

**A Tale of Two Wages:
Separating Contract from Governance**

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Abstract: This paper distinguishes between governance structure and contractual form. The basic premise is that researchers often confuse these two concepts when they develop or empirically test models within the transaction cost framework. In the paper I utilize a simple principal-agent model to show that transaction cost factors affect both contractual form and governance structure, but not identically. Transaction cost factors that are known to result in employment as a governance structure do not automatically result in contracts characterized by the payment of fixed-wages, as suggested by economic theory. Instead, incentive pay and the delegation of decision-making authority to workers may be preferred by firm owners. The implication is that the relationship between a firm and a worker involves a two stage decision-making process by the firm owner. The first is the choice of governance structure, the second is the nature of the contract linking the worker to the firm.

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1. Introduction

The transaction cost framework recognizes the market and the firm as two alternative forms of governing production and exchange (Williamson, 1975; Masten, 1986; Demsetz, 1988; Hart, 1988) and “market contracts” and “managerial control” representing the two basic ways of contracting for labor services (Coase, 1937; Simon, 1951; Alchian and Demsetz, 1972; Masten, 1988). The hallmark of managerial control is that workers are directed by a manager, who “tells” workers what to do in exchange for a fixed wage payment. This is in contrast to a market contract in which the manager and worker bilaterally agree over the actions the worker will perform and what the payment will be.

The logic of transaction cost economics suggests that employment in a firm will *govern* contracts characterized by the direction of workers by a manager and the payment of fixed wages, and that the market will *govern* market-type contracts (Williamson, 1979). However, scholars often take a stronger position by implying that managerial control as a form of contract is *necessarily* governed by employment within a firm. For example, Holmstrom and Milgrom describe employment in part as having “significant restrictions on worker freedom” (1994, p. 973), and Milgrom and Roberts liken employment to “the traditional assembly line .. [in which] individuals on the line have little or no discretion about what they do and how they do it” (1992, p. 114). Moreover, scholars testing the transaction cost framework in employment relationships rely on this linkage by operationalizing contracts representing “managerial control” by the employment status of workers (see Anderson and Schmittlein 1984; Davis-Blake and Uzzi, 1993). In essence, they test what transaction cost economics has to say about contractual forms by the type of governance structure that exists.

However, employment is not the same as managerial control. Even casual observation indicates that “employment” comprises a number of different types of contractual relationships. Some of these may be considered as agreements between workers and the firm that allow managers to control the actions of

workers in exchange for a fixed wage payment. In other cases, employed workers are not paid fixed wages and told what to do, but rather appear to have substantial discretion granted to them regarding the actions that they may take. These workers typically have contracts that have high-powered incentives and many of the characteristics of market contracting. Moreover, many market-mediated laborers, such as most temporary workers, are subject to significant managerial control and are paid wages, even though they are not formally employed.

The point is that governance structures and contractual forms are not equivalent. *Governance* refers to “alternative institutional modes for organizing transactions” (Williamson, 1979, p. 234) and “the institutional matrix within which transactions are negotiated and executed” (p. 239), while *contract* represents the particular, idiosyncratic exchanges existing between individuals. The purpose of this paper is to show that transaction costs affect both contracts and governance, but not identically. In some instances, transaction costs result in firm employment and managerial control with the payment of fixed wages. In other instances, transaction costs result in firm employment and the granting of discretion with incentive pay. Still other circumstances result in market governance with managerial control and fixed wage payments.

This is not to say that there is no linkage between governance and contract. Williamson (1979) correctly notes that

simple governance structures should be used in conjunction with simple contractual relations and complex governance structures reserved for complex relations ... Use of a complex structure to govern a simple relation is apt to incur unneeded costs, and use of a simple structure for a complex transaction invites strain (p. 239).

What is not clear is the strength of the connection. Is it correct to assume that all contracts of a particular type are governed by the same structure as transaction cost theory suggests? Should labor contracts characterized by the direct monitoring of workers and the payment of fixed wages always be governed by employment? Or, can market processes effectively govern such contracts? Similarly, are high powered contracts best governed by the market? Or, can they be effectively utilized within the firm? These questions are particularly germane when one considers the breadth of market, organizational, and management innovations that have evolved in recent years. For instance, self-managed teams, networks,

virtual organizations, temporary workers, quality circles, employee empowerment, the flattening of hierarchies, and employee leasing services, to name only a few, are being increasingly adopted as alternatives to the more traditional employment-managerial control and market-market contract relationships. By separating the nature of the contract from the governance structure, transaction cost economics can provide considerably more insight not only into positive assessments of organizational effectiveness but also into normative issues regarding how to effectively manage workers. This paper contributes to the transaction cost literature by emphasizing the distinction between governance and contract. Further research needs to be directed at modeling the interrelationships between various forms of contracting and governance structures.

This paper builds on recent research on delegation (Jensen and Meckling, 1992; Minkler, 1993; Aghion and Tirole, 1997), job design (Holmstrom and Milgrom, 1991; Hirao, 1993; Valsecchi, 1996), and the control of agents (White, 1992; Fumas, 1993) by showing that factors that affect the choice between markets and hierarchies also affect the extent to which workers are given control over their activities. One way to think about this is to consider the firm owner's problem as involving two steps. The first is to determine whether workers will be governed by the market or by the firm (transaction cost problem), while the second is to determine the nature of the tasks workers will be assigned (delegation and job design problem). In this paper I examine how transaction costs affect the use of fixed wage and incentive contracts, which is a second stage problem, when market contracting fails in the first stage. The insight offered here is that the choice between fixed wage and incentive contracts – or direct managerial control and worker-granted discretion – is affected by the characteristics of the transaction between worker and firm. That is, the costs that make the granting of discretion relatively more attractive to firm owners than direct managerial control from the principal-agency perspective are often precisely the costs that make managerial coordination attractive from the perspective of the theory of the firm. Thus, when a bilateral market agreement between a firm and worker regarding effort and pay is costly to devise and enforce, it is not entirely clear that the worker will be integrated into the firm, paid a wage, and then subject to managerial authority as suggested by Simon (1951), Alchian and Demsetz (1972), Williamson (1975, 1985) and others. In this paper I examine the relative advantages and disadvantages of contracts in which

workers are directly controlled and monitored by a supervisor and contracts in which workers are granted discretion to act for the firm owner or supervisor when employment is expected to occur.

This paper will first present a brief example to demonstrate the importance of distinguishing between contract and governance. The paper will then outline a simple model contrasting two types of contracts – fixed wages and incentive pay. The model itself is not new but is used to illustrate how transaction costs affect the choice of contractual form. The model will be used to demonstrate that transaction cost factors that are known to result in employment as a governance structure do not always result in contracts characterized by the payment of fixed wages, as transaction cost theory suggests. The implications for testing transaction cost theory in employment relationships will then be examined. The concluding section will relate these findings to the work of other researchers on employment contracting issues and will suggest additional avenues of analysis.

2. Distinguishing Between Governance and Contract: An Example

In order to illustrate why it is important to distinguish between contractual form and governance, consider the Holmstrom and Milgrom (1994) paper on incentive systems within firms. They explain how asset ownership, the level of incentives, and job restrictions are related to the cost of measuring performance, using an earlier study on industrial sales representatives as an empirical foundation to their model. They summarize their findings as follows:

Our main finding is that when the cost of measuring sales performance is high (e.g., because it involves team selling) . . . it is more likely that the agent's optimal incentives will conform to employment: modest commissions, firm ownership of customers, and no right for the agent to sell products of other manufacturers. On the other hand, when performance is easy to measure . . . incentives will conform with the attributes of independent contracting: strong output-based incentives, customer ownership, and freedom to sell products of other manufacturers (p. 974).

At the end of their paper they are presented with a puzzle regarding franchising. They state that "monitoring costs best explain the choice between franchising and company ownership, [but] *the relationship is opposite* to that predicted by our model: the harder it is to monitor a unit (as proxied by the distance to headquarters), the *more likely* it is that the unit is franchised." (p. 988; emphasis in

original). In attempting to explain this contradiction, Holmstrom and Milgrom note differences between franchising and industrial selling. However, they also note the "tight constraints and significant monitoring imposed on franchisees." But this is precisely what their theory predicts! The characteristics of the franchise contract agree with their prediction of what the contract should look like – the *contracts* are restrictive and monitoring is extensive in the presence of high measurement costs, while the *governance structure* is what is unusual (franchising instead of ownership). Because they confused governance with contractual form, they completely missed the relevancy of their model to the contracting problem.

3. A Simple Principal-Agent Model

The model developed below is a simple principal-agent model designed to illustrate the differential effects of fixed wages and incentive pay on employee behavior and to show how contractual form differs from governance. The model is not new, but is based on previous analyses by Milgrom and Roberts (1992), Tirole (1990), and Levinthal (1988). The contribution of this paper is in how the model is used. The basic insight is that transaction cost factors affect both contractual form and governance structure, although the effects are not identical. It will be shown that in some instances, transaction costs result in employment and managerial control; in other cases, transaction costs result in employment and contracts characterized by the granting of discretion to workers.

In presenting the model I assume that a bilateral bargaining agreement is sufficiently costly to both parties; *ex ante* agreements regarding the worker's effort inputs and the firm owner's compensation are unverifiable to third parties (such as a court). The reason for this assumption is to allow me to examine theoretically the types of contractual relations that emerge when market governance fails and firm employment is expected. In doing so I will examine two types of contracts – fixed wage and incentive contracts. Fixed wage contracts have the following characteristics: they pay a fixed wage, and the task performed by the worker is chosen by the firm owner. Contracts of this type represent the idea of managerial coordination in the sense that workers are directed, controlled, and monitored by superiors. Incentive contracts, on the other hand, have the following characteristics: payment varies as a function of

the worker's effort or output, and the task performed by the worker is chosen by the worker. The firm owner's role is to design an incentive contract that will induce the worker to select the action that makes the firm owner as well-off as possible, recognizing the fact that the worker will use the incentives to choose the task that makes him or her as well off as possible. Contracts of this type have the feature that workers have discretion to act for the firm owner in deciding the specific action to perform.

3.1. Description of Model

Suppose a firm owner requires the efforts of a worker to supply some task, $t \in T$, where $T = [0, \infty)$. The action imposes a cost, $c(t)$, on the worker of $c(t) = Rt^2/2$, where R is a parameter representing disutility of effort. The benefit received by the firm owner is $B(t)$. For simplicity, suppose $B(t) = t$. A contract between the worker and the firm owner will consist of two parts: (1) an expression of how the task, t , is determined (whether the firm owner or worker chooses the task), (2) an understanding of how the actions of the worker are evaluated (either through direct observation of t or some observable function of t), and (3) a statement defining the nature of the compensation, w , paid by the firm owner to the worker (either a fixed or variable payment). Assume that the worker is risk averse and that the firm owner is risk neutral. The worker's Certainty Equivalent (CE), CE^w , is defined as

$$CE^w = w - \frac{Rt^2}{2} - \frac{1}{2}rVar(w),$$

where $Var(w)$ is the variance of w , and r is the worker's coefficient of risk aversion.¹ The worker will accept the contractual terms if $CE^w \geq w_0$, where w_0 is the worker's reservation wage. The firm owner's Certainty Equivalent, CE^f , is

$$CE^f = t - w.$$

The firm owner will offer (and thus accept) a contract if $CE^f \geq 0$. The Total Certainty Equivalent, CE^T , is

$$CE^T = CE^w + CE^f, \text{ or}$$

$$CE^T = t - \frac{Rt^2}{2} - \frac{1}{2}rVar(w).$$

¹ I assume that r , the coefficient of risk premium, does not depend upon the average wage. The term $rVar(w)/2$ represents the risk premium a worker would pay to convert a risky opportunity into a risk-free one.

3.2. Fixed-Wage Contracts

Suppose that the task, t , performed by the worker is observable to the firm owner but unverifiable by a third party. *Ex ante* agreements regarding t and w will be too costly to enforce. In this case, the optimal contract is a forcing contract characterized by the payment of a fixed wage $\bar{w} \geq w_o + \frac{Rt^2}{2}$ and an agreement in which the firm owner is allowed to choose the task, t . The optimal task, t^* , that maximizes Total Certainty Equivalent $CE^T = t - \frac{Rt^2}{2}$, is $t^* = 1/R$, and is determined by the firm owner, who assigns this to the worker.² The Total Certainty Equivalent under this first type of contractual relation in which the wage is fixed is

$$CE_1^T = t^* - \frac{Rt^{*2}}{2},$$
$$CE_1^T = \frac{1}{2R}.$$

Under fixed wage contracts, the actions taken by workers are determined by the firm owner who “instructs” the workers what actions or tasks to perform. Such task assignments will be rather specific in nature. For instance, a worker may be told to “type this letter on this letterhead and mail today to this person” or to “cut this piece of wood into pieces of this size and shape using this blade.” Thus, job design is particularly crucial when fixed-wage contracts are utilized, as Holmstrom and Milgrom (1991) argue, since task assignments must be relatively specific and easy for the firm owner to monitor and evaluate. Otherwise, the worker will choose to perform the least costly activities at the expense of the relatively more difficult and important tasks. Furthermore, workers will only do what they are told – and no more – since they have no incentive to choose tasks themselves that increase profits to the firm owner but which may not lead to an increase in their pay. Firm owners not only assign the tasks and pay wages but also monitor the workers’ activities to ensure that the residual returns to the firm owners are maximized (Alchian and Demsetz, 1972; Grossman and Hart, 1986).

² Note that $Var(w)=0$ since the wage is fixed.

3.3. Incentive Contracts

Suppose that the task, t , to be performed by the worker is not observable. *Ex ante* agreements regarding t and w will be too costly to enforce because workers, knowing that t^* cannot be perfectly known, will agree to a wage but have an incentive to perform a suboptimal level of activity. If firm owners expect this they may be unwilling to agree *ex ante* to a wage offer in excess of the worker's reservation wage. In extreme cases, contracting between the worker and firm owner will not occur. An alternative arrangement is a contractual mechanism that will induce "appropriate" behavior by the worker but does not rely on *ex ante* bargaining agreements regarding t and w or agreements in which the firm owner pays a wage and chooses t^* . If there is an observable (and verifiable) outcome that is a function of the task action performed by the worker, then payment could be tied to that outcome. Such contracts are called incentive contracts. The distinguishing characteristic of incentive contracts is that the worker's income is not tied directly to effort but to some (perhaps imperfect) function of effort.

Suppose there is a performance measure that is a function of the worker's chosen task, $x(t)$, and that is observable and verifiable to a third party. For instance, $x(t)$ could be profit or total sales. Suppose $x(t) = \delta t + \mu$, where δ is a parameter representing the sensitivity of x to t and $0 \leq \delta \leq 1$, and μ is an error term with mean zero and variance $Var(\mu)$. For example, μ may represent unforeseen changes in demand, and δ may represent the degree to which worker effort directly affects company profits or sales. For simplicity, I will consider only linear incentive schemes of the form $w(t) = a + bx(t)$.

Under this wage scheme, the worker's Certainty Equivalent is

$$CE^w = a + b(\delta t + \mu) - \frac{Rt^2}{2} - \frac{1}{2}rVar(a + b(\delta t + \mu))$$

$$CE^w = a + b\delta t - \frac{Rt^2}{2} - \frac{1}{2}rb^2Var(\mu).$$

The worker will choose the task, t' , that maximizes CE^w , yielding $t' = b\delta/R$. Note that task effort increases in b and δ , and decreases in R . The choice of task level, t' , chosen by the worker is a function of the degree to which income increases as effort increases, the sensitivity of the performance measure to worker actions, and the disutility of effort. Note also that when $b = \delta = 1$, then the worker receives the full marginal returns from additional effort and $t' = t^*$.

The firm owner's objective is to choose the optimal incentive intensity, b , given that the worker will choose $t' = b\delta/R$. This is done by maximizing the Total Certainty Equivalent, subject to $t' = b\delta/R$. That is, choose b^* to

$$\begin{aligned} \text{Max CE}^T &= t' - \frac{Rt'^2}{2} - \frac{1}{2}rb^2\text{Var}(\mu) \text{ subject to } t' = \frac{b\delta}{R}, \text{ or} \\ \text{Max CE}^T &= \frac{b\delta}{R} - \frac{b^2\delta^2}{2R} - \frac{1}{2}rb^2\text{Var}(\mu), \end{aligned}$$

which yields $b^* = \delta/[\delta^2 + Rr\text{Var}(\mu)]$. Let $K = r\text{Var}(\mu)$. Then, $b^* = \delta/[\delta^2 + RK]$.³ This relationship suggests that the incentive intensity chosen by the firm owner is affected by the sensitivity of the performance measure to actions taken by the worker, the worker's disutility of effort, and how sensitive the worker is to the riskiness of the incentive mechanism.

A simple rearrangement of the optimal incentive intensity yields $\frac{\delta - \delta^2 b^*}{R} = b^* K$. This equation defines the optimal incentive intensity in terms of net marginal gains and marginal costs to the worker. Marginal costs increase as K increases; the higher the variance of income is or the relatively more risk averse the worker is, the lower or weaker the incentive intensity will be, other things equal. Net marginal gains increase as δ increases (assuming $\delta^2 \leq RK$).⁴ This suggests that the more sensitive the performance measure is to actions taken by the worker, the stronger the incentive intensity should be. Net marginal gains decrease, however, as R increases, suggesting that the higher the disutility of effort is, the weaker the incentive intensity should be. Milgrom and Roberts (1992, ch. 7) suggest another interpretation of R as being inversely proportional to the responsiveness of the worker's choice of task to changes in incentives. In other words, R may represent the ability of the worker to change tasks. The higher R is, the relatively more difficult it is for the worker to change what he or she is doing or to respond to incentives effectively. This suggests that the more a worker is able to change his or her tasks (the lower R is), the stronger the incentives should be. As Milgrom and Roberts state, "An employee with wide discretion

³ I assume that there is no "gaming" over the identification of K . However, clearly this assumption is not entirely realistic, since K is known to the worker but not to the firm owner. Therefore, the firm will likely need to employ some type of incentive compatible revealing mechanism to determine K accurately.

⁴ The partial derivative of b with respect to δ is $\frac{\partial b}{\partial \delta} = \frac{RK - \delta^2}{(\delta^2 + RK)^2}$. The derivative is non-negative when $\delta^2 \leq RK$.

facing strong wage incentives may find innovative ways to increase his or her performance, resulting in significant increases in profits” (1992, p. 222).

Given that $t' = b\delta/R$ and $b^* = \delta/[\delta^2 + RK]$, the Total Certainty Equivalent under the incentive contract is

$$\begin{aligned} CE_2^T &= t' - \frac{Rt'^2}{2} - \frac{1}{2}b^{*2}K, \\ CE_2^T &= \frac{b^*\delta}{R} - \frac{b^{*2}\delta^2}{2R} - \frac{1}{2}b^{*2}K, \\ CE_2^T &= \frac{\delta^2}{R(\delta^2 + RK)} - \frac{\delta^4}{2R(\delta^2 + RK)^2} - \frac{K\delta^2}{2(\delta^2 + RK)^2}, \\ CE_2^T &= \frac{\delta^2}{2R(\delta^2 + RK)}. \end{aligned}$$

Under contracts of this type, the actions taken by the worker are determined by the worker. Firm owners “control” what workers do only by manipulating the incentive intensity, b . Moreover, firm owners may assign “tasks” to workers, but they will likely be general in nature; a task “assignment” may be to hit a certain target of $x(t)$, with the delegation of authority over the specific tasks given to the worker (see Aghion and Tirole, 1997). The worker then chooses the appropriate task, t , given the incentives, b . For instance, the firm owner may instruct the worker to choose actions that increase sales, with pay tied to sales, but he will not assign specific tasks for the worker to perform since the firm owner will be unable to observe such actions – only the outcomes or effects of the worker’s actions.

3.4. Comparing Fixed-Wage and Incentive Contracts

Traditional microeconomic theory provides considerable understanding into the relative advantages and disadvantages of fixed wage and incentive contracts. The basic insight is that fixed wages and incentive compensation result in a tradeoff between risk sharing and incentives (Stiglitz, 1987; see also Miller, 1992). Since firms are generally less risk averse than their employees, firms should absorb random income flows and pay workers a fixed wage. However, the payment of a fixed wage provides workers with little incentive to improve productivity and increase firm profits. Conversely, compensation that links pay to performance provides the appropriate incentives for workers to work hard in the interest

of the firm but forces them to bear risks that both management and workers agree should be born by the firm.

In general, fixed wage contracts dominate incentive contracts. That is, it is readily shown that $CE_1^T \geq CE_2^T$. Recall that $CE_1^T = \frac{1}{2R}$ and $CE_2^T = \frac{\delta^2}{2R(\delta^2 + RK)}$. Note that

$$\frac{1}{2R} \geq \frac{\delta^2}{2R(\delta^2 + RK)},$$

since $\frac{\delta^2}{(\delta^2 + RK)} \leq 1$ for any $0 \leq \delta \leq 1$, $R \geq 0$, and $K \geq 0$. Thus, $CE_1^T \geq CE_2^T$. In other words, the Total

Certainty Equivalent from fixed wage contracts exceeds the Total Certainty Equivalent from incentive contracts.

There are two reasons for this (see Levinthal, 1988). First, under incentive contracting the expected wage bill exceeds the expected wage bill for fixed wage contracts for any task level, t , other things equal. This is shown as follows: Let $w_1 = w_o + \frac{Rt^2}{2}$ represent the anticipated fixed wage and $w_2 = a + b\delta t$ represent the expected incentive wage. We need to show that $w_1 \leq w_2$ for any t . This will be true if

$$w_o + \frac{Rt^2}{2} \leq a + b\delta t.$$

Note that $t = b\delta/R$, or $b = tR/\delta$, under the incentive contract. Then,

$$w_o + \frac{Rt^2}{2} \leq a + Rt^2, \text{ or}$$

$$w_o \leq a + \frac{Rt^2}{2}.$$

We need to show that this relation is valid. Recall that the worker will only accept the incentive contract if his Certainty Equivalent exceeds his reservation wage. Thus, if CE_2^w is the worker's total Certainty Equivalent from the incentive contract, then

$$w_o \leq CE_2^w = a + \frac{Rt^2}{2} - \frac{1}{2}b^2K$$

must be true before the worker will accept the contract. If this is the case, then it must be that

$$w_o \leq a + \frac{Rt^2}{2},$$

since $\frac{1}{2}b^2K \geq 0$. Thus, $w_1 \leq w_2$.

In other words, incentive wages must be proportionally greater than fixed wages. The reason is that workers must be compensated for bearing a portion of the risk when pay is tied to a variable, uncertain outcome. Risky wages must, on average, exceed risk-free compensation, other things equal.

Second, effort is lower, other things equal, under incentive contracts than effort determined by the firm owner under fixed wage contracts. This is easily proven: If t^* is the optimal task assignment under the fixed wage contract, and t' is the optimal task determined under incentive contracting, then

$t^* \geq t'$ if

$$\frac{1}{R} \geq \frac{b^* \delta}{R}, \text{ or}$$

$$\frac{1}{R} \geq \frac{\delta^2}{R(\delta^2 + RK)},$$

where $b^* = \delta/[\delta^2 + RK]$. This relation holds, since $\frac{\delta^2}{(\delta^2 + RK)} \leq 1$ for all $R \geq 0$ and $K \geq 0$. Thus, $t^* \geq t'$.

The reason that effort is lower under incentive contracting is that effort must be induced indirectly through incentives. In other words, for each dollar paid under fixed wage and variable pay contracts, effort derived through variable wages is lower than effort under fixed wages, since a portion of the incentive wage payment must compensate the worker for the bearing of risk.

Therefore, high effort requires wages to be proportionately higher when wages are tied to imprecise performance measures than when wages are fixed and effort is determined by the firm owner. This leaves firm owners with a tradeoff. Higher effort may result in higher profits, but the effort must be induced through relatively higher wages. As long as the increase in wages does not result in lower net profit, then firm owners will be willing to induce the higher effort. However, this also suggests that firm owners may tolerate lower than desired effort, or slacking, rather than induce higher effort through higher wages. This tradeoff between the efforts of workers and the payments of wages is precisely the problem firm owners face when designing incentive systems (Stiglitz, 1987), which helps explain in part why firms are reluctant to link compensation to the performance of workers (Miller, 1992, ch. 5; Lawler, 1971; see also Kruse, 1993 and O'Dell and McAdams, 1987).

If fixed wage contracts dominate incentive contracts, other things equal, why don't firm owners universally use them? The answer, as one would expect, is that other things are not equal. There is a cost to using a fixed wage contract that reflects the ability of the firm owner to observe and verify worker activities.

The reason that some workers are paid a flat wage and are "told what to do," while other workers are not told what to do but appear to have substantial discretion to choose their activities, reflects the relationship between the cost of observing and verifying worker tasks and the agency costs associated with the use of incentive wage contracts. Agency relationships of the type characterized by worker-granted discretion and the use of incentive pay exist because the cost of observing and verifying worker activities through direct managerial oversight exceeds any gains firm owners may realize by using fixed wage contracts. Under these circumstances, firm owners may be willing to accept the fact that profits may not be fully maximized when workers are delegated authority and paid variable wages because alternative forms of organizing are "too costly" (Levinthal, 1988). In fact, the payment of fixed wages and the direct supervision of workers may be problematic for firm owners, even if the monitoring of workers is costless, since factors other than informational ones may affect the contractual relationship between workers and firm owners (White, 1992). This fact seems to have been overlooked by many transaction cost scholars examining the "make or buy" decision.

For instance, Williamson (1985) has observed, and Holmstrom and Milgrom (1991, 1994) have shown, that fixed wage contracts are predominant in employment relationships. The reason, they argue, is that if workers use and develop assets owned by others (which is how they define employment), and if assets are hard to value, then workers will not devote sufficient time to "asset development" if pay is tied to performance or output measures. Workers will devote a relatively larger proportion of time to activities most closely tied to the verifiable performance measures. The payment of a fixed wage and the assignment of tasks by the asset owner to the worker is optimal because the asset owner can allocate worker effort to asset development and other activities in order to maximize total profit. However, this assumes that asset owners are able to observe worker activities at little or no cost; it assumes that fixed wage contracts may be implemented at little or no cost. If this were true, then there would be no reason to

choose between fixed wage contracts and incentive contracts in the first place, since fixed wage contracts clearly dominate. Stated differently, if firm owners have the option of choosing fixed wage contracts at little or no cost, then why bother with the determination of incentive mechanisms that rely on (perhaps) imperfect measures of worker effort and that may result in lower worker effort, lower profits, and lower total social welfare? Why not directly observe worker effort and pay workers accordingly?

4. Transaction Costs and the Choice of Contractual Form

Firm owners will adopt fixed wage contracts if the costs associated with observing and verifying worker effort do not exceed the net gains from such contracts. That is, firm owners will choose to exercise the right of control and to “tell workers what to do” if

$$z = CE_1^T - CE_2^T \geq m,$$

$$z = \frac{1}{2R} - \frac{\delta^2}{2R(\delta^2 + RK)} \geq m,$$

$$z = \frac{K}{2(\delta^2 + RK)} \geq m,$$

where z is the opportunity cost of utilizing incentive contracts and worker-granted discretion relative to the use of direct control and the payment of fixed wages (i.e., the foregone gain associated with fixed wage contracts), and m is the cost of observing, verifying, and managing worker effort directly.

Conversely, firm owners will utilize incentive contracts and allow workers to decide what to do if $z < m$.⁵

The cost of contractual relationships characterized by incentive mechanisms and worker-granted discretion as derived above is a function of the sensitivity of the performance measure to worker activities, the worker’s disutility of effort, and the degree to which risk affects the worker. More generally, these costs are a function of the characteristics of the worker (through R and K) and the characteristics of the tasks required by the firm owner (through δ , K , and R , if R is interpreted as the

⁵ This discussion is in the spirit of Jensen and Meckling (1992), who show how the delegation of decision rights is affected by the “costs owing to inconsistent objectives” (when decision rights are delegated to workers) and the “costs owing to poor information” (from monitoring and coordinating the activities of workers directly). While Jensen and Meckling describe the problem along a continuum, I assume the choice is discrete. Firm owners choose either fixed wages and decision-making authority held by management or incentive pay with workers having the decision rights.

ability of workers to change task assignments). Therefore, we may expect transaction-specific factors, in addition to the individual characteristics of the worker, to affect the cost of agency relations, just as we expect transaction-specific characteristics to affect the cost of direct managerial control. In other words, transaction cost factors are expected to affect the nature of the contract, as *transaction* cost economics suggests, with the emphasis on the specific transaction itself.

Moreover, factors that increase the cost of direct managerial control may be the factors that make bilateral bargaining and market coordination costly from a governance perspective. And factors that increase the cost of delegating authority to workers may also be factors that make market contracting costly. Thus, when market coordination as a form of governance fails due to substantial transaction costs, it is not at all obvious what the resulting contractual relationship will look like, even though firm employment is expected. Employment contracts may be characterized by fixed wages and the direction of workers by the firm owner, or they may be characterized by agency relations, the ability of workers to choose their own tasks, and incentive-type contracts. The specific form the contract takes is affected by the relative costs of each alternative type of contract, just as governance is affected by the costs of transacting. As an illustration of this point, consider two examples of particular types of transaction costs that make governance through firm employment preferable to market-based exchanges.

4.1. Team Production and Task Interdependence

Alchian and Demsetz (1972) argue that when production requires a team effort, market contracts will be too costly to implement and enforce because they will be unable to circumvent free riding or shirking by the workers. The reason is that when workers participate through a team effort, the marginal contributions of workers will be difficult to determine precisely enough so that bilateral agreements can be made between each worker and the firm, with pay tied to the workers' individual efforts. Alchian and Demsetz conclude that a relatively more efficient form of organizing would involve a substantially different governance structure and contractual relationship if the workers agree to be paid a wage and to be directed and monitored by a capital owner. If the capital owner is also the residual claimant, then he will have an incentive to ensure that each worker is working as efficiently and effectively as possible by

monitoring and controlling their actions. The result is the traditional firm organization, with employees subject to managerial control and paid a fixed wage.

This conclusion can be illustrated using the model developed above. Suppose δ represents (inversely) the extent to which workers participate in team production. An increase in the difficulty of determining a worker's marginal contribution because of his involvement in a team is represented by a decrease in the sensitivity by which the performance measure is affected by an individual worker's actions, or δ . That is, it is assumed that the more extensive team involvement is, the lower δ will be.

Taking the partial derivative of z (agency costs) with respect to δ we obtain

$$\frac{\partial z}{\partial \delta} = \frac{-K\delta}{(\delta^2 + RK)^2} \leq 0.$$

This suggests that agency costs will increase as δ decreases or the extent of involvement in team production increases. Consequently, we expect that fixed wage contracts will be relative more attractive than incentive contracts and worker-granted discretion when δ is low. Therefore, when production requires a team effort and market coordination is untenable, then the resulting alternative contractual form is likely to be characterized by the "classical" firm in which capital owners pay wages to workers and direct and monitor their activities.

4.2. Uncertainty

In his seminal work on the nature of employment, Simon (1951) shows that market exchanges are relatively less efficient than employment in a firm if there is uncertainty at the time the market contract is made regarding the specific action the worker should take. Simon argues that "employment" as a governance structure dominates because the choice regarding what action the worker should take can be delayed until the action needs to be taken when contracts are governed by firm employment. In presenting his model, Simon defines employment as the payment of a fixed wage and the direction of the worker by a firm manager. The model developed above, however, can be used to show that uncertainty may not necessarily lead to direct managerial control as Simon suggests, even though employment is expected. As shown below, uncertainty may increase the cost of managing relative to the cost of the

granting of discretion, thus favoring indirect managerial control, agency relations, and the use of incentive compensation, rather than the payment of fixed wages and direct managerial oversight.

For instance, suppose there is some uncertainty regarding the specific task, t , that the worker should engage in. Specifically, suppose that the manager knows that the Total Certainty Equivalent maximizing task, t^* , is “around” $t^*=1/R$, but that the manager is uncertain precisely where it is. Let $\tilde{t} = \frac{1}{R} + \tau$, be the optimal task selected by the manager, where τ represents the degree to which the firm owner is uncertain about the optimal task that the worker should perform. Observe that when $\tau=0$ then $\tilde{t} = t^*$.

The Total Certainty Equivalent under a fixed wage, managerially-assigned task contract is

$$\begin{aligned} CE_1^{T'} &= \tilde{t} - \frac{R\tilde{t}^2}{2}, \\ CE_1^{T'} &= \frac{1}{R} + \tau - \frac{R}{2} \left(\frac{1}{R} + \tau \right)^2, \\ CE_1^{T'} &= \frac{1}{2R} - \frac{R\tau^2}{2}. \end{aligned}$$

In this case

$$z' = CE_1^{T'} - CE_2^T = \frac{K}{2(\delta^2 + RK)} - \frac{R\tau^2}{2}.$$

Differentiating with respect to τ we obtain the result that

$$\frac{\partial z}{\partial \tau} = -R\tau \leq 0.$$

Other things equal, the opportunity costs of agency relationships are relatively lower the greater is the manager’s uncertainty regarding the specific action the worker should take. Stated differently, when firm owners are uncertain about the specific assignment the worker should engage in, the benefits of direct managerial control are reduced and may in fact be less than the costs of monitoring and evaluating the specific assignments of the worker.⁶ Hence, while market contracting will likely fail in the presence of uncertainty, the resulting alternative contractual form that emerges may not necessarily be one characterized by the payment of wages and the subjection of workers to authority by firm owners, as

⁶ The costs of managing under uncertainty may be represented by $m + \frac{R\tau^2}{2}$.

Simon (1951) suggests. Rather, firm owners may grant discretion to workers to choose the actions themselves, especially if workers have more knowledge regarding the best actions to take (see Jensen and Meckling, 1992; Minkler, 1993; Aghion and Tirole, 1997). Payment will likely be linked to some (perhaps imperfect) performance measure, and managerial control will be implicit through the incentive mechanism. We expect that this form of organizing will differ substantially from organizations developed around direct managerial control and supervision of workers. For instance, if technological changes or improvements in production process technologies make it more difficult for firm owners or managers to determine what workers should do, firm owners may be better off shifting decision-making responsibilities to workers. It also suggests why some firms may reorganize their firms by flattening hierarchal structures and increasing the degree of authority and responsibility worker's have over their activities.

5. Testing for Transaction Cost Effects on Contractual Form and Governance Structures

When examining the nature of the relationship between firm owners and workers, transaction cost factors are expected to affect both the governance structure and the contractual form. However, as shown above, it is not clear whether the resulting contract will be characterized by the payment of fixed wages or by the use of incentive pay. Consequently, researchers examining the degree to which transaction cost economics explains the employment relationship must be careful how they develop and test their models. A reasonable approach is to examine the problem of how firm owners link workers to their organizations in two steps. The first is to examine governance, and the second is to investigate the characteristics of the contractual relationship.⁷

Empirical tests of the relative advantages of employment and markets generally take the following form: If G_i represents the structure governing the contractual relationship between a worker, i , and firm, then

$$G_i = G_i^e \quad \text{if } L_i^e(X_i) \leq L_i^c(X_i)$$

⁷ The order in which the decisions are made is not important. We can easily imagine firm owners who decide first on the nature of the contract and then choose the governance structure.

$$G_i = G_i^c \quad \text{if } L_i^e(X_i) > L_i^c(X_i)$$

where G_i^e is employment and G_i^c is market contracting, $L_i^e(X_i)$ is the cost of employing and $L_i^c(X_i)$ is the cost of transacting in the market, and X_i represents transaction-specific factors. Because $L_i^j(X)$, $j=e, c$, is difficult to observe directly, we can test for the likelihood a worker will be employed according to the relation

$$\text{prob}(L_i^e(X_i) \leq L_i^c(X_i)) = \text{prob}(G_i = G_i^e | X_i),$$

which can be estimated using standard limited dependent model methods.

Similarly, we can let H_i represent the contract linking the worker to the firm, then

$$H_i = H_i^m \quad \text{if } m_i(X_i) \leq z_i(X_i),$$

$$H_i = H_i^z \quad \text{if } m_i(X_i) > z_i(X_i),$$

where m_i is the cost of directly controlling and monitoring workers and z_i is the cost of worker-granted discretion and incentive contracting.⁸ Since managing and agency costs are also difficult to observe directly, we can use the relationship

$$\text{prob}(m_i(X_i) \leq z_i(X_i)) = \text{prob}(H_i = H_i^m | X_i)$$

to test for the likelihood that we observe either fixed wage or incentive contracts.

If transaction cost factors that lead to employment also lead to managerial control, then we may conclude that employment is characterized primarily by the payment of fixed wages and the direct control of workers. In this case we may say that employment as a governance structure is generally equivalent to managerial control and associated contractual forms. However, if transaction cost factors lead to employment but do not lead to managerial control, we may conclude that employment, in this case, is not characterized by traditional forms of managerial control, but rather represents contractual relations characterized by worker-granted discretion. The point is to distinguish between tests of governance structure and tests of contractual form. If researchers develop a model that is couched in terms of contractual form, but test the model using the employment status of workers as the “measure” of

⁸ I am assuming here that the contracts are discrete and can be represented as either fixed wage or incentive pay.

managerial control, then they are conducting the wrong test. Thus, a test of a model of contracting must examine the nature of the contractual relationship rather than the employment status of workers.

6. Conclusions

This paper has shown the importance of distinguishing between governance structure and contractual form. This distinction is only important when researchers focus on the extent to which human, rather than physical, capital inputs are integrated within a firm's organization. The reason is that the firm ownership and the control of capital are generally regarded as synonymous (see Klein, Crawford, and Alchian, 1978; and Grossman and Hart, 1986). However, there are several reasons why the integration of labor is expected to differ from that of capital. First, there are important differences in the ways physical and human capital are utilized in production; hence, contracts governing their relationships will likely reflect these differences. Second, unlike capital assets, labor cannot be integrated through ownership. Third, while the integration of labor can generally be terminated "at will" by either the firm or the worker, the ownership of physical capital may only be terminated by the asset owner; physical assets cannot walk away. Finally, there are significant distinctions in the law regulating the ownership and transfer of physical capital and in the law governing contracts that define the relationship between worker and firm. For these reason, we expect transaction cost factors to affect both governance and contract in the case of organizing workers. By examining factors that affect both governance structures and contractual relationships, we can gain a greater understanding into a number of important issues relating to delegation, job design, and other contracting issues, as well as findings of other researchers.

For instance, the analysis by Holmstrom and Milgrom (1994) on incentives within firms described at the beginning of this paper is based in part on the empirical work of Anderson and Schmittlein (1984), who examined factors affecting the employment of sales representatives. They found that sales representatives are more likely to be employed than retained as independent contractors the more difficult it is to evaluate the performance of the sales staff. Holmstrom and Milgrom (1994) suggest that this is because hard to monitor cases should be associated with low-powered incentives and firm

ownership of customer lists, factors they equate with employment. An alternative explanation for the employment of sales representatives is that hard to monitor cases may require more judgment on the part of the representative than not-so-hard to monitor cases. Anderson and Schmittlein hint at this possibility by recognizing that “selective judgment” by employees may be preferable to relying on “defective” measurements required with market contracts (1984, p. 338). Thus, sales representatives may be employed so that they decision rights over “selective” issues may be delegated to the workers.

As a further illustration of the advantages of distinguishing between contract and governance, consider the paper by Aghion and Tirole (1997) on control and delegation. They distinguish between formal and real authority and show how these are allocated within organizations, based on factors such as span of control, performance measurement conditions, and reputation, among others. Because an increase in an agent’s delegated authority results in a loss of control by the principal, they show how monetary incentives can affect the degree of control principals have over their agents, thus providing a reasonably effective “check” on the actions agents may take. Their analysis suggests that contracts, and the monetary incentives embodied by the contracts, will change as the allocation of real authority varies within firms, just as the allocation of formal authority is affected by different governance structures. The distinction they make between formal and real authority is consistent with the distinction between governance structure and contract as outlined in this paper. The analysis presented here supports the conclusion that formal authority is expected to be related to governance structure, while real authority is defined by contractual relationships.

The distinction between contract and governance also helps us understand the importance of job design, as illustrated by Holmstrom and Milgrom (1991). In their paper they argue that job design affects the incentives agents face when choosing among a variety of tasks to complete, since increases in pay linked to one activity will result in the reallocation of effort away from other activities. The analysis presented above suggests that the issue of job design is primarily a contractual one, rather than a governance problem. Contractual elements, such as monetary and non-monetary incentives and monitoring mechanisms, are the primary factors affected by job design, rather than the employment status of workers. Thus, employment is expected only to the extent that it best governs contracts

characterized by the payment of fixed wages when the grouping of tasks is difficult to monitor, but not necessarily because the measurement of activities is difficult.

Previous work in transaction cost economics places undue emphasis on the connection between contractual form and governance. This is due in part because researchers assume that there is a direct relationship between contract and governance. Further research needs to be directed at examining theoretically how contracts are linked to different governing structures, and how transaction cost factors affect both contracts and governance.

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