
Poaching and the Misappropriation of Information: Transaction Risks of Information Exchange

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ABSTRACT: We address the concept of poaching, the risk that in any transactional relationship, information that is transferred between parties for purposes specified in the contract will deliberately be used by the receiving party for purposes outside the contract, to its own economic benefit, and to the detriment of the party that provided the information. We argue that this form of transactional risk, a component of transaction costs, is increasingly important in our service-centered, information-driven, postindustrial economy. Using case examples and a discussion of the related literature, we demonstrate and discuss the conditions under which shared information creates the potential for poaching, examine the impact and efficacy of traditional remedies for contractual problems in managing poaching, and identify additional mechanisms for managing poaching risk. Our analysis suggests that these risks and their remedies are fundamentally different in nature from those considered in previous theories of supplier relations and contractual governance.

KEY WORDS AND PHRASES: economic analysis of information, incomplete contracts, information sharing, intellectual property, managing risks, transaction cost theory.

WE ADDRESS THE CONCEPT OF *POACHING*, the risk that in any contractual relationship, information that is transferred between parties for purposes specified in the contract will deliberately be used by the receiving party for purposes outside the contract, to its own economic benefit, and to the detriment of the party that provided the information. We argue that this form of transactional risk, a component of transaction costs, is increasingly important in our service-centered, information-driven, postindustrial economy. To be clear, poaching is not a new concept; it is merely one component of opportunistic behavior, along with deliberate underperformance when a client cannot monitor performance and abuse of power when a client has become dependent upon a vendor's services. However, for reasons that will be explained and illustrated throughout this paper, poaching has become an increasingly important risk associated with interfirm contracting.

The increased use of contractors for business services such as consulting, systems development, or customer support and relationship management has vastly increased the opportunities for poaching in recent years. For example, many information technology (IT) outsourcing projects involve a substantial exchange of proprietary business processes or product designs to enable vendors to design software to support these processes or products. Similarly, IT-intensive third-party service firms (e.g., call centers, data processors) often require substantial amounts of private customer data to accomplish their tasks in an efficient and effective manner. In both cases, these data may have substantial value if sold to interested third parties, possibly exceeding the value of the contract. Similar concerns also arise in manufacturing settings with the growth of offshore contract manufacturing facilities and an increasingly cooperative approach to research and development between buyers and suppliers. Poaching is gaining additional importance as IT has enabled firms to engage in global business process outsourcing, transferring customer-sensitive and data-intensive tasks such as

order-taking and customer support to third parties, often operating in the developing world.

The issues of contracting problems and sourcing problems have received considerable attention from economists over the past decades, and many of the issues are well understood. Problems with sourcing would not arise if incentives of clients and vendors in sourcing relationships were always in alignment; it is clear that this is not the case. Likewise, problems would not arise if any malfeasance by either party could be precluded in advance by a (long-term) contract that specified all acceptable and unacceptable activities, provided for certain and absolutely reliable monitoring, and were accompanied by certain and enforceable sanctions and penalties. These concerns could be completely eliminated by vertical integration or by forgoing contracting altogether, although this is not an economically viable approach in most settings. Indeed, precisely because these remedies are often economically inefficient, contractual risks are economically significant.

Moreover, as we move to a more information-intensive economy, the issues of information transfer and the possibility of poaching become more central. Consequently, we find that concern with the misuse of intellectual property transferred during sourcing relationships and other contracts is becoming the most important area of contract risk, and thus poaching now is of considerable economic significance. Just as the transaction costs economics (TCE) literature has been concerned that moral hazard and holdup create economic inefficiency through increased mitigation costs, underinvestment in relationship-specific assets, or inefficient governance structures (e.g., “uneconomic vertical integration”), we are similarly concerned about situations where imperfect intellectual property protection within a contractual arrangement leads to production inefficiencies, underutilization of information-sharing opportunities, or forgoing of the opportunities provided by contracting altogether. We offer a few short examples here to suggest to the reader that this is of more than theoretical concern, and that it causes considerable expense.

- A software services firm in India tests software for clients who develop their code in the United States. While some of this software is proprietary and of limited use outside the developing firm, some may have significant resale value if modified to fit the needs of other companies. The client firms invariably provide only object code to the testing firm, permitting only *black box* testing. Although this does prevent resale, it adds greatly to the cost of testing, since black box testing has combinatorial complexity, while submodule testing can often be accomplished with linear complexity. The client’s perceived risk of poaching by the vendor creates economic inefficiency.
- An American credit card issuer enjoys a considerable advantage relative to all of its competitors in assessing the expected future profitability of cardholders. This information is used by proprietary retention specialists to set the interest-rate charges for all customers in order to maximize usage and the probability that the customer stays with the bank, thus maximizing expected earnings from each account. The bank divides support for retention specialists, with one firm doing data analysis, another working on software, and a third training specialists and

operating call centers. Dividing activities up this way assures that no single firm truly understands the theory and data behind successful retention specialists, but it does increase coordination costs. Once again, the client's perceived risk of poaching creates economic inefficiency.

- An American financial services firm has developed considerable expertise in collecting from accounts that are late or delinquent. There are significant cost savings available to the firm from outsourcing to an offshore call center in India. Moreover, since this activity requires a high degree of training and skill from the call center employees, it is not a commodity service, and the high margins that could be earned would represent the best return on the call center's existing investments. Nonetheless, the American firm is unwilling to risk the loss of its proprietary expertise; if the call center operator chose to do so, it could resell the methods to the client firm's competitors. Like the uneconomic vertical integration that Williamson writes about [19], the client firm is doing work internally at higher cost and the vendor is losing profitable opportunities to sell services. But unlike Williamsonian underinvestment, the problem is not caused by the vendor's reluctance to make investments that may cause it to lose bargaining power. Rather, it is caused by the client bank's reluctance even to consider outsourcing due to fear of poaching.

As intellectual property becomes more important to the competitive positioning of firms, and as outsourcing increases in importance, poaching has become an increasingly important source of interfirm transactions risk.

Economic analysis of interfirm relationships has primarily been based on one of three perspectives from organizational economics: transaction costs economics [5, 14, 19], agency theory [1, 13], and incomplete contracts theory [8, 10]. These perspectives cover a wide range of possible contractual problems that arise from asymmetric information, bounded rationality, and irreversible investments. Information about vendor behaviors or external market conditions plays a large role in these theories, with the general perspective that more or better information will usually improve contractual performance. The benefits and problems of sharing market information, such as demand estimates, has drawn considerable attention in operations management (e.g., [7]), economics [6], and finance. Similarly, there has been some attention to the benefits of sharing or transferring information assets used for production [3]. The R&D literature has also considered the problems in the transfer of intellectual assets, but this perspective assumes either that the information has enforceable property rights or that the potential for misappropriation is foreseen and deliberately considered in contracting among parties that value the asset (see [2], especially footnote 3). Thus, although there is considerable research on several closely related issues, there is only limited research on misappropriation of information assets in contractual settings in the absence of enforceable property rights.¹

The paper is an analysis of how the increased use and sharing of information assets in a contractual exchange can lead to a set of risks different from those that have been previously considered in work in transaction costs economics, incomplete contracts theory, or other theories of contracting and governance. This is emerging as an impor-

tant issue in information systems (IS), as almost all systems development and IS outsourcing contracts create these risks, as do most contracts for information-intensive services supported by IS (see our examples section for several variants). These risks are especially important for e-commerce businesses with limited resources or time-to-market considerations that require the use of outside service providers for many operational functions.

Previous Literature

WE CONSIDER TWO STREAMS OF RESEARCH especially relevant when reviewing problems in contracting and the remedies proposed for them. The first deals with the transaction costs approach to managing the risks associated with interfirm contracting. The second deals with the theory of incomplete contracts as an analytical framework for dealing with the risks associated with interfirm contracts. One can oversimplify and make the following comparisons. Transaction cost economics deals with a party's failing to honor the terms of a contract, either because the contract cannot be fully monitored, allowing the party to follow its own objectives, or because the strategic dependency forces the other party to accept its terms for contract revision in the future. Incomplete contracts theory deals with the fact that in an environment of future uncertainty and requirements that can never be fully known, a contract can never deal adequately with all future contingencies. The transaction cost approach tends to favor remedies that constrain, punish, and reward the potential abuser. The incomplete contracts approach favors transferring resources to the weaker party, which would allow that party to earn more from following a socially optimal strategy.

Transaction Cost Economics and Principal-Agent Theories

To date, the dominant approach to evaluating interfirm contractual arrangements is the transaction cost economics approach. TCE focuses on design of governance relations and the "failure" of markets in the sense that hazards of market transactions create lost opportunities for beneficial trade.

Mainstream work in TCE focuses on the tradeoff between reduced production costs and increased transaction costs of using market procurement. Earlier writers on the issue of transaction governance (e.g., [5]) emphasized the role of frictional costs—the cost of locating suppliers, negotiating agreements, and writing contracts—as the impediment to contracting and a motivation for the existence of firms. Williamson extended this to focus on "transaction risks," which arise due to bounded rationality and the potential this creates for opportunism. These transaction risks are not borne directly but are the expected costs of adverse events that become possible (or likely) in specific contracting settings, or the costs of preventing these risks. Numerous costly mechanisms have been devised to protect parties in a contract, such as monitoring, performance measurement, bonding, or dual-sourcing. At an extreme, the opportunism risks are so great that firms refrain from contracting altogether in favor of "un-

economic vertical integration,” where firms forgo benefits of the market and instead own critical resources themselves.²

The emphasis of transaction cost analysis has historically been in two areas: moral hazard (principally “shirking”) and holdup (also referred to as “opportunistic renegotiation” (see [4]). Shirking represents a classic example of the principal-agent problem [1, 13], where a principal seeks to hire an agent to perform a task. In cases where effort is costly to the agent and the outcome of the effort is difficult to measure, the agent will exert less effort than is optimal for the principal, thus increasing his or her own benefit at the expense of the principal. The usual remedies for this problem are monitoring to detect underperformance by the agent, or incentive contracting where the principal and agent share the benefits of effort and thus have better aligned incentives. In some cases, when the principal cannot be satisfied that the agent will perform satisfactorily, or where the uncertainty of performance is so great that the agent cannot bear the risk of an incentive contract, the parties may fail to reach a contract altogether. Numerous examples of shirking as a problem exist throughout the literature, and the problems caused by shirking have the potential to play a role in almost any contractual relationship. For example, in contract software development, vendors may place less-skilled staff on a project than originally promised and bill the client at the same hourly rates; may reduce efforts allocated to testing while claiming testing was performed completely; or may fail to follow best practice for code structure or documentation, making future maintenance more difficult.

Holdup represents a renegotiation of the terms of an agreement due to changes in bargaining power that occurs after a contract is signed. In the economics literature, the emphasis has been placed on holdup arising from switching costs, which principally arise due to relationship-specific investment [1, 18, 19] and the postcontractual small-numbers bargaining situations that this creates [15]. Once an investment has been made that has limited use outside the original contractual relationship, the party that made the investment is vulnerable to the other party’s unilateral reduction in promised payments. Examples of such relationship-specific investment that have been discussed in the literature include collocated facilities (site specificity), dedicated skills or training (human capital specificity), or unusual investments in specialized machinery or services for a particular customer (see a discussion in [18, p. 21]). In each case, one party makes an investment that is more valuable within an existing relationship than on the open market. Once the investment has been made, the other party can then reduce future payment for services as long as they remain above the level that the first party could hope to earn from alternative uses of the investment; since, by definition, the investment is relationship specific, the alternative uses may be considerably less valuable, and such investments create real strategic vulnerability. The primary remedy for holdup is to establish the rules for future trade as clearly as possible; to build in mechanisms that adjust the contract to account for foreseeable but uncertain future conditions (e.g., commodities prices); and, when this is not adequate, to forgo contracting altogether. In actual contracts, these efforts to reduce holdup appear as longer-term contracting, as “escalator clauses” and other market-based repricing schemes, or as shared investment in dedicated facilities. However,

even with a well-designed contract, holdup can still occur, as unforeseen changes in external conditions can result in unexpected shifts in bargaining power [1].

Information and differences in information between parties are viewed as critical in transaction cost economics. However, nearly all transaction problems identified in TCE relate to problems of information asymmetry. For instance, most shirking problems can be attributed to imperfect measurement of effort or output. Williamson also identifies environmental uncertainty, bounded rationality, and other forms of information asymmetry as the principal drivers of transaction risks [19, pp. 22, 31]. Williamson later describes a specific relationship between information asymmetry and opportunism: “Opportunism here takes the form of selective disclosure or distortion of the data to which each party uniquely has access” [19, p. 32]. That is, withholding, not sharing information has been seen as the principal source of risk in interfirm relationships.

Information “assets” in the form of procedures, work practices, and training have also been considered a critical source of opportunism risk arising from holdup, but in a way opposite to the problem we consider. It is the failure to invest in and to create these assets that has been seen as the problem, not the possibility that these assets may be too widely shared.

Incomplete Contracts and Property Rights Approaches

More recent and more specialized work by Grossman and Hart [8], Hart and Moore [10], and others led to the development of what is generally known as “incomplete contracts theory.” These analyses start with the assumption that contracts are incomplete and seek ways to structure the contract such that postcontractual bargaining yields efficient outcomes. Unlike TCE, where the principal concern is that beneficial contracts cannot be written, incomplete contracts place emphasis on ensuring appropriate levels of noncontractible investment in a relationship.

The stylized incomplete contracts model is a setting in which one or both parties to a contract must make a noncontractible investment in support of contract activities, which creates value for the entire relationship. Because each party must bear the total cost of their private investment, but receives only a share of the gains they create (simply because there is only 100 percent of the relationship value to divide among all parties), they will not provide socially optimal levels of effort. If, however, it is possible in advance to set up an ex post bargaining structure that will allow each firm to capture its fair share of the gains after all investments are made, then incentives to make future noncontractible investment can be improved. These ex post bargaining positions are generally established through the ownership³ of essential assets. The threat to remove these assets from the relationship creates the bargaining power. When a party has the ability to capture a fair portion of the gains from their investments in bargaining, their incentive to invest is increased.

Grossman and Hart [8] use this approach to analyze the decision on whether GM should own their metal stamping supplier or utilize arm’s-length contracting. They conclude that it is in the best interest of GM to own the stamping plant, otherwise the

supplier will underinvest in quality, which is a noncontractible investment. Hart and Moore [10] focus more specifically on the welfare-maximizing ownership of different combinations of assets within a relationship.

This work was also extended to information assets by Brynjolfsson [3]. In general, these theories predict that if an agent must make a noncontractible investment, or has essential information, then welfare is maximized when that agent also owns the complementary physical assets. Alternatively, essential information can be transferred to agents that must make noncontractible investments. As we will later discuss, the remedies of broadening distribution of information or the transfer of needed physical assets have exactly the wrong impact on poaching. That is, rather than reducing poaching, broader information sharing tends to increase the risk of poaching—thus, poaching considerations may alter or reverse the predictions about allocation of assets for maximal welfare that result from other TCE analyses. Moreover, the presumption in these models is that all agents can be engaged in bargaining over the value of information. In contrast, one of the critical reasons why poaching can become a problem is that the value from alternative uses of information, and even the nature of these alternative uses, cannot be easily foreseen.

Overall, this synthesis of the literature suggests that an analysis of poaching will raise different concerns and suggest different remedies than are typically considered in the mainstream approaches on transactional governance.

A Theory of Poaching

Introduction

WE DEFINE POACHING⁴ AS INVOLVING THREE COMPONENTS: (1) the exchange of information between two parties, as a natural byproduct of contractual exchange for other goods or services, necessary for the performance of contractual obligation; (2) the subsequent use of this information by the receiving party, outside the purposes for which the information was provided, and for its own benefit or economic gain; and (3) at the expense of, or creating economic damage to, the party that provided the information.

For poaching to have substantive economic implications, all three components must be present. Information transfer (1) is clearly essential, since otherwise there is no information transfer to abuse. Use of information outside the contractual boundaries (2) distinguishes this theory from nearly all other analyses of information sharing where the concern is the direct consequences of sharing between parties to a contract. Economic damage (3) to the contracting party is essential, since information sharing absent economic damage is typically welfare improving and, without damage to the information provider, there would generally be no objection to the practice. As mentioned in the second section, the types of risks that arise are different than those considered by previous theories of contractual governance. It is these differences that we will highlight in the following sections.

Case Examples of Poaching

Poaching is a relevant concern in a wide variety of settings, including both manufacturing and services, and in a variety of activities that can be outsourced. The case examples below represent events and scenarios faced at actual firms, although in some cases the names are omitted for confidentiality.

Example 1 (Dual Sourcing): A common practice in the semiconductor industry is a “dual sourcing” arrangement, where a company licenses technology to a competitor to enable them to produce competing products in return for a royalty. The goal of these arrangements is to allay customers’ fears of holdup by the principal manufacturer and ensure a stable supply of compatible products, which promotes greater adoption. In 1982, Intel Corporation licensed the technologies related to the 8086 microprocessor to Advanced Micro Devices (AMD) as part of a long-term technology sharing and dual sourcing arrangement. By 1986, Intel decided that they no longer wanted AMD to be the second source, starting with the 80386 microprocessor line. However, using the knowledge and technologies they previously obtained and realizing that Intel was not going to continue the relationship, AMD reverse-engineered Intel’s 80386 microprocessor and soon had a competing product in the market.⁵ AMD subsequently developed their own competing technologies and has now become a fierce competitor of Intel in microprocessors, sometimes beating Intel to market with next-generation microprocessor technology. Indeed, even today, in the battle for the next generation of 64-bit processor chips, AMD’s Opteron design seems to be gaining greater acceptance than the Intel Itanium.

Example 2 (Technology-Based Services): Use of a third-party account administration firm naturally requires that an insurance company using this service provide all of their company records on individual accounts so that the account administrators can process and service accounts. The account administration firm now has the ability to mine the company data to identify the most profitable customers, which they can pass on as sales leads to competitors or resell to third-party marketing firms. At a minimum, this could cause a loss of business. In addition, it could also cause substantial reputational damage to the insurance company if companies and individuals believed their insurer could not be trusted to protect their private information.

Example 3 (Software Contracting): A credit card firm engages a systems development consultant to build an extensive database system for correlating private product use information with publicly available customer data. The goal is to identify the predictors of profitable customers and to enable rapid design of new financial services products. After constructing the system, the systems consultant has considerable expertise in building data warehousing systems in credit cards and has fully tested source code for interfacing credit card databases with external data sources. They are now in a strong position to underbid their competitors for work at other credit card firms by reusing expertise and possibly actual code from their previous engagement. They may have even factored in the value of learning and transferable expertise in their original bid for the job. More damaging to their original client, the consulting firm can pitch this work to competing credit card companies, and, with the

expertise acquired during their first implementation, can enable these firms to successfully implement “copycat” technologies years before they otherwise would have been able to do so. This accelerated entry of competitors and their rapid deployment of similar technologies will shorten the period of advantage enjoyed by the original client firm.

Example 4 (Business Services): Big Fish (BF), a large domestic travel agent seeking to compete with global firms such as American Express, needs to have expertise and presence in adjacent or related markets, such as Canada and the United Kingdom, and it needs them immediately. It lacks both the expertise in the market and the access to preferred pricing or products necessary to be competitive. It forms an alliance with Little Fish (LF), a specialized player in one of these markets who provides this expertise, in return for access to BF’s systems and network of global travel providers. After two or three years—when BF has local expertise, name recognition, and the relationships it needs—BF opens its own offices in the same building as LF, and is in direct competition with LF. It is willing to honor the other terms of its agreement with LF, but that is of little help. BF has appropriated the expertise and exposure it gained through cooperation and is now competing effectively with LF. With its survival at stake, LF then contacts a major competitor of BF, and offers to transfer the expertise and software that it has received during its period of affiliation with BF, potentially undercutting some of BF’s sources of competitive advantage.

Example 5 (Consultants): Here BF⁶ engages a major strategic consulting house to help it develop a strategy and systems infrastructure for offering different prices to different consumers for travel services. This project involves the development of a database infrastructure for customer information, the development and validation of a variety of modeling tools to determine customers’ willingness-to-pay, and the design of systems that monitor the marketplace to assess the customers’ next-best alternatives. In order to provide strategic consulting services, the firm must first learn a great deal about BF’s business and the environment in which it operates, the various strategies that BF has considered, and the resources needed to implement them. Upon completion of the project, it then consults for and develops a price discrimination strategy for companies in different aspects of the travel business, such as Marriott and USAirways, two companies that are not competitors but are critical suppliers to BF. It then consults for and develops a price discrimination strategy for other firms that can utilize differential pricing, such as CitiBank or Prudential Insurance, companies that are neither competitors nor suppliers.

Analysis of Examples of Poaching

In each of these cases, we observe the essential ingredients for poaching: information transfer, opportunity for reuse of transferred information, and damage to the original contributor of the information. We also observe several of the factors that make poaching more likely:

1. *Weak intellectual property protection.* Example 1 highlights the inability to “return” information at the end of a contractual relationship. The other ex-

amples highlight the difficulties created by limited or nonexistent protection for expertise or business practices. Had suitable intellectual property protection been in place, there would have been legal remedies to reduce the potential for poaching.

2. *Existence of complementary assets.* In all cases, the firm engaged in poaching has a well-defined market of firms that had the complementary physical and information assets to exploit the information. In some cases (e.g., Example 1) the contract could only be written with a firm that already enjoyed or was able to build complementary facilities. In other cases, such resources were available in the market, usually through a relationship with another firm. Poaching is less of a threat absent these complementary assets. For example, the firm described in Example 3 breaks most projects down into multiple parts and assigns them to different systems development contractors. That reduces the possibility that a single contractor will have all the expertise required to reconstruct the entire system.
3. *Limited observability.* In many cases, even when remedies could exist, the actual poaching is difficult to observe. In the insurance example, it would be difficult to know whether the account administrator was reselling data with any certainty unless steps were taken to mitigate this specific risk.
4. *Bounded rationality.* Even in cases where the poaching is readily observable, it may not have been anticipated and therefore was not prohibited in the contract. For example, in Example 4 it may have been difficult for LF to realize that BF would have all the necessary resources to enter into their market after such a short period of time. It might be difficult for the credit card company in Example 3 to anticipate all the potential uses for their target marketing technology or to predict which other firms are likely to offer credit cards in the future along with their existing portfolio of products or services.

In most cases, poaching is usually associated with increasing social welfare, despite the damage caused to the initial provider of the information. Information reuse is not costly but can create value through increased market efficiency or reduced production cost, provided that the poaching risk is not so great the firm forgoes contracting altogether. However, the distribution of the value created by poaching is often complex. The firm providing the information typically does not benefit in any way from its partner's poaching, and may actually be significantly worse off as a result of increased competition. The loss to the client firm that is created by poaching can potentially be much larger than the anticipated benefits of contracting. Consumers and the firm(s) engaging in poaching are likely to be better off. The poaching firm is better off as a result of revenues created through selling or using the information that has been poached, and consumers are better off as a result of lower prices enabled by more effective competition with the firm that initially provided proprietary information.

The transfer of value created by poaching need not be a zero-sum game, and may create enough value for the poaching party to enable a contract to be reached that allows information sharing to occur within the bounds of a contract. That is, in some

cases, the gain of the second firm can exceed the losses incurred by the information provider, enabling a potentially welfare-increasing agreement to be reached that benefits all parties. (This will happen only if it is possible to bargain over these gains—antitrust or other considerations may limit this choice.) For instance, a client firm can allow the vendor to license their technology to approved third parties in return for a royalty. In contrast, however, when the gains to the second party are insufficient to compensate the information provider adequately, such as when information sharing increases competition and therefore transfers significant rents to consumers, such an arrangement cannot be reached and poaching becomes a risk. In this setting, the information provider will typically want to invest in preventing poaching, although these investments are socially wasteful. Alternatively, the firm at risk may forgo contracting altogether, engaging in Williamsonian “uneconomic vertical integration,” but for very different reasons than considered in the classic models.

Comparison of Poaching to TCE Analysis

In distinguishing the differences that a theory of poaching implies for contractual design and postcontractual conduct, it is useful to compare the predictions of traditional transaction cost economics approaches to the predictions yielded by a theory of poaching. In almost every example, transaction cost or incomplete contracts theory analyses of these cases would highlight different concerns and identify different remediation strategies, some of which can be detrimental.

In Example 1, transaction cost analysis would highlight the potential for holdup as one party, through relationship-specific investment, has developed a dependence on the other. The principal risk to Intel would be holdup from having made a commitment to a single alternative source during the duration of the relationship. The traditional TCE remedy would be to have the primary supplier contract with *several* vendors, yet from the perspective of poaching this may be the worst possible remedy. The likelihood of poaching increases at least linearly with the number of independent suppliers, simply because there are more opportunities for players independently to choose to abuse their counterparties. However, the likelihood of poaching will also increase more rapidly, as each secondary supplier perceives the possibility that other suppliers will poach and thus experiences competitive pressures to do so as a result. Even worse, each secondary supplier not only feels pressure to poach before a competitor, but also enjoys *plausible deniability*, knowing that it would be increasingly difficult to attribute the losses resulting from poaching to a specific supplier when the number of secondary suppliers has become quite large.

In the second example, a primary concern raised by TCE analysis would be the holdup of the client, since switching third-party administrators would require substantial time and cost to the insurance company. Perhaps more severe, however, is the risk of shirking in the customer service function, which could cause customer attrition at the insurance company and reduce the client’s profitability. Given that customer service outcomes could be monitored through satisfaction surveys, measured complaint and error rates, or inspection of actual customer service events,⁷ there is an

opportunity for incentive contracting. However, if incentive contracting also comes with a commitment to full information sharing between the client and vendor on product problems, customer service concerns, or other proprietary data, then this can increase the scope of poaching. Thus, these contractual remedies, at best, do nothing to reduce poaching and, at worst, may actually increase it.

In the third and fifth examples (software development outsourcing), there is often a substantial gain from trade resulting from using a specialized development house for software production. A traditional TCE analysis would suggest that the principal risk to the client comes from vendor shirking, made possible by the client's uncertainty about characteristics of the delivered product and imperfect monitoring capability (e.g., software defects may not be apparent except when examined over long time periods). Furthermore, to the extent that the client becomes dependent upon the vendor for maintenance or delivery, holdup by the vendor becomes a real future possibility as well. In this case, since incentive contracting is limited to coarse measures such as time of delivery, the principal remedy for shirking would be for the client to work closely with the vendor, transferring expertise and ensuring quality of the delivered product. However, this also ensures that the resulting product is of sufficient quality to permit resale and thus may actually have the unintended effect of facilitating poaching.

Interestingly, like much of the literature on the "make versus buy" decision, research on IT contracting has placed substantial emphasis on the tradeoff between cost savings and vendor shirking as the explanation for uneconomic vertical integration. An analysis of poaching, however, would suggest that often a more serious concern should be misuse of information. In addition, this sort of analysis of poaching is different from the usual remedy of "not outsourcing strategic systems" (see, e.g., [16]) or never outsourcing "core competencies" [17], since it does not rely on definitions of "core" or "strategic" but identifies an issue that is present whenever transferred information has value from reuse or resale.

An incomplete contracts analysis of the Big Fish–Little Fish example (4) would show BF enjoying critical resources (integrated information systems, a global network, and a global set of relationships with international suppliers) that are not readily available to LF elsewhere; this suggests that LF will face a small-numbers bargaining situation and, if it makes commitments to its clients to deliver global services, it will be vulnerable to holdup by BF. In contrast, BF would conclude that LF had few critical resources, and that any of several local agencies might provide it with service comparable to that which LF could deliver; thus, holdup by LF would not be a threat. Consequently, both BF and LF might conclude that, provided that each could monitor the degree of effort made by the other, the principal risk associated with the relationship would stem from LF's reliance upon BF. This risk might manifest itself as changes in payments between BF and LF, or disputes over distribution of gains resulting from their association. This would be made more complex by the unobservability of some of these gains; how, for example, might each party estimate the increase in revenues earned by the other that were directly attributable to their relationship? Classical approaches to resolve these problems might, if profits from the association could be measured, result in some form of long-term incentive contract. If monitoring were not

sufficiently effective, some form of asset transfer to LF might be appropriate to help balance long-term bargaining power. However, incentive contracting will do little to prevent poaching, and asset transfers to prevent shirking always increase the danger of poaching.

Remedies for Poaching

Traditional Approaches

THERE IS A WIDE VARIETY OF CONTRACTUAL REMEDIES for addressing various types of information or incentive problems that have been identified by other contracting theories. In this section, we systematically examine the efficacy of these approaches for limiting poaching, as well as any negative consequences that could arise when these approaches are employed without considering the potential for poaching.

Incentive Contracting and Monitoring

The classic solution to incentive problems is to propose a contract that aligns the interests of the client and the vendor. The general structure is that when effort is not observable directly, the client can be compensated on the basis of an ex post signal of effort (such as output, stock price, etc.). This partial alignment of incentives leads to increased effort by the vendor and better contract performance than would be obtained without any incentives. However, the less accurate the signal is as a measure of the agent's actual effort—that is, the more random variance there is in the signal—the greater the risk placed on the agent. Facing this risk, the agent will demand higher average pay levels to account for the disutility created by uncontrollable variance in their compensation. Investments in monitoring can improve the precision of the signal, but doing so creates some additional expense. This is the classic tradeoff among incentives, risk, and monitoring cost (see [12]).

Incentive contracting is only weakly applicable to preventing poaching, because poaching is difficult to observe. To the extent that poaching does affect high-level performance measures of the client or vendor, paying based on profitability or other high-level performance measures may help somewhat. However, this is likely to be a very weak incentive when compared to the much larger gains or damage created by poaching. Investments in monitoring of poaching activity are a reasonable remedy, although limited by the degree of observability of poaching. Information misuse can often be observed only by the capabilities it provides, making it difficult to establish with certainty a direct link between a market outcome and the misappropriation of information. To resolve this uncertainty, it may require extensive access to private information on activities and business processes of the firm engaging in poaching, which may be costly and difficult to obtain. Thus, monitoring may be a relatively costly or limited remedy, although extreme circumstances will justify its use.

There is some risk of incentive contracts actually exacerbating poaching. The primary difficulty is that incentive contracting is often coupled with increased informa-

tion sharing. For example, for a sales agent to be effective and to direct customers to high-profit products to maximize their compensation under a profit-based incentive scheme, the sales agent will need to know a great deal about the relative profitability of different products. This information may have substantial value to the agent (and create substantial losses to the employer) should the agent begin to work for a competitor.

Finally, effective incentive contracts can encourage a firm to invest in the same product characteristics that make poaching profitable. For instance, a supplier that is rewarded for meeting high-quality standards will find more opportunities to resell the resulting products outside of their contract. Indeed, suppliers may even appear to be performing well on contractual terms because they are not only responding to the contractual incentive but have additional incentives from potential reuse.

Transfer of Asset Ownership

In the usual logic of incomplete contracts analysis, asset ownership creates bargaining power, increases the ability to demand compensation, and therefore encourages parties to make noncontractible investments in ensuring product quality or lowering production costs. Therefore, following this logic, transferring assets to the weaker party, perhaps the vendor in some instances, will encourage the vendor to make investments that it would not otherwise choose to make. However, broadening the ownership of assets will typically increase poaching risk in several ways: (1) transferring information by itself creates a basis for poaching; (2) transferring complementary assets may provide the necessary capabilities to reuse other information (e.g., a design is only useful if production capability exists), and thus facilitates poaching; and (3) assets often embed information that can be misappropriated (e.g., transferring a machine that produces a unique product may provide information on the design or the formula for the product itself). Generally, it is optimal to limit asset ownership as much as possible if poaching is a concern, and thus transferring assets has, once again, precisely the wrong effect on the risk of poaching.

Restricted Activities

A key component of contracts is restrictions on certain activities that can be performed by one party or the other. This can simultaneously eliminate unwanted activities and increase incentives for permitted activities in multitask settings [11]. Whereas the idea of exclusion restrictions for incentive purposes seems to have little relationship to poaching, the general idea of restricting activities is quite important. Many types of contractual mechanisms, such as nondisclosure agreements, noncompetition clauses, and limitations of future trade partners, can be effective in limiting poaching if the appropriate set of restrictions can be identified at the time of contracting. The use of these restrictions has many limitations, and thus the technique of limiting poaching through contractual restrictions raises two concerns. First, it may be difficult to identify in advance those activities that should be restricted and it may be difficult to monitor them. This combination of bounded rationality and information asymmetry

produces the uncertainty concerning the outside opportunities, which in turn creates the potential for poaching. Second, these restrictions create opportunity costs for the vendor, which reduce the value of the contract to the vendor and may require increased compensation without adding value for the client.

Bonding

Firms may agree to post a bond to demonstrate willingness or ability to satisfy terms of an agreement. Bonding has two values: first, it guarantees that some resources will be available to compensate the aggrieved party in the case of contractual nonperformance, and, second, it often introduces a third-party arbitrator to oversee whether the terms of the agreement were met. In general, to the extent that poaching is observable and verifiable by a third party, bonding can be effective. Similarly, there are no potential negative consequences caused by using bonding to solve other contractual problems, provided the bonding process does not require additional information to be shared.⁸

Reputation

Reputation is a form of bonding, where the bond itself is implicit. A firm builds up a reputation over time for engaging in appropriate conduct. This forgone opportunism has a cost to the firm, which forms the economic value of their bond. As with bonding, poaching can be prevented by reputation only if it can be detected and credibly communicated to the market. While this type of communication has a reduced burden compared to proving to a third party (e.g., a court) that misappropriation occurred, there are generally few reliable mechanisms for accurate communication of negative information about contractual performance. For instance, it is common for most large-scale IT project disputes to be resolved in private forums (e.g., arbitration) without any public record.

Relational Contracting

Relational contracting is the use of loosely defined contractual agreements that set the rules for future negotiations, but allow terms for the agreement to be a process of ongoing negotiation. Relational contracting works best when there are substantial gains from trade and value from repeated interaction (in essence, this is the equivalent of a reputational bond that is limited to a single relationship rather than the marketplace as a whole). Relational contracts often lead to greater levels of information sharing than normal arm's-length agreements and thus can enhance the opportunities for poaching. However, this sharing may not be risky; the ongoing negotiation process may make it more likely that reuse of information is negotiated rather than seized through poaching. The primary concern of using relational contracting to reduce poaching is that it hinges on observability of poaching—to the extent that poaching is unob-

servable in the short term, it will not damage the relationship and thus will not be an effective deterrent.

Auctions and Competitive Bidding

A very common approach to contracting, especially when key factors (such as the productivity of the vendor or potential set of vendors) are unknown, is to utilize competitive bidding or auction processes. In this mechanism, vendors are prequalified based on an established set of conditions, and then allowed to submit a proposal (or in some cases, simply a bid at a specified cost). In some auctions, the party collecting the bids simply accepts the low-cost bidder. In others, the bidding initiates a round of further negotiations with the best bidders to obtain the best price–quality tradeoff.

Competitive bidding structures are likely to be very problematic in situations where poaching is possible. To the extent that engaging in poaching can provide a revenue stream to offset cost, low bidders are disproportionately likely to be the ones that plan to engage in poaching. Moreover, it is already well known that bidders in common value auctions, where the actual (but not necessarily privately estimated) value of the good is the same for all bidders, often succumb to the “winner’s curse,” where the lowest bidder (the one whose bid was accepted) often wins because they were overly optimistic about their cost. A firm that has erroneously committed to a contract that cannot be profitable for it may have lower relative opportunity costs (e.g., reputational damage) associated with engaging in poaching; that is, the reputational damage from poaching or other contractual abuse may still be less than the financial damage of competing the contract on its original terms. Surely, a firm that faces severe losses due its bidding mistake has greater short-term incentives to recover whatever value it can from the client. In situations where poaching is a real possibility, there is very little possible advantage and potentially substantial disadvantage associated with relying on competitive bidding mechanisms.

Risk Reduction Approaches

There is as yet no standardized list of approaches for solving poaching problems. Several common approaches described above that offer some relief were bonding, monitoring, exclusion of activities (e.g., noncompetition agreements), use of firms with strong reputations that they would not wish to jeopardize, and relational contracting. In addition, we have identified some other approaches that have proven useful in the past in specific settings where the insights might extend outside their original domain. In general, these rules divide into *obscuring information* from the recipient and *enhancing observability* or detection by the information provider. We provide a few examples below.

- *Embed Information in Systems.* Information can be partially withheld by embedding it in software or systems that are passed along as “sealed black boxes.”

The vendor may have full access to the capabilities of the information, but not to the information itself.

- *Encryption/Separation of Models and Data.* Confidential and critical data can be encrypted or kept separate from the information that is necessary to reveal to the vendor to perform a service or build a product. One example is that a vendor can be utilized to build an expert system processing engine, while the business rules and models are available only to client personnel. More recent examples include providing an outside service firm with a “black box” algorithm to perform their task. The vendor can use the algorithm to perform the service function, but does not know the methods or data the algorithm employs.
- *Modularity of Product.* An approach that has been effectively utilized by the Coca-Cola company is to retain complete responsibility for formulating the syrup used to produce their soft drinks, while contracting all the manufacturing and bottling capabilities to franchisees and independent suppliers. As long as the product cannot be easily reverse-engineered and is never disclosed by the company (qualifying it for trade secret protection), this can be effective.
- *Modularity of Processes.* In most cases, poached information has value only if it can be combined with complementary assets. To the extent that information is modular or the complementary physical assets are unique, a firm could distribute different components to different suppliers. This makes it less likely that any single supplier could reconstruct the complete set of information (or information–asset combination) that has economic value. It remains unlikely that a coalition of suppliers could in secret conspire to reconstruct the complete set of information (or information-asset combination) that would enable poaching.
- *Seeding.* For large bodies of information that are likely to have resale value, “dummy” information could be included that may help reveal the presence of poaching. Mailing list vendors and mapmakers have used this strategy for many years.

Conclusion

A Summary and Comparison of Risk Mitigation Methodologies

TRADITIONAL RISK REDUCTION MECHANISMS to control opportunistic behavior include the following:

- using multiple vendors,
- monitoring vendors’ performance,
- providing incentives to vendors, and
- transferring assets to vendors to provide incentives automatically.

We will explore in Table 1 the impact that each of these can have on poaching. We do not consider mechanisms like vertical integration to be a mechanism for reducing the risk of an outsourcing contract while receiving the benefits of outsourcing be-

Table 1. Poaching Is Different: Traditional Forms of Contractual Opportunism, Traditional Mechanisms Used to Control Them, and Their Impact on the Risk of Poaching

Traditional problem	Time for problem to manifest itself	Traditional solution	Impact of the solution on the risk of poaching
Shirking	Immediate	Use multiple vendors, assess performance relative to each other	Increases risk of poaching
Shirking	Immediate	Monitor performance	No impact
Shirking	Immediate	Provide performance bonuses and incentives	No impact
Vendor holdup	Deferred	Use multiple vendors, retain ability to shift work from one to the other	Increases risk of poaching
Underinvestment and incomplete contractability	Deferred	Transfer assets to vendor to increase bargaining power and incentives	Increases risk of poaching

Notes: This brief table compares the various forms of contractual opportunism other than poaching and the traditional mechanisms available to control these risks. As can readily be seen, poaching risks are frequently exacerbated and seldom reduced by the mechanisms used to control other forms of risk.

cause, tautologically, vertical integration is an alternative to outsourcing and thus precludes gaining the benefits of outsourcing.

Findings

Overall, our primary conclusion is that poaching is a distinct contractual risk that is of increasing importance; that is, it is fundamentally different from other forms of opportunism such as shirking (the principal agent problem) and small-numbers post-contractual bargaining. We argue that this form of contractual risk has become increasingly important, as intellectual property has become a more critical resource. And we argue that this form of opportunism is, at best, not well addressed by classical contracting mechanisms or well studied by traditional economics; historically, assets were physical, could be repossessed if necessary, and would ultimately be consumed if they were not returned. The study of poaching does not offer a complete analysis of opportunistic behavior, since principal-agent problems and other risks remain, but it is an important adjunct to the study of contractual opportunism.

While poaching has at best been ignored by mainstream analysis of contractual opportunism, at worst it is actually exacerbated by remedies for various contractual problems suggested by TCE, principal-agent, or incomplete contracts theory. While we are able to identify a number of mechanisms that might perform better, the optimal

contract structure when poaching is a potential difficulty is a promising area of future research from both a theoretical and a practical standpoint. The principal managerial implication of the present work is to identify this newly important form of risk and to highlight effective mechanisms for addressing and mitigating it.

The rise of outsourcing and of interfirm activities that entail the transfer of intellectual property increases the risk of poaching. We would expect both the frequency of high-risk situations and the severity of the risks to increase. As this happens, we would likewise hope that poaching will be recognized as an additional form of opportunistic behavior and will receive the academic study needed to understand and mitigate it in practical situations. Indeed, as the recent paper by Han et al. in this issue of the journal indicates, other researchers are beginning to focus on this problem [9].

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NOTES

1. The earliest examples we have located are Clemons and Row [4] and subsequent work by the same authors. Later examples can be found in Grossman and Hart [8].

2. Clearly, firms would engage in outsourcing or market mechanisms only if they believed that there were benefits to be obtained from forgoing vertical integration. On occasion, however, firms will engage in vertical integration even when there are real benefits to be gained through market solutions. Such outsourcing is termed uneconomic vertical integration and is one of the principal concerns of Williamson and other early writers in the transaction cost literature.

3. By "ownership," we are referring to the economic definition of residual rights of control [10]. In other words, the owner of an asset retains all decisions regarding the use of the asset that are not already specified by law or contract. The most important of these rights is the right to exclude others from using the asset. Clearly, this notion of ownership is problematic for information (except information protected by some form of intellectual property law, such as a patent or copyright), since it is virtually impossible to exclude someone from access to information they already have.

4. Our review of the economics and management literature revealed only two current uses of the phrase "poaching." One refers to unlawful hunting of endangered species, the other to acquisition of staff from competitors. We therefore believe that our use of the term is new, distinct, and unlikely to be confused with references in the prior literature.

5. AMD was retroactively granted rights to the 80386 processor technologies in an arbitration proceeding, later upheld by the U.S. Court of Appeals Ninth Circuit (*Intel Corporation v. Advanced Micro Devices*, No. 92-16899), due to Intel's breach of the original dual sourcing arrangement.

6. This event occurred at different firms in the same industry as in Example 4. The same pseudonyms are retained to shorten the exposition.

7. It is not uncommon in customer service call centers to have 1 hour out of every 40 hours of telephone time for each representative monitored by a supervisor or tape recorded, and evaluated against a set of customer service guidelines. Most customer support centers also allow random monitoring of phone calls by supervisors or client personnel.

8. This could become an issue if a party attempted to collect on a bond. The discovery process of a court proceeding or arbitration can often require substantial revelation of information. This may or may not be suitably protected by protective orders that limit the disclosure of information released in trial or arbitration proceedings.

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