or the co-branded pages) in any advertising of its own web site or to submit all advertising to the other party for approval. These provisions were coded as +1 if this provision favored the portal, -1 if it favored the partner, and 0 if neutral.

The second set of control rights specifically limited the activities of the partner. Several of these sought to insure that portal's users would have minimal disruption when visiting the site: the partner may have been required to optimize the site for viewing by a certain browser, to use a certain software package in the construction of the site, to employ certain navigation devices (e.g., frames), and to make a "good faith" effort to return visitors back to the portal. Finally, in some cases, the portal either made an equity investment in the partner or reserved the right to attend its board meetings. These rights were coded as +1 if present and 0 if absent.

Table 3 examines the determinants of the individual control provisions described above. In this case, a SUR using an ordered logit specification could not be run using all twelve control provisions simultaneously, because the independent variables in some regressions perfectly predicted some of the dependent variables. Instead, Table 3 displays the results of a SUR using a linear probability model.¹³ In these regressions, the coefficients on the year of the agreement are jointly significant at the $p < .05$ level; half of the observed coefficients are positive and half are negative, however, so it is difficult to draw any overall conclusion about how the timing of the contract might have affected the allocation of control rights. Likewise, the coefficients on relative effort are jointly significant at the $p < .1$ level, but they are evenly split between positive and negative signs.

Five of the twelve control provisions seem sensitive to measures of relative bargaining power¹⁴: restrictions on the partner's line of business, requirements to conform to posted standards, determining the "look and feel" of the site, optimization of the site for a particular browser client, and efforts to return traffic to the portal site. Two additional control provisions—requirements to mention the portal in the partner's off-line advertising and requirements to use certain software—exhibit moderate sensitivity (significance of a one-sided test at $p < .1$) to relative sales.¹⁵ Together, the coefficients on relative sales are jointly significant at the $p < .05$ level. Consistent with theoretical suggestions, the signs of the statistically significant coefficients are overwhelmingly positive: cases where the portal has more

bargaining power are associated with more restrictions on the partner. (For the regression on the determination of “look and feel,” however, the coefficient on relative sales is negative and significant.) In an unreported regression, we included dummy variables for deal type in the SUR equations; relative sales remained significant at the $p < .05$ level. Overall, the SUR analysis suggests that the relative bargaining power of the contracting parties is an important determinant of some—though not all—of the control provisions.

We were also interested in exploring how bargaining power affected the overall assignment of control rights. Unfortunately, we did not have enough information about the parties’ preferences to construct a precise measure of control rights that would account for the importance that each provision has to the contracting parties. Instead, we examined the simplest possible aggregate measure of control rights: the sum of each of the twelve individual provisions. In Table S6 of the supplement, we display the results of an ordered logit specification using the sum of the twelve individual control rights as the dependent variable. Neither the year nor the relative effort of the two parties were significantly related to the dependent variable. Each of the specifications we employed suggested, however, that the allocation of control rights was sensitive to the relative bargaining power of the parties. The measure of the relative visitations to the two parties’ sites remained significant whether we used the simple three-category approach discussed in the introduction to this section or more complex measures. The results were significant economically. At the mean of the other independent variables, a shift from the partner having a greater reach than the portal to an even division changed the predicted division of control rights from being on a borderline between an even division and +1 to having one control right assigned to the portal. When the portal had the greater reach, the predicted allocation of control rights was +2. This is consistent with Aghion and Tirole (1994)’s theoretical depiction of the research alliance, although that model does not draw a sharp distinction between ownership and control rights. The pattern was also consistent with the biotechnology alliances analyzed by Lerner and Merges (1998).

Bargaining power is not the only explanation for the division of control rights that is observed in the sample. One alternative explanation is that control rights are introduced into a contract to mitigate franchise risk. Many alliances may entail significant franchise risk: poor performance or even non-performance by one party may reduce the value of the other's brand. In this way, franchise risk would enter into the firm's profit function and would be addressed explicitly in the bargaining process. If reach is good proxy for brand strength, then it might be efficient for more control rights to be allocated to the party with more at stake. Because some of the control provisions are more likely to mitigate franchise risk than others, the data set does give us some ability to distinguish between the two theories. Three provisions seemed most likely to mitigate franchise risk: approving the other party's content, requiring the other party to conform to certain standards, and determining the "look and feel" of the site, corresponding to regressions B, C, and D in Table 3, respectively. As the estimated coefficients show, it is by no means clear that having more users increases the likelihood that these provisions would be allocated to one party or another. This analysis suggests that franchise risk is unlikely to be driving the results of the allocation of control rights.

In addition to inspecting Table 3, we also addressed the question of franchise risk by analyzing two alternative composite measures of control as the dependent variables in an ordered logit analysis. The construction of these alternative measures of control is detailed in Table S7. First, we excluded provisions related to content restrictions from the composite control measure; in the resulting regressions, relative reach remains significant in the basic specification and after the addition of deal type and portal controls as well as in regressions using alternative measures of relative reach. Table S8 in the supplement reports these results. Second, we excluded provisions related to both content restrictions *and* provisions relating to control over "look and feel" from the composite control measure. We report these results in Table S9. After making this adjustment, relative reach is nearly significant at the $p < .1$ level in the basic specifications and is not significant when controls for deal type are added. When alternative measures of relative reach are used on the subset of alliances for which they are available, however, relative reach is

highly significant. Moreover, in these regressions, relative financial strength, another potential measure of bargaining power, is highly significant. Thus, stripping away the issue of franchise risk, relative bargaining power still seems to have an impact on the allocation of control rights, consistent with Aghion and Tirole (1994).

6. Conclusion

This paper examined the how well contract theory explains ownership and the specification of control rights in alliances by Internet portals from 1995 to 1999. Our empirical tests supplied support for models of incomplete contracting. In particular, the division of ownership in these alliances was highly sensitive to the allocation of (critical) effort between the parties. Furthermore, the allocation of control rights appeared most sensitive to measures of the relative bargaining power of the two parties, consistent with incomplete contracting models that allow for financing asymmetries between the two parties.

Several questions about the design of these contracts and the applicability of incomplete contracting theory, however, remain. First, in this industry there appeared to be many observable measures of performance and effort. In a separate paper (Elfenbein and Lerner, 2002), we examine the use of additional measures of performance and effort in these contracts. Our interpretation of the analysis is that firms rarely contracted on available measures of product market and technical performance during the period of study. Why the contracting parties would fail to include all such provisions in agreements, if indeed they were enforceable, was not obvious. Consistent with the incomplete contracting view, we interpret the lack of inclusion of such provisions as strengthening the incentives that come from ownership and control rights.

Second, we find it puzzling that we need to invoke two separate theories to explain the division of ownership and control rights. In our data, control rights are sensitive to relative bargaining power, but ownership is not. Although the patterns of ownership are robust in every technology-based partition of the sample that we analyzed, it is possible that technological considerations, rather than maximization of *ex post* surplus, are the primary forces driving the allocation of ownership rights. In the absence of these technological considerations, both variables might have shown sensitivity to relative bargaining power.

Additionally, the incentive impact of ownership—rather than cash flow rights—in models of incomplete contracts stems from the threat of renegotiation after the relationship-specific investments are sunk. Parties anticipate this potential for renegotiation and accordingly allocate ownership and the surplus generated by the agreement. In the alliances we investigate, not all of the effort / investment is sunk prior to the commencement of the alliance. For example, maintaining the quality of customer service or adding additional servers to maintain speed as alliance traffic increases require ongoing investments. It is not clear how the ongoing character of the effort / investment decisions of the contracting parties affects the property rights result, although a related issue—namely the role of sequential investments and contingent ownership structures—has been investigated (Noeldeke and Schmidt, 1998). Moreover, in the contracts we observe, considerable attention is given to specifying the payment terms. Contingent payments based on product sales, new subscribers, and other measures are included in many contracts. It is possible that these payment systems are merely sophisticated methods of dividing the agreement's surplus. It is also possible, however, that the payment terms themselves provide important incentives to the parties and thereby impact the value of the agreement. The interaction between cash flow rights and ownership when investments are ongoing is a potential avenue for theorists to explore.

We believe this study highlights another potentially intriguing question for theorists. During the period in question, portals and their partners, not to mention public investors and venture capitalists,

seemed to possess a systematically upward bias in their assessment of the value of Internet traffic. This led to the signing of alliance contracts that some industry experts retrospectively believe was irrational. Several announcements of alliances that subsequently proved to be poorly designed were viewed positively by investors. For example, on the day of the announcement by DrKoop.com of a four-year strategic alliance with AOL, DrKoop's share price jumped 56% and AOL's share price increased by 5% (Hahn, 1999). The agreement was renegotiated nine months later when it became apparent that DrKoop was unable to live up to its commitment to buy \$89 million of advertising from AOL. A number of contemporaneous observers, such as consulting firm Jupiter Research, raised questions as to whether the structure of this and other transactions was feasible. A potentially interesting avenue of exploration for theorists is to investigate how bargaining changes under conditions in which both parties have upwardly biased expectations, and whether traditional results obtain in these circumstances.

References

- AGHION, P. AND TIROLE, J. "On the Management of Innovation." *Quarterly Journal of Economics*, Vol. 109 (1994), pp. 1185-1207.
- , AND ———. "Formal and Real Authority in Organizations." *Journal of Political Economy*, Vol. 105 (1997), pp. 1-29.
- ELFENBEIN, D. W. AND LERNER, J. "Determinants of Contract Structure in Internet Portal Alliances." Unpublished Working Paper, Harvard University, 2002.
- GANDAL, N. "The Dynamics of Competition in the Internet Search Engine Market." *International Journal of Industrial Organization*, Vol. 19 (2001), pp. 1103-1117.
- GROSSMAN, S.J. AND HART, O.D. "The Costs and Benefits of Ownership: A Theory of Lateral and Vertical Integration." *Journal of Political Economy*, Vol. 94 (1986), pp. 691-719.
- HAHN, A.L. "AOL Deals Drkoop a Healthy Boost." *The IPO Reporter*, Vol. 23 (July 12, 1999), p. 15.
- HART, O.D. *Firms, Contracts, and Financial Structure*. OXFORD: CLARENDON PRESS, 1995.
- HART, O.D., AND MOORE, J. "Incomplete Contracts and Renegotiation." *Econometrica*, Vol. 56 (1988), pp. 755-785.
- , AND ———. "On the Design of Hierarchies: Coordination versus Specialization." Working paper no. 7388, National Bureau of Economic Research, 1999.
- HOLMSTRÖM, B. "Moral Hazard and Observability." *Bell Journal of Economics*, Vol. 10 (1979), pp. 74-91.
- HOLMSTRÖM, B., AND ROBERTS, J. "The Boundaries of the Firm Revisited." *Journal of Economic Perspectives*, Vol. 12 (1998), pp. 73-94.
- LERNER, J. AND MERGES, R.P. "The Control of Technology Alliances: An Empirical Analysis of the Biotechnology Industry." *Journal of Industrial Economics*, (Special Issue on "Inside the Pin Factory: Empirical Studies Augmented by Manager Interviews"), Vol. 46 (1998), pp. 125-156.
- NOELDEKE, G. AND SCHMIDT, K.M. "Sequential Investments and Options to Own." *RAND Journal of Economics*, Vol. 29 (1998), pp. 633-653.
- TIROLE, J. "Incomplete Contracts: Where Do We Stand?" *Econometrica*, Vol. 67 (1999), pp. 741-781.
- TRUEMAN, B., WONG M.H.F., AND ZHANG X.J. "The Eyeballs Have It: Searching for the Value in Internet Stocks." *Journal of Accounting Research*, (Supplement), Vol. 38 (2000), pp. 137-162.

Footnotes

¹Holmström and Roberts (1998) argue that a variety of factors other than an inability to specify a complete contract may affect the formation and structure of alliances. These include the need for information transfers and the extent of agency problems. As the authors note, however, the impact of these factors needs further theoretical attention.

²These restrictions might be thought of as corresponding to the elimination of one type of action in a multi-tasking environment.

³In this model, bargaining power stems from the uniqueness of the research unit. If the research unit is the only such organization that can provide a valuable innovation to the customer, then it has the *ex ante* bargaining power. If, on the contrary, there are many such research units, then the customer has the *ex ante* bargaining power. Thus, although it formally considers only two parties, the Aghion and Tirole (1994) model clearly applies in the case in which downstream (or upstream) party has many potential trading partners. This is an important consideration given that both portals and partners almost surely have multiple potential partners.

⁴Gandal (2001) examines competition within the search engine segment of the portal industry and finds that while first mover advantages were important in attracting unique visitors, search engines competed on the quality of search services, which became an increasingly important determinant of traffic over time.

⁵During this period, Trueman, Wong, and Zhang (2000) find Internet firms' valuations responded to measures of traffic. Our discussions with practitioners suggested that this was frequently a major point of negotiation in the period in question.

⁶Technological or practical considerations may also have driven some of the ownership allocation decisions that we study. In some cases, for example the servers used for hosting, ownership could entail a cost that parties wished to avoid. Alternatively, some configurations of asset ownership could generate higher overall costs for the alliance, particularly if one party could take advantage of scale economies not available to the other.

⁷These provisions are the use of frames around the alliance site and "good faith" efforts to return the user to the portal site.

⁸Presumably, in this case, the contracting parties believed that the incentives in other parts of the contract were strong enough to generate the desired behavior, or believed that the cost of negotiating over new provisions was prohibitively high.

⁹The reach of a website is defined as the fraction of all Internet users who access the website in a given month. For example, Media Metrix estimates that, in September 1999, 54.9 percent of all Internet users accessed at least one of Yahoo!'s webpages from home.

¹⁰The online supplement can be found at <http://www.people.hbs.edu/jlerner/PortalSupp.pdf>.

¹¹There were relatively few cases where the partner had significantly greater reach than the portal.

¹²One question about the multiple measures of ownership in this analysis (and the other measures used below) is the extent to which they are correlated. If they were closely correlated, the independence of the

individual tests would be suspect. The measures were positively correlated, but certainly not perfectly: the mean correlation coefficient of the ownership measures was .30. This correlation was considerably less in the analyses below: for instance, the average correlation coefficient of the twelve control measures was .07.

¹³The typical problems with linear probability models are well documented: an assumption of constant marginal effects, heteroskedastic residuals, and out-of-range predictions. Although we cannot address these problems directly, we perform several corroborating analyses that we describe in this section.

¹⁴The correlation between the two measures of relative bargaining power—relative sales and relative reach—was 0.20. Therefore, eliminating either of the measures of relative bargaining power from the regression analysis increased the coefficient of the remaining measure, strengthening any claims of significance.

¹⁵These regression results are corroborated by the univariate analysis of each of the individual contract provisions in Table S5 of the supplement.

Table 1: Summary statistics.

Panel A: Distribution of Observations by Year					
	<i>1995</i>	<i>1996</i>	<i>1997</i>	<i>1998</i>	<i>1999</i>
Number of Contracts Signed in Year	1	6	27	46	26
Panel B: Effort Required by Two Parties					
	<i>Mean</i>	<i>Median</i>	<i>Stan. Dev.</i>	<i>Minimum</i>	<i>Maximum</i>
Site development	-.65	-1	.66	-1	1
Maintenance and hosting	-.58	-1	.69	-1	1
Customer service	-.56	-1	.54	-1	1
Order fulfillment	-.50	-1	.56	-1	1
Billing	-.46	-1	.59	-1	1
Sum of five effort measures	-2.75	-3	2.30	-5	5
Panel C: Traffic on Internet Properties of Portal and Partner					
	<i>Mean</i>	<i>Median</i>	<i>Stan. Dev.</i>	<i>Minimum</i>	<i>Maximum</i>
Reach of portal	29.5%	31.2%	19.8%	.8%	67.1%
Reach of partner	4.9%	1.5%	10.2%	.2%	55.3%
Days per viewer-month for portal	3.30	3.21	1.36	1.10	6.50
Days per viewer-month for partner	1.67	1.46	.68	1.00	4.50
Minutes per viewer-month for portal	19.34	14.10	15.67	4.20	73.90
Minutes per viewer-month for partner	8.87	7.30	6.43	1.40	36.70
Panel D: Financial Position of Portal and Partner					
	<i>Mean</i>	<i>Median</i>	<i>Stan. Dev.</i>	<i>Minimum</i>	<i>Maximum</i>
Sales of portal	953	30	2873	0	23978
Sales of partner	759	4	4276	0	37903
Net income of portal	134	-1	437	-104	2284
Net income of partner	39	-3	257	-433	1986
Cash of portal	1606	174	4271	0	21761
Cash of partner	720	17	3327	0	24956
Shareholders' equity of portal	2646	306	6621	-1	37165
Shareholders' equity of partner	1161	16	4346	-8	24067

Notes: The sample consists of 106 alliances involving Internet portals between 1995 and 1999. Observations are summarized by the date of the agreement, the effort required of the portal and partner (cases where the portal is expected to make the greatest effort are coded as +1, those where the partner is as -1, and those where the effort is shared or not applicable are coded as 0), the traffic on the portal and the partner's Internet properties in the month before the signing of the contract, and the financial position of the portal and the partner in the quarter before the signing of the contract (in millions of dollars).

Table 2: Seemingly unrelated regression analysis of individual ownership provisions in portal alliances using an ordered logit specification.

	<i>Basic Specification</i>			<i>Controlling for Deal Type</i>		
	<i>Servers</i>	<i>URL</i>	<i>Customer Data</i>	<i>Servers</i>	<i>URL</i>	<i>Customer Data</i>
Year of agreement	.15 [.28]	*.42 [.23]	.10 [.31]	^{ij} .05 [.29]	** ^{ij} .50 [.22]	^{ij} .22 [.43]
Relative effort required after alliance signing	*** ^{ij} .77 [.04]	** ^{ij} .19 [.09]	*** ^{ij} .57 [.13]	*** ^{ij} .86 [.12]	^{ij} .15 [.10]	*** ^{ij} .38 [.08]
Does the portal have greater reach?	.17 [.50]	.47 [.36]	* ^{ij} -.76 [.39]	-.24 [.38]	.44 [.29]	-.36 [.42]
Does the portal have greater sales?	^{ij} -.14 [.47]	* ^{ij} -.29 [.14]	^{ij} .25 [.27]	-.07 [.52]	-.23 [.20]	.15 [.60]
Did the alliance promote content?				.49 [1.46]	.56 [.84]	.65 [.94]
Did the alliance promote product sales?				^{ij} .17 [1.34]	^{ij} .01 [.84]	** ^{ij} -1.66 [.70]
Did the alliance involve a service agreement?				^{ij} -1.04 [1.23]	^{ij} .53 [.33]	** ^{ij} -1.73 [.69]
Number of observations	106	106	106	102	102	102
χ^2	***58.49	**10.96	***33.81	***62.08	*12.38	***56.29
Pseudo-R ²	.29	.05	.20	.32	.06	.34

* = Significant at the 10% confidence level; ** = significant at the 5% confidence level; *** = significant at the 1% confidence level.

^j = Jointly significant at the 10% confidence level; ^{ij} = Jointly significant at the 5% confidence level; ^{ij} = jointly significant at the 1% confidence level

Notes: The sample consists of 106 alliances involving Internet portals between 1995 and 1999. The dependent variables are ownership of the URL, servers, and customer data (+1 denoted a case where the ownership was assigned to the portal, -1 those where it was assigned to the partner, and 0 intermediate cases.) Independent variables include the year of the agreement, the relative effort required of the portal and partner after the alliance signing on five key dimensions (with those where the most effort is required of the portal coded as -5 and the most effort by the portal as +5), the relative reach of the portal and the partner in the month before the signing of the contract (+1 denoted a case where the portal has the greater reach, -1 those where the partner did, and 0 intermediate cases), and the relative sales of the portal and the partner in the quarter before the signing of the contract (+1 denoted a case where the portal has the greater sales, -1 those where the partner did, and 0 intermediate cases). Heteroskedastic-consistent standard errors in brackets. Chi-square and Pseudo-R² statistics are from the individual ordered logit regressions estimated in the first stage of the non-linear SUR procedure.

Table 3: Seemingly unrelated regression analyses of the individual control in portal alliances.

	<i>A: Business Restriction</i>	<i>B: Content Approval</i>	<i>C: Conform to Standards</i>	<i>D: Determine Look and Feel</i>	<i>E: Advertising Mention</i>	<i>F: Approve Adverts</i>
Year of agreement	** ^{ij} .11 [.05]	^{ij} -.07 [.04]	^{ij} .03 [.05]	^{ij} -.04 [.07]	^{ij} .01 [.04]	^{ij} -.02 [.02]
Relative effort required after alliance signing	* ^j -.03 [.02]	* ^j -.04 [.02]	^j -.00 [.02]	*** ^j .10 [.03]	* ^j -.03 [.02]	^j .01 [.01]
Does the portal have greater reach?	** .23 [.09]	.00 [.09]	.12 [.10]	.12 [.15]	.06 [.09]	-.03 [.04]
Does the portal have greater sales?	^{ij} .04 [.06]	^{ij} .07 [.05]	*** ^{ij} .18 [.06]	** ^{ij} -.22 [.09]	^{ij} .07 [.05]	^{ij} .03 [.02]
Number of observations	99	99	99	99	99	99
χ^2	***20.45	6.24	***16.45	***25.47	*9.08	3.37
R ²	.17	.06	.14	.20	.08	.03
	<i>G: Optimization</i>	<i>H: Software</i>	<i>I: Use of Frames</i>	<i>J: Return Traffic</i>	<i>K: Equity Investment</i>	<i>L: Board Membership</i>
Year of agreement	^{ij} -.01 [.04]	* ^{ij} -.08 [.04]	^{ij} .07 [.05]	^{ij} .00 [.04]	^{ij} .06 [.04]	^{ij} -.01 [.01]
Relative effort required after alliance signing	^j .00 [.02]	^j .02 [.02]	^j -.03 [.02]	*** ^j -.04 [.02]	* ^j -.01 [.01]	^j .00 [.00]
Does the portal have greater reach?	-.07 [.08]	-.02 [.08]	.13 [.10]	*.15 [.08]	-.00 [.07]	-.04 [.09]
Does the portal have greater sales?	*** ^{ij} .14 [.05]	^{ij} .07 [.05]	^{ij} -.04 [.06]	^{ij} .06 [.05]	^{ij} .04 [.04]	^{ij} .02 [.05]
Number of observations	99	99	99	99	99	99
χ^2	*8.32	5.73	5.44	***14.64	4.43	1.94
R ²	.08	.05	.05	.13	.04	.02

Breusch-Pagan test of independence rejected at the $p < 0.01$ confidence level.

* = Significant at the 10% confidence level; ** = significant at the 5% confidence level; *** = significant at the 1% confidence level.

^j = Jointly significant at the 10% confidence level; ^{ij} = Jointly significant at the 5% confidence level; ^{ijj} = jointly significant at the 1% confidence level

Notes: The sample consists of 106 alliances involving Internet portals between 1995 and 1999. The dependent variables are 12 key control provisions. Independent variables include the year of the agreement, the relative effort required of the portal and partner after the alliance signing on five key dimensions (with those where the most effort is required of the portal coded as -5 and the most effort by the portal as +5), the relative reach of the portal and the partner in the month before the signing of the contract (+1 denoted a case where the portal has the greater reach, -1 those where the partner did, and 0 intermediate cases), and the relative sales of the portal and the partner in the quarter before the signing of the contract (+1 denoted a case where the portal has the greater sales, -1 those where the partner did, and 0 intermediate cases). Heteroskedastic-consistent standard errors in brackets.