



Legal systems, information asymmetry, and firm boundaries: Cross-border choices to diversify through mergers, joint ventures, or strategic alliances

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Abstract

We examine how the organizational structure for diversification decisions involving firms from different countries is affected by the institutional context of the target country. Our theoretical analysis suggests that, as legal systems improve and information asymmetry is reduced, a transition from relational, “firm-like” arrangements to arm’s length, “market-like” arrangements takes place. If institutions continue to improve, eventually a threshold is crossed after which arm’s length deals edge out internal firm contracting. We provide an empirical test of the model using the sample of international strategic alliances, joint ventures and cross-border mergers involving US firms. Our empirical findings support the predictions of the theory. In addition, we document that US companies entering organizational structures predicted by our model are associated with greater abnormal returns around deal announcements.

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INTRODUCTION

Once firms from different countries, operating in different capital markets, and subject to different legal and disclosure systems, decide to combine their assets, how should this combination be undertaken? Do multinationals prefer arm’s length arrangements, such as strategic alliances and joint ventures, or closer ties such as mergers? How are these choices affected by the quality of legal and accounting institutions of the target country? How do intermediation problems arising from legal differences and the existence of informational asymmetries affect firm boundaries? In this paper we attempt to provide answers to these questions by means of a theoretical framework and an empirical analysis using cross-country data on strategic alliances, joint ventures, and mergers.

Interest in the boundaries of the firm has been reinvigorated by the unprecedented levels of mergers and acquisition activity of the past decade, together with the globalization of this activity as firms from developed countries such as the US have sought to enter new

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markets in emerging and transition countries. At the same time, recent finance research has shown that global diversification efforts may be associated with significant costs. Denis, Denis, and Yost (2002) document that globally diversified firms trade with discounts up to 30% (compared with their non-diversified counterparts). Similarly, Black, Carnes, Jandik, and Henderson (2007) and Moeller and Schlingemann (2005) show that cross-border mergers are associated with lower acquisition abnormal returns and poorer post-merger stock and accounting performance. Recent studies have also suggested that differences in financial laws and disclosure still significantly influence the shape of inter-firm financial contracts, as well as firm boundaries, especially among companies operating in substantially different financial markets.¹

In this vein, our approach is motivated by the literature on the benefits and costs of global diversification, as well as by the “law and finance” literature (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000). However, rather than the extent of diversification (whether or not to diversify, and why), our focus is on the strength of cross-border diversification. Our paper is also related to the rapidly developing literature on the industrial organization of international trade, with papers such as Antràs (2003), Antràs and Helpman (2004), and Feenstra and Hanson (2005) being closely related. These papers are concerned with the integration vs outsourcing decision in the context of international trade. However, an important distinction is that we examine a broader range of relationships (mergers, joint ventures, and strategic alliances) between firms, as well as relate these arrangements to cross-country evidence on institutional inadequacies.

In our theoretical framework, we associate institutional development with a better ability to measure performance objectively and thus support arm’s length contracts between the parent firm and a potential subsidiary. The development of a robust and sophisticated legal system and financial intermediation sector is better able to process and interpret firm performance. While this is a specific interpretation of institutional development, it comes under the rubric of institutions as rules, enforcement mechanisms, and organizations.² The goal of our theoretical framework is to understand how contractual arrangements between firms are affected by differences in the severity of the information asymmetry between the parent firm in a developed country (such as the United States)

and the target-country based subsidiary. In order to do this, we consider the possibility of two modes of contractual governance between the parent firm and a potential subsidiary, arm’s length explicit contracts reliant on formal institutions; and relational, implicit contracts that depend on repeated game, reputational considerations.³ Following Demsetz’s (1993) interpretation of Coase (1937), we consider relational contracts to be more “firm-like”, and formal arm’s length contracts to be more “market-like”. We believe therefore that this assumption is consistent with the extensive literature on the theory of the firm that emphasizes incentives within the organization being less market-like than those across organizations.⁴ Consequently we associate relational contracts with stronger ties, and formal arm’s length contracts with weaker ties.

We allow the two modes of contracting to coexist, and examine how the mix between the two changes as institutions improve. We find that, starting from very low levels of institutional development, as we move to situations with higher-quality institutions the two modes of contracting complement each other. The intuition is that, even though the reliability of arm’s length contracting improves if institutions improve, until such contracts are able to stand on their own, the improvement in their reliability serves to increase the value of the ongoing repeated relationship. Relational contracting is therefore strengthened over this range of institutional development. However, if institutional development reaches higher levels, eventually a threshold is crossed after which arm’s length contracts edge out relational contracting. The two modes of contracting become substitutes after this point.

We test our model implications empirically by examining diversification choices of US firms. We study how contractual arrangements between a US-based business entity and a foreign firm vary across countries with different institutional quality. Our main focus is on analysis of choices between international strategic alliances or joint ventures (reflective of more “market-like” relationships between firms) and cross-border mergers involving US bidders (representing more “firm-like” relationships). Our empirical results support the predictions of our theoretical model. We measure the quality of a foreign country’s legal systems by the “Rule of law” index (Kaufmann, Kraay, and Zoido-Lobaton, 1999), which was shown by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997) to be the most significant determinant of the

capital market development. The extent of information asymmetry is measured by the quality of accounting index generated by the Center for International Financial Analysis and Research (CIFAR). Rajan and Zingales (1998a) find that this variable is significantly positively related to the rate of economic growth. Our results show that firms from countries with legal and accounting systems of either high- or low-quality enter primarily market-like contractual arrangements (joint ventures or strategic alliances) with their US counterparts. On the other hand, firms from countries with average-quality legal or accounting standards are more likely to form firm-like contracts (mergers) with US firms. Our results are significant both statistically and economically. Compared with companies with average-quality legal (accounting) standards, the decline in relative propensity to enter mergers is 52% (50%) for firms with poor-quality legal (accounting) standards and 10% (16%) for firms with high-quality legal (accounting) standards.

We find that contractual choice has significant economic consequences for the US participants. US firms entering organizational structures predicted by our model generate significantly greater shareholder gains around deal announcements. These findings suggest that for each potential deal there indeed exists an optimal organizational structure maximizing shareholder value.

The rest of the paper is organized as follows. The next section outlines the theoretical framework for our model. This is followed by a presentation of the model analysis, and then a description of our empirical analysis. The final section concludes.

THEORETICAL FRAMEWORK

In the theoretical literature, Coase's (1937) insight that the choice between locating transactions within a firm and in the market depends on the transaction costs of each form of economic organization continues to influence the recent resurgence of interest in the boundaries of the firm.⁵ The research program that dominated the question in the last decade – the property rights approach, pioneered by Grossman and Hart (1986) and Hart and Moore (1990) – has most recently led to a broader view of the firm as a complex mechanism for coordinating and motivating individual activities (Holmstrom, 1999; Holmstrom & Milgrom, 1994; Rajan & Zingales, 1998b, 2001). This most recent strand of research is characterized by a reassertion of the importance of measurement costs

of the kind stressed by Alchian and Demsetz (1972), and a recognition that ownership of critical resources, reminiscent of the resource-based view of the firm (see Montgomery, 1994; Penrose, 1959; Wernerfelt, 1984), is an important source of power for the entrepreneur. Measurement problems and ownership of critical resources are both important ingredients of the framework we present here. Our framework is based on Kali (2002), which combines the subjective performance evaluation model of Baker, Gibbons, and Murphy (1994) with the resource-based view of the firm (see Montgomery, 1994; Penrose, 1959; Wernerfelt, 1984).

The starting point for our theory is the notion that at the root of many diversified conglomerates is a “core” firm or entrepreneur with a unique critical resource that is an essential component in a wide variety of activities.⁶ Examples could be access to funds, ownership of critical raw materials, access to restricted licenses, privileged access to the seat of political power, a reputation for superior quality, or a superior management technique. Ownership of the critical resource enables the core firm to expand into different areas by establishing relationships with other subsidiary firms whose capabilities are situated in these areas. Since our context is that of international diversification, the core firm is considered to be the US-based multinational, while the subsidiaries are foreign firms located in target countries.

There is moral hazard between the US-based key firm and the foreign subsidiaries. In contracting with them for their outputs, the US core has at its disposal subjective and objective measures of performance evaluation. Contracts involving the subjective measure are what we refer to as *relational contracts*, and those involving the objective performance measure are referred to as *explicit contracts*. The further away the subsidiary activities are from the location of the “core” of the conglomerate, the more costly it is to assess performance subjectively under relational contracts. We thus use a spatial metaphor to represent the idea that it is easier for the core to obtain subjective data on activities or individuals that are less disparate from or “closer” to the core. However, the quality of the subjective performance assessments is assumed not to degenerate with distance from the core. For the same reason, relational contracts are assumed to be less “noisy” instruments of performance evaluation than explicit contracts. The objective performance measure is noisy, but the cost of obtaining it does not vary with distance from the core. In our model,

the US-based core chooses the scope (distance from the core), which in turn determines the scale (number of subsidiaries) and the pattern of explicit and relational contracts between itself and the foreign subsidiary firm (the strength of integration) so as to maximize net profits.⁷

As our empirical application is geared toward examining the mode of contractual governance in the international diversification decisions of US companies, we are particularly interested in how the extent of information asymmetry affects contractual governance between the US-based core and foreign subsidiaries.

Technology

A US-based core firm possesses a unique critical resource that it wants to exploit. This resource can be combined with N other activities, which can be thought of as corresponding to N other foreign subsidiary firms in order to produce final output. The core has to give the subsidiary agents access to the critical resource for them to produce effectively (as in Rajan and Zingales, 2001).

The final good is produced using a continuum of intermediate goods, measured on the interval $[0, N]$, according to

$$Y = \int y_j d_j \quad (1)$$

where y_j denotes the amount of intermediate good j used by the conglomerate. Intermediate good y_j is in turn produced by a foreign subsidiary firm, which we index by j .

The specialized subsidiary activities (and corresponding firms) are distributed with density δ along a line of infinite length, with the origin being the location of the US core with the critical resource. The distance of a foreign intermediate firm from the US core, which we call x , is important, because the cost of obtaining a subjective evaluation of the performance of the firm is proportional to the distance from the core. The objective performance measure does not depend on distance from the core (more on these measures below).

Final output is owned by the US-based core firm. All prices are measured in units of the final good.

Performance Measures

There are two types of performance measure that the core can use to evaluate firms producing the intermediate good, a subjective measure and an objective measure. The transfer from the core to the foreign subsidiary associated with the subjective

measure is what we call the *relational contract*, and the transfer associated with the objective measure is the *explicit contract*. To capture the notion of trust inherent in productive relationships we consider a repeated game between the US-based core that possesses the critical resource and the foreign subsidiary firms that produce the intermediate input.

Subjective measure. There is moral hazard at the level of the intermediate input. In each period the foreign subsidiary firm j chooses an unobservable action e_j , which stochastically determines the intermediate output y_j . For simplicity, we assume that y_j equals either 0 or 1 and $\text{Prob}[y_j=1|e_j]=e_j$, where $e_j \in [0, 1]$. We assume that y_j cannot be objectively measured. However, it can be subjectively assessed. This subjective assessment forms the basis for the relational contract.

Consequently, we can rewrite the US-based conglomerate's aggregate production function⁸ (1) as

$$Y = \int e_j d_j \quad (2)$$

Objective measure. The subsidiary's action also affects a second performance measure p_j , which equals either 0 or 1. However, p_j can be objectively measured, and so can be the basis of an explicit contract.

The objective performance measure p_j is an imperfect proxy for the subsidiary's contribution to overall conglomerate value, in the following sense. Before choosing an action, the subsidiary receives private information (denoted by $\mu_j > 0$) about the difference between the effect of the subsidiary's action on y_j and its effect on p_j . $\text{Prob}[p_j=1]=\mu_j e_j$. (we assume $\mu_j e_j < 1$). Given μ_j and e_j , the events that $y_j=1$ and that $p_j=1$ are independent. High values of μ_j (say around 1) are situations when actions increase both y_j and p_j ; small values of μ_j (say around 0) are situations when actions increase y_j but not p_j ; and values of μ_j greater than 1 are situations when small actions increase p_j but not y_j . Assume $E(\mu_j)=1$ in order to minimize notation. Thus, on average, the performance measure p_j is an unbiased measure of contribution y_j .

Note that this setup implies that μ_j and e_j are not independent. The relationship between the two plays an important role in the model.

Contracts

Contracts between the US core and a foreign subsidiary are a combination of relational and explicit contracts. These contracts consist of three parts: a base transfer s_j , a relational contract component b_j paid when the subjective assessment is $y_j=1$, and an explicit contract component β_j paid when the objective measure is $p_j=1$. The total transfer between the core and the subsidiary is therefore $s_j + b_j + \beta_j$.

We associate higher values of the relational component of compensation (b) with stronger ties between the US-based core and the foreign subsidiary firm, in accordance with the notion that this is a more “firm-like” arrangement. We interpret higher-powered explicit contracts (β) as being a more “market-like” arrangement.

Timing of Events

The sequence of events is as follows.

- (1) The US-based core chooses the scope of the conglomerate by determining the distance x from the core of the most disparate intermediate activity that will be the boundary of the firm. This in turn determines the number of foreign subsidiaries $N=\delta x$ in the conglomerate. N is what we refer to as the scale of the conglomerate.
- (2) The core offers contracts (s_j, b_j, β_j) to the foreign subsidiaries located at different distances from the core.
- (3) Each subsidiary accepts the contract if it satisfies its participation constraint.
- (4) If the subsidiary accepts, then the subsidiary observes μ_j and chooses an action e_j at cost $c(e_j)=\gamma e_j^2$. The core does not observe μ_j or the subsidiary's action.
- (5) The US-based core observes the realization of the subsidiary's subjective contribution y_j by incurring a cost tx , where x is the distance of the foreign subsidiary from the core's location and $t \geq 0$ is the per unit distance cost of gathering the subjective assessment. The subsidiary's observation of y_j is costless. The US core and the foreign subsidiary (and, if necessary, a court) costlessly observe the realization of the objective performance measure.
- (6) If $p_j=1$, then the US-based core transfers to the foreign subsidiary β_j dictated by the explicit contract. If $y_j=1$, then the US-based core chooses whether to pay the foreign subsidiary the amount b_j specified in the implicit contract.

ANALYSIS

Given a relational contract b_j and an explicit contract β_j , if the foreign subsidiary believes the US-based core will honor the implicit contract, then the subsidiary's problem after observing the realization of μ_j is

$$\text{Max}_{e_j} s_j + e_j b_j + \mu_j e_j \beta_j - \gamma e_j^2 \quad (3)$$

which yields the subsidiary's optimal action/effort

$$e_j^*(\mu_j, b_j, \beta_j) = \frac{b_j + \mu_j \beta_j}{2\gamma} \quad (4)$$

The subsidiary will work with the core if its expected payoff (before observing μ_j) exceeds the opportunity cost w , that is, the individual rationality/participation constraint is satisfied:

$$E_{\mu}[s_j + e_j^*(\mu_j, b_j, \beta_j)b_j + \mu_j e_j^*(\mu_j, b_j, \beta_j)\beta_j - \gamma e_j^*(\mu_j, b_j, \beta_j)^2] \geq w \quad (5)$$

Now suppose foreign subsidiary j is located at a distance x from the core. The US core's expected profit per period from its relationship with this foreign subsidiary, given a relational contract b_j and an explicit contract β_j , but before the subsidiary observes the realization of μ_j , is

$$E_{\mu}\{e_j^*(\mu_j, b_j, \beta_j) - [s_j + e_j^*(\mu_j, b_j, \beta_j)b_j + \mu_j e_j^*(\mu_j, b_j, \beta_j)\beta_j]\} - tx \quad (6)$$

The optimal base transfer s_j will be the lowest amount satisfying the participation constraint. Substituting this into the expected profit above yields the US-based core's expected profit per period as a function of the relational component b_j , the explicit component β_j and the distance from the core x , which we denote by $V(b_j, \beta_j, x)$.

$$V(b_j, \beta_j, x) \equiv E_{\mu}[e_j^*(\mu_j, b_j, \beta_j) - \gamma e_j^*(\mu_j, b_j, \beta_j)^2 - w - tx] \quad (7)$$

Relational and Explicit Contracts

We now consider the combination of an explicit contract based on an objective performance measure with a relational contract based on a subjective performance assessment. For simplicity, we assume that the subjective assessment is non-contractable but otherwise perfect.

To formalize the notion of trust in enforcing implicit contracts we consider an infinitely

repeated relationship. We consider equilibria in which both parties play trigger strategies such that any betrayal destroys the relationship forever. The parties begin by cooperating, and then continue cooperating unless one side defects, in which case they refuse to cooperate forever after. If the foreign subsidiary's contribution to the firm is $\gamma_j=1$, the US-based core must decide whether to pay the bonus b_j . The core should pay the bonus if and only if the present value of the expected profit beginning next period exceeds the size of the bonus: $V(b_j, \beta_j, x) \geq b_j r$.

The optimal relational contract sets b_j to maximize expected profit per period $V(b_j, \beta_j, x)$ subject to the reneging constraint $V(b_j, \beta_j, x) \geq b_j r$. As we demonstrate in the Appendix, the reneging constraint is quadratic in b_j . The reneging constraint therefore binds for values of the interest rate r high enough that the first best b_j is not attainable. The solution to this constrained optimization problem then becomes the highest value of b_j satisfying the reneging constraint.

Also, when explicit contracts are available, they are available both before and after the core reneges. We assume that if the US-based core were to renege, then the foreign subsidiary would refuse to participate in any future relational contracts but would be willing to consider explicit contracts, and would accept an explicit contract if it were sufficiently attractive. In order to derive the reneging constraint in this case we therefore need to characterize the payoff when only explicit contracts are used.

In this case, from Eq. (4), the subsidiary's optimal action will then be $e_j^*(\mu_j, \beta_j) = \mu_j \beta_j / 2\gamma$. The optimal fallback contract for the core sets the base transfer at the minimum value that satisfies the participation constraint and β_j at the value that maximizes the expected profit per period,

$$\text{Max}_{\beta} E_{\mu} [e_j^*(\mu_j, \beta_j) - \gamma e_j^*(\mu_j, \beta_j)^2 - w] \quad (8)$$

Solving the first-order condition implies that the optimal explicit-contract bonus in the fallback situation is

$$\beta_j^* = \frac{E_{\mu}(\mu_j)}{E_{\mu}(\mu_j^2)} = \frac{1}{1 + \text{var}(\mu)} \quad (9)$$

and

$$V(\beta_j^*) = \frac{1}{4\gamma[1 + \text{var}(\mu)]} - w \quad (10)$$

In the absence of relational contracts, the expected profit per period from the optimal contract

is $V(\beta_j^*)$ as defined in (10), which can be positive or negative depending on the agent's opportunity cost and the level of noise in the objective performance measure, $\text{var}(\mu)$. The fallback position for a core reneging on relational contracts is $V(\beta_j^*)$. So we consider two subcases, when $V(\beta_j^*) > 0$ and $V(\beta_j^*) < 0$.

Case 1: $v(\beta_j^*) > 0$. The reneging constraint is now

$$V(b_j, \beta_j, x) - V(\beta_j^*) \geq r b_j \quad (11)$$

If this constraint is satisfied, the subsidiary's effort decision is $e_j^*(\mu_j, b_j, \beta_j)$ as in Eq. (4). The optimal contract sets b_j and β_j to maximize expected profit $V(b_j, \beta_j, x)$ as in Eq. (7) subject to this reneging constraint. Going through this constrained optimization problem yields the optimal β_j for a given value of b_j :

$$\beta_j^{**}(b_j) = \frac{1 - b_j}{1 + \text{var}(\mu)} \quad (12)$$

For parameter values such that the first-best relational contract $\beta_j^{**}=1$ is not feasible, the optimal β_j^{**} is determined by substituting $\beta_j^{**}(b_j)$ into the reneging constraint, which becomes

$$\begin{aligned} V(b_j, \beta_j, x) - V(\beta_j^*) &\geq r b_j \\ V[b_j, \beta_j^{**}(b_j), x] - V(\beta_j^*) & \\ = \frac{b_j(2 - b_j)}{4\gamma} \frac{\text{var}(\mu)}{1 + \text{var}(\mu)} - t x &\geq r b_j \end{aligned} \quad (13)$$

The optimal relational contract b_j^{**} is the largest value of b_j solving this constraint. Equation (13) yields a quadratic equation in b_j from which we can obtain the function $b_j^{**}[r, x, t, \text{var}(\mu)]$. The derivation of b_j^{**} can be found in the Appendix. The function is decreasing in the first three arguments. In addition it is increasing in the noise parameter $\text{var}(\mu)$.⁹ For given values of the other parameters, the distance from the core beyond which relational contracting will break down can be obtained by solving for the value of x (call this $\bar{x}$) at which $b_j^{**}[r, t, \text{var}(\mu); x] = 0$. This implies that the set of optimal relational contracts $\{b_j^*(x) | V(b_j, x) \geq b_j r\}$ is empty for $x > \bar{x}$.

Discussion. If objective performance measures are sufficiently reliable, relational contracts are not feasible. The value of the optimal relational contract $b_j^{**}[r, t, \text{var}(\mu); \bar{x}]$ becomes 0 when $\text{var}(\mu) < [2\gamma r / (1 - 2\gamma r)]$. Consequently the scope, and hence the scale, of the US-based conglomerate will become extremely small. Contractual arrangements

take the form of arm's length contracting through purely explicit contracts in this event.

But so long as $\text{var}(\mu) \geq [2\gamma r / (1 - 2\gamma r)]$ subjective contracts will be feasible, and scope and scale will be positive. Scope increases as the objective performance measure becomes more noisy, that is, x increases as $\text{var}(\mu)$ increases. Also, b_j^{**} rises and β_j^{**} falls. Thus we can say that as the objective performance measure becomes more noisy, scope and scale expands and relational ties become stronger. Relational and explicit contracts are substitutes in this situation.

Case 2: $v(\beta_j^*) < 0$. This situation can arise when the incentive distortions in the objective performance measure are sufficiently high. In this case the fallback position after reneging on a relational contract is to shut down. The reneging constraint is now

$$V(b_j, \beta_j, x) \geq rb_j \quad (14)$$

or

$$E_\mu[e_j^*(\mu_j, b_j, \beta_j) - \gamma e_j^*(\mu_j, b_j, \beta_j)^2 - w - tx] \geq rb_j$$

or

$$\frac{1}{4\gamma} \{2(b_j + \beta_j - b_j\beta_j) - b_j^2\} - \beta_j^2[1 + \text{var}(\mu)] - w - tx \geq rb_j.$$

The first-order conditions are the same as above, and we can then write the reneging constraint as

$$V[b_j, \beta_j^{**}(b)] = \frac{1}{4\gamma} (2b_jk - b_j^2k + 1 - k) - w - tx \geq rb_j$$

where

$$k = \frac{\text{var}(\mu)}{1 + \text{var}(\mu)}$$

Again, the optimal relational contract bonus b_j^{**} is the largest value of b_j solving this constraint, which is a quadratic equation from which we can obtain the function $b_j^{**}[r, x, t, \text{var}(\mu)]$. The derivation is contained in the Appendix. As in the previous case, the function is decreasing in the first three arguments. For given values of the other parameters, the distance from the core beyond which relational contracting will break down can be obtained by solving for the value of x (call this $\bar{x}$) at which $b_j^{**}[r, t, \text{var}(\mu); x] = 0$. However, in contrast to the previous case, it is decreasing in the noise parameter

$\text{var}(\mu)$. In this case, if $\text{var}(\mu)$ increases, scope falls. The effect of a change in $\text{var}(\mu)$ on β_j^{**} is ambiguous.

Empirical Implications

In contrast to case 1, in case 2, starting from a situation where the noise in the objective performance measure is sufficiently high, a decrease in the noise causes relational contracts to become stronger, and the scope and size of the conglomerate expands. What happens in this case is that though the objective contract by itself is not a viable fallback, its improvement (through the decline in the noise) enhances the effectiveness of the relational contract by increasing the value of the ongoing relationship between the US-based core and the foreign subsidiary. In case 1, however, a decline in the noise causes relational contracts to become weaker; scope and scale fall.

Combining the results of cases 1 and 2, we could summarize in the following manner. Starting from a situation where the distortion in the objective performance measure is sufficiently high – which could be due to poor institutional development, as alluded to earlier – a decrease in the noise causes relational contracts to become stronger, and the scope and scale of the conglomerate expand. This expansion in scale, scope, and strength of relational ties continues until the distortion in the objective measure is reduced to the level at which explicit arm's length contracting becomes a viable fallback option ($V(\beta_j^*)$ switches from being negative to positive). After this point, the scope and scale of the conglomerate abruptly start moving in the opposite direction and become smaller, accompanied by a decrease in the strength of ties as the distortion in the objective measure decreases.

In taking the theory to the data, a number of comments regarding interpretation are in order. The model parameter $\text{var}(\mu)$, which stands for the "noise" in the objective performance, can be thought of as being correlated with the quality of a country's institutions, which we proxy in our empirical application by quality of legal systems and the quality of accounting systems. This is consistent with Bergman and Nicolaievsky (2007), who suggest that one of the effects of investor protection may be to improve the quality of verifiable performance measures.

The model parameters b and β (the strength of relational ties and arm's length contracts, respectively) are associated in the empirical application with the prevalence of mergers (more "firm-like" arrangements) and joint ventures/strategic

alliances (more “market-like” arrangements), respectively. In this connection, we should note that while in the model the variables are continuous, in our empirical application the data are dichotomous (mergers or joint ventures/strategic alliances). In the data, continuous choices are often not observed owing to other non-convexities such as fixed costs. With this caveat, it may help the reader to provide a graphical illustration of the role that $\text{var}(\mu)$ and x play in the model. To this end, Figures 1 and 2 summarize the relevant comparative static results from the model discussed above.

Figure 1 depicts the non-linear relationship between “noise” in objective performance measure ($\text{var}(\mu)$) and the likelihood of arm’s length contracting arrangements as described above. Figure 2 depicts the relationship, again non-linear, between “noise” in objective performance measures and the “strength” of inter-firm ties (b and β). As noise falls, initially the strength of ties (the likelihood of mergers) rises, but if institutions become of sufficiently high quality, then the strength of ties falls (the likelihood of joint ventures and strategic alliances rises).

Keeping in mind the caveats above, the empirical implications are as follows. From a low level of institutional development, as we move to countries where institutions for reducing the noise in objective performance measures are better, both arm’s length arrangements, such as international joint ventures or strategic alliances, and closer ties, such as mergers between US-based firms and foreign firms, should increase in frequency. This would be expected to be reflective of the range of institutional development over which both arm’s length and relational contracting are complements. However, once institutional development crosses a certain threshold, arm’s length type arrangements,

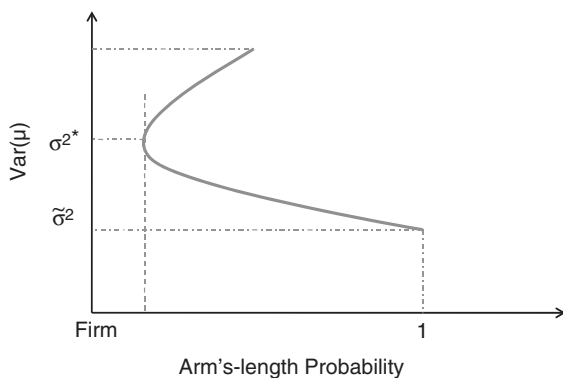


Figure 1 “Noise” and arm’s length contracting

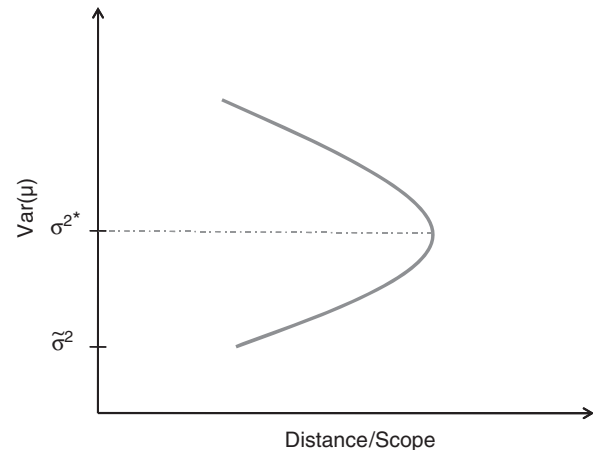


Figure 2 “Noise” and scope

such as joint ventures or strategic alliances, should begin to crowd out relational contracting. International mergers should be less likely to be observed in countries where institutional quality is sufficiently high.

EMPIRICAL ANALYSIS

Data

We searched the *SDC Joint Ventures Database* and *SDC Worldwide Mergers&Acquisitions* (data collected by Thomson Financial) for all completed international strategic alliances, international joint ventures, and cross-border mergers (with US bidders) with announcement dates between 1985 and 2000.¹⁰ For joint ventures and strategic alliances we restricted our sample to deals involving two participants only. In addition, one of the participants had to be from the United States, and the other had to be from one of 42 countries that have data available on the quality of the country’s accounting system provided by the CIFAR and available country statistics such as GDP/capita from *Penn World Tables*. We also required our deals to have data on industry classification of both deal participants as well as of the deal itself.

Table 1 provides details of sample distribution by countries and by years. The final sample consists of 17,442 business deals (10,551 international strategic alliances, 4108 international joint ventures, and 2783 cross-border mergers involving US bidders) between US firms and entities from 42 foreign countries. These countries represent a vast cross-section in terms of quality of both legal and accounting systems. Most of the deals in our sample occurred in the middle of the 1990s, which

**Table 1** Sample distribution

Panel A: Distribution of sample by participant countries

<i>Participant nation</i>	<i>Joint ventures</i>	<i>Strategic alliances</i>	<i>Mergers</i>	<i>Quality of legal system</i>	<i>Quality of accounting system</i>
Argentina	28	20	102	0.32	45
Australia	187	270	102	1.60	75
Austria	13	26	14	1.81	54
Belgium	23	92	26	0.80	61
Brazil	94	57	98	−0.22	54
Canada	319	1,357	447	1.55	74
Chile	23	19	35	1.09	52
Colombia	10	8	15	−0.78	50
Denmark	17	61	29	1.69	62
Egypt	8	4	8	0.13	24
Finland	22	51	24	1.74	77
France	214	507	202	1.08	69
Germany	236	695	288	1.48	62
Greece	7	9	3	0.50	55
Hong Kong	110	99	64	1.33	69
Iceland	0	4	0	1.47	41
India	225	141	47	0.16	57
Israel	51	145	48	0.97	64
Italy	106	201	86	0.86	62
Japan	867	3,497	63	1.42	65
Luxembourg	7	42	5	1.62	44
Malaysia	79	47	14	0.83	76
Mexico	158	112	81	−0.47	60
Netherlands	111	278	69	1.58	64
New Zealand	41	23	28	1.82	70
Nigeria	3	1	1	−1.10	59
Norway	28	50	26	1.83	74
Peru	10	6	18	−0.52	38
Philippines	26	31	9	−0.08	65
Portugal	8	12	8	1.08	36
Singapore	75	82	3	1.94	78
South Africa	41	36	33	−0.35	70
South Korea	137	300	25	0.94	62
Spain	51	109	67	1.03	64
Sweden	39	152	57	1.62	83
Switzerland	46	183	38	2.00	68
Taiwan	61	121	8	0.93	65
Thailand	78	28	16	0.41	64
Turkey	27	7	6	−0.01	51
United Kingdom	476	1,654	547	1.69	78
Uruguay	3	0	3	0.27	31
Venezuela	43	14	20	−0.66	40
Total	4,108	10,551	2,783		

Panel B: Distribution of sample by the year of deal announcement

<i>Announcement year</i>	<i>Joint ventures</i>	<i>Strategic alliances</i>	<i>Mergers</i>
1985	33	376	27
1986	82	364	31
1987	61	441	31
1988	122	349	31
1989	68	399	85
1990	274	674	67



Table 1 Continued

Panel B: Distribution of sample by the year of deal announcement			
Announcement year	Joint ventures	Strategic alliances	Mergers
1991	394	924	90
1992	275	950	130
1993	295	972	160
1994	467	1,016	187
1995	626	808	253
1996	326	498	299
1997	395	646	305
1998	228	701	408
1999	232	677	339
2000	230	756	340
Total	4,108	10,551	2,783

Sample of international strategic alliances and joint ventures and cross-border mergers with US bidders is generated using *SDC Joint Ventures* and *SDC Mergers&Acquisitions* databases. *Quality of legal system* is an index representing the “rule of law” index generated by Kaufmann et al. (1999). *Quality of accounting system* is an index generated by the Center for International Financial Analysis and Research.

coincides with the period of boom in the US economy. We find that the incidence of firm-like, wholly owned organizational structures (mergers in our sample) has been gradually increasing throughout the sample period – from 6% in 1985 to 26% in 2000. Desai, Foley, and Hines (2004) detect a similar trend in their sample, and attribute it to the increased liberalization of restriction on asset ownership by foreigners in US partnering countries.

Analysis of Determinants of Choice between “Market-like” Structures (Joint Ventures and Strategic Alliances) and Mergers

Binary analysis. Table 2 contains comparison of subsamples of mergers and market-like structures (joint ventures or strategic alliances). Most importantly, our results for quality of both legal and accounting systems show lack of a relationship between market development and incidence of arm’s length transactions. *Quality of legal system* is an index representing the “rule of law” variable generated by Kaufmann et al. (1999). *Quality of accounting system* is an index generated by the CIFAR.¹¹ Both variables are increasing functions of the quality of legal (or accounting) system. Scores for both quality measures are greater for strategic alliances and joint ventures than for mergers, based on means (which suggests that more developed markets are associated with more arm’s length transactions). However, median-quality score values are actually smaller for strategic alliances/joint ventures subsamples.¹² Nevertheless, our findings

allow for the possibility that there is a more complex non-linear relationship – as predicted by our theoretical model – between organizational structures and quality of legal and accounting systems.

Table 2 also shows that that deals involving counterparts from economically richer countries (in terms of GDP per capita) are more often finalized as joint ventures or strategic alliances, suggesting that partners in more developed countries rely more on market arrangements. Mergers also involve significantly greater portion of deals involving participants from related industries. Financial research has shown that vertical firm-like diversifications are, on average, value destroying (Berger and Ofek, 1995; Rajan, Servaes, & Zingales, 2000; Shin & Stulz, 1998). Our results suggest that these potential value losses induce US firms to be more likely to enter market-like deals (joint ventures or strategic alliances) rather than to bid for and later integrate unrelated foreign assets.¹³

The size of the US deal participant does not appear to be clearly linked to either of the organizational types. On the other hand, mergers are, on average, undertaken by significantly more profitable US firms. Since bidders usually take over the target’s operating, organizational, and governance structures, it is not surprising that such firms are more successful and profitable. There are no significant differences in industry growth opportunities between the two subsamples, but our data suggest that deals involving operations with greater research intensity are finalized more often as

Table 2 Descriptive statistics: joint ventures or strategic alliances vs mergers

Panel A: Descriptive statistics Variable

	Mergers			Joint ventures and strategic alliances		
	Median	Mean	s.d.	Median	Mean	s.d.
Industry growth opportunities	1.513	1.644	0.569	1.511	1.639	0.515
Industry research intensity	0.000	0.024	0.032	0.030***	0.030***	0.030
Participant country GDP/capita (\$1000s)	20.71	18.79	6.15	21.12***	19.55***	5.43
Quality of legal system	1.483	1.193	0.667	1.421***	1.313***	0.503
Quality of accounting system	69.00	67.58	10.01	65.00***	67.82	7.33
US firm's assets	0.92 (N=1330)	10.49	38.68	0.69*** (N=6018)	12.97**	39.69
US firm's return on assets	0.0907 (N=1330)	0.0663	0.1789	0.0733*** (N=6018)	-0.0049***	0.2762

Panel B: Sample proportions Variable

	Mergers	Joint ventures and strategic alliances
Related participants	50.59%	32.77%***

***, **, *: Statistical difference between the two subsamples significant at 1, 5, and 10% levels, respectively, using Wilcoxon test (median) and *t*-test (mean).

The table contains key sample descriptive statistics for the sample of 14,659 completed cross-border joint ventures, strategic alliances, and 2783 mergers that were announced between 1985 and 2000. *Industry growth opportunities* are measured as median M/B ratio of assets [(MV of equity+total assets-BV of equity)/total assets] for all US companies with the same two-digit industry SIC code as the code of the joint venture (or strategic alliance), measured during the year of deal completion. *Industry research intensity* is measured as median R&D expenses normalized by total assets for all US companies with the same two-digit industry SIC code as the code of the joint venture (or strategic alliance), measured during the year of deal completion. *Participant country GDP* is the gross domestic product of the non-US deal partner during the year of deal announcement, as reported by *Penn World Tables*. *Quality of legal system* is an index representing the "rule of law" variable generated by Kaufmann et al. (1999). *Quality of accounting system* is an index generated by the Center for International Financial Analysis and Research. The deal is between *related participants*, if the US and the foreign participants share the same two-digit SIC code.

"market-like" business structures (strategic alliances or joint ventures).¹⁴ Deals with greater research intensity are more likely to involve intangible, hard-to-value assets, subject to greater probability of hold-up costs due to asset-specific investment by business partners (Klein, Crawford, & Alchian, 1978). Our results suggest that more intangible assets are combined through joint ventures or strategic alliances, because such business combinations allow easier break-up in case the deal becomes disadvantageous for any of the participants (and/or when one of the participants attempts to hold up the other partner).

Multivariate probit analysis. Table 3 presents the results of probit analysis of the determinants of choice to form joint ventures or strategic alliances as opposed to forming mergers. Most importantly, we show – in accordance with our theoretical model – that the quality of both legal and accounting systems is significantly non-linearly related to the probability of observing a particular type of an organizational structure. In Model 1, we account for the expected non-linear relation

between quality of legal (accounting) systems and the likelihood of observing an arm's length deal by creating three separate piecewise linear variables based on system quality: *quality of legal (accounting) systems: low*, *quality of legal (accounting) systems: middle*, and *quality of legal (accounting) systems: high*.¹⁵ As Model 1 suggests, for system quality scores below the sample's 50th percentile, quality indices are positively related to the likelihood of a market-like deal (based on the positive coefficients for *quality of legal system: low* and *quality of accounting system: low*). This suggests that deals are more likely to be closed as arm's length transaction if legal and accounting systems in the country of the foreign participant are better. We also show that the coefficients measuring the impact of system quality scores on the likelihood of market-like deals for countries between the 50th and 80th sample percentiles (*quality of legal system: middle* and *quality of accounting system: middle*) are significantly negative. These results suggest that firms in countries in this range are more likely to be associated with firm-like arrangements (mergers). On the other hand, since the coefficients measuring

Table 3 Probit analysis of determinants of joint ventures or strategic alliances vs mergers

Independent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Related participants	−0.3910 (<0.001)	−0.4079 (<0.001)	−0.3952 (<0.001)	−0.4078 (<0.001)	−0.3955 (<0.001)	−0.4971 (<0.001)	−0.4910 (<0.001)
Industry growth opportunities	0.2040 (<0.001)	0.2093 (<0.001)		0.2021 (<0.001)		0.1360 (<0.001)	
Industry research intensity			3.2099 (<0.001)		2.9858 (<0.001)		1.0888 (0.055)
US firm's assets						0.0012 (0.017)	0.0011 (0.024)
US firm's return on assets						−0.8726 (<0.001)	−0.8824 (<0.001)
Participant's GDP/capita	0.0267 (<0.001)	0.0296 (<0.001)	0.0293 (<0.001)	0.0255 (<0.001)	0.0252 (<0.001)	0.0367 (<0.001)	0.0367 (<0.001)
Quality of legal system: low	0.5010 (<0.001)						
Quality of legal system: middle	−1.4462 (<0.001)						
Quality of legal system: high	0.8785 (0.008)						
DLAWMI		−0.4680 (<0.001)	−0.4562 (<0.001)			−0.4105 (<0.001)	−0.4082 (<0.001)
DLAWHI		−0.3954 (<0.001)**	−0.3914 (<0.001)*			−0.2948 (<0.001)*	−0.2954 (<0.001)*
Quality of accounting system: low	0.0409 (<0.001)						
Quality of accounting system: middle	−0.0345 (<0.001)						
Quality of accounting system: high	0.0199 (0.048)						
DACTMI				−0.4511 (<0.001)	−0.4353 (<0.001)	−0.4658 (<0.001)	−0.4611 (<0.001)
DACTHI				−0.3237 (<0.001)***	−0.3165 (<0.001)***	−0.2786 (<0.001)***	−0.2718 (<0.001)***
N	17,442	17,442	17,442	17,442	17,442	7,348	7,348

***, **, *: Statistical difference between impacts of coefficients based on DLAWMI and DLAWHI (or DACTMI and DACTHI) significant at 1, 5, and 10% levels. The dependent variable is equal to 1 if the business deal is a joint venture or a strategic alliance, and 0 if the deal is a merger involving a US bidder. *Industry growth opportunities* are measured as median M/B ratio of assets [(MV of equity+total assets−BV of equity)/total assets] for all US companies with the same two-digit industry SIC code as the code of the joint venture (or strategic alliance), measured during the year of deal completion. *Industry research intensity* is measured as median R&D expenses normalized by total assets for all US companies with the same two-digit industry SIC code as the code of either the US bidder (in the case of mergers) or the joint venture or strategic alliance, measured during the year of deal completion. *US firm's assets* are total assets of the US deal participant in \$billion. *US firm's return on assets* equal EBIT/total assets of the US deal participant. *Participant country GDP* is the gross domestic product of the non-US deal partner during the year of deal announcement, as reported by *Penn World Tables*. *Quality of legal system* is an index representing the "rule of law" variable generated by Kaufmann et al. (1999). *Quality of accounting system* is an index generated by the Center for International Financial Analysis and Research (CIFAR). The deal is between *related participants* if the US and the foreign participant share the same two-digit SIC code. The deal involves cross-technology transfer if one of the participants transfers technology to another participant or to the alliance (this information is collected from the SDC database). *Quality of legal (accounting) system: low*, *quality of legal (accounting) system: middle*, and *quality of legal (accounting) system: high* measure the piecewise linear impact of *quality of legal (accounting) system* separately for three ranges based on the *quality of legal (accounting) system* percentiles: low (for values below the sample's 50th percentile), middle (for values between the 50th and 80th percentiles), and high (for values above the 80th percentile). See footnote 15 for the detailed definitions of the piecewise linear variables. DLAWMI (DACTMI) is a dummy variable equal to 1 for observations with the value of *quality of legal system (quality of accounting system)* greater than or equal to the sample's 50th percentile and lower than sample's 80th percentile. DLAWHI (DACTHI) is a dummy variable equal to 1 for observations with value of the *quality of legal system (quality of accounting system)* greater than or equal to the sample's 80th percentile. The regressions control for industry and year effects (unreported in the table). p-values based on standard errors corrected for heteroskedasticity and country-level clustering are in parentheses.

the impact of system quality scores above the 80th percentile range (*quality of legal system: high* and *quality of accounting system: high*) are significantly positive, our results suggest that firms in countries

from the above 80th percentile range are once again associated with a greater likelihood of arm's length deals. Ultimately, Model 1 supports our theoretical model and suggests that there is a more

complex, non-linear relation between quality of legal and accounting systems and the probability of combining assets via a market-like business transaction.¹⁶

Models 2–5 further analyze the non-linear relationship between quality scores and probability of observing certain business organization type. To make our results more intuitive, and to allow us to make economic inferences regarding the average impact of system quality scores, we study the average impact of quality scores for three separate ranges of sample distribution (separated by 50th and 80th sample percentiles) and analyze the impact of dummies for the respective ranges, rather than actual quality scores.^{17,18} Our results suggest that the overall probability of observing a strategic alliance or a joint venture is significantly smaller (and the probability of observing a merger is significantly greater) for the countries from the middle of the quality spectrum than it is for the countries that have either relatively undeveloped (quality score below 50th sample percentile) or very developed (quality score above 80th percentile) legal (accounting) systems. In other words, mergers are more likely for countries in the middle of the spectrum, consistent with Model 1. These results are significant both statistically and economically. Estimating at independent variables' means, the coefficients of quality score-related variables from Models 2–5 suggest that, compared with companies with average-quality legal (accounting) standards, the decline in relative propensity to enter mergers is 52% (50%) for firms with poor-quality legal (accounting) standards and 10% (16%) for firms with high-quality legal (accounting) standards. Models 6 and 7 show that our results remain unchanged for the restricted sample of deals with available Compustat data for US participants.^{19,20}

Our results are consistent not only with our theoretical model, but also with the existing empirical literature. The deals in countries with high-quality legal or accounting standards are likely to be associated with a significantly smaller degree of transaction costs owing to the low likelihood of hold-up (Klein et al., 1978) and the small chance of expropriation of the US deal partner. Thus our results suggesting a higher likelihood of “market-like” structures in such countries are consistent with studies claiming that firms select organizational structures to minimize transaction costs (Asiedu & Esfahani, 2001; Baker, Gibbons, & Murphy, 2002; Beamish & Banks,

1987; Gatignon & Anderson, 1988; Gomes-Caseres, 1989). On the other hand, countries with poor-quality law or accounting standards are also likely to be associated with the least efficient and most restricted financial markets (La Porta et al., 2000; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2002). Therefore our findings of the lowest incidence of mergers in those countries support the results of Desai et al. (2004), who show that the likelihood of US firms' creating a wholly integrated as opposed to partially owned affiliate relationship (mergers as opposed to joint venture or strategic alliance in our case) depends significantly positively on the degree of the liberalization of foreign country's ownership restrictions during the 1980s and 1990s.²¹ Countries with the poorest legal and accounting standards may simply not allow for full ownership of the country's assets by US firms.

Most of our other independent variables have coefficients with signs suggesting the same impact on organizational structures as those discussed in Table 2. Namely, we show that deals between unrelated partners, as well as deals with greater research intensity, and those involving less profitable US firms and firms from richer foreign countries, are all more likely to be consumed as market-like structures (joint ventures or strategic alliances). In addition, in the multivariate framework, we also show that higher growth opportunities, and asset size of the US deal participant, both increase the likelihood of combining assets through a market-like organization.

Country-level analysis. In the previous section we analyzed the choice between “market-like” structures (joint ventures and strategic alliances) and “firm-like” structures (mergers) in terms of the propensity of an individual firm to enter an arm's length vs a firm-like deal. As a robustness test, we now analyze the same choice on the country level – in terms of the determinants of the proportion of market-like deals in every country. For every country and year, we define the proportion of market-like deals, P_{MARKET}, as

$$P_{MARKET} = \frac{\text{Number of joint ventures and strategic alliances}}{\text{Number of joint ventures and strategic alliances} + \text{Number of mergers}}$$

Then, we regress P_{MARKET} on the participant country's GDP/capita and the separate piecewise linear variables based on system quality defined in the previous section (in addition, we control for country fixed effects, though we do not report them below).

For the quality of legal systems, we get the following results (p-values as subscripts):

$$\begin{aligned} \text{P}_{\text{MARKET}} = & -0.0118_{0.009} \times \text{GDP/capita} \\ & + 0.1171_{0.645} \times \text{Quality : Low} \\ & - 2.4834_{0.163} \times \text{Quality : Middle} \\ & + 7.6190_{0.190} \times \text{Quality : High} \end{aligned}$$

For the quality of accounting systems, we get the following results (p-values as subscripts):

$$\begin{aligned} \text{P}_{\text{MARKET}} = & -0.0122_{0.012} \times \text{GDP/capita} \\ & + 0.0290_{0.012} \times \text{Quality : Low} \\ & - 0.1451_{0.048} \times \text{Quality : Middle} \\ & + 0.1053_{0.024} \times \text{Quality : High} \end{aligned}$$

The above results are similar to those presented in Table 3. Even though we cannot control for specific

deal features such as relatedness, growth opportunities, and research intensity, the above country-level results once again suggest that the incidence of market-like deals should be higher for countries with either low or high quality of legal (accounting) systems, while firm-like arrangements should be more prevalent for countries in the middle of quality spectra.

Analysis of Determinants of Choice between Joint Ventures and Strategic Alliances

Even though joint ventures and strategic alliances were both treated as “market-like” organizational structures in the previous section, we predict that these two types of contract still differ from each other. Namely, joint ventures are an example of a tighter, more “firm-like” contract than the relatively weaker, more arm's length-like strategic alliances. Thus, as a robustness test of our model, we repeat the analysis presented in the previous section to analyze the determinants of contractual choices between joint ventures and strategic alliances.

Table 4 Descriptive statistics: joint ventures vs strategic alliances

Panel A: Descriptive statistics Variable

	<i>Joint ventures</i>			<i>Strategic alliances</i>		
	<i>Median</i>	<i>Mean</i>	<i>s.d.</i>	<i>Median</i>	<i>Mean</i>	<i>s.d.</i>
Industry growth opportunities	1.421	1.576	0.506	1.545***	1.664***	0.516
Industry research intensity	0.000	0.022	0.031	0.041***	0.033***	0.030
Participant country GDP/capita (\$1000s)	20.11	17.71	6.87	21.31***	20.26***	4.56
Quality of legal system	1.421	1.139	0.661	1.421***	1.381***	0.428
Quality of accounting system	65.00	66.59	8.30	65.00***	68.29***	6.85
US firm's assets	2.03 (N=1644)	20.17	53.80	0.37*** (N=4374)	10.27***	32.45
US firm's return on assets	0.0858 (N=1644)	0.0469	0.2045	0.0642*** (N=4374)	−0.0244***	0.2965

Panel B: Sample proportions Variable

	<i>Joint ventures (%)</i>	<i>Strategic alliances (%)</i>
Related participants	34.68	32.02***
Cross-technology transfer	7.86	10.32***

***, **, *: Statistical difference between the two subsamples significant at 1, 5, and 10% levels, respectively, using Wilcoxon test (median) and t-test (mean).

The table contains key sample descriptive statistics for the sample of 4108 completed cross-border joint ventures and 10,551 strategic alliances that were announced between 1985 and 2000. *Industry growth opportunities* are measured as median M/B ratio of assets [(MV of equity+total assets−BV of equity)/total assets] for all US companies with the same two-digit industry SIC code as the code of the joint venture (or strategic alliance), measured during the year of deal completion. *Industry research intensity* is measured as median R&D expenses normalized by total assets for all US companies with the same two-digit industry SIC code as the code of the joint venture (or strategic alliance), measured during the year of deal completion. *Participant country GDP* is the gross domestic product of the non-US deal partner during the year of deal announcement, as reported by *Penn World Tables*. *Quality of legal system* is an index representing the “rule of law” variable generated by Kaufmann et al. (1999). *Quality of accounting system* is an index generated by the Center for International Financial Analysis and Research. The deal is between related participants, if the US and the foreign participant share the same two-digit SIC code. The deal involves cross-technology transfer if one of the participants transfers technology to another participant or to the alliance (this information is collected from the SDC database).

Binary analysis. Table 4 contains comparison of subsamples of joint ventures and strategic alliances. Means of legal and accounting system quality scores are greater for the sample of market-like contracts (strategic alliances), suggesting that more developed markets allow greater incidence of arm's length contracts. Nevertheless, the magnitudes of differences between the subsamples do not seem to be economically significant (and medians are insignificantly different), again leaving the possibility of a more complex link between quality of legal and accounting systems and the type of organizational structure.

Our results also again suggest that cross-border combinations of assets with greater growth opportunities and associated with greater research intensity are more often finalized as arm's length organizational structures (strategic alliances). This conclusion is further supported by our finding that strategic alliances have a significantly greater proportion of deals involving cross-technology transfers.²² Contracts between US firms and companies from countries with high a GDP per capita are more often consummated as arm's length structures, once again suggesting that environments in more developed countries are associated with market-based contractual arrangements. Also, similarly to our results for the broader sample, bigger and more profitable US firms are more likely to enter firm-like contracts (joint ventures). Our findings suggest that the ability to enter closer contracts and to utilize internal markets is confined to more successful, more reputable companies. Joint ventures also involve a greater proportion of related business participants' deals, but the difference between the subsamples does not appear to be economically significant.

Multivariate probit analysis. Table 5 presents the results of Probit analysis of the determinants of organizational structure choices between strategic alliances and joint ventures. Our results are qualitatively identical to those presented in Table 3. All determinants of choices between mergers ("firm-like" structures) and joint ventures or strategic alliances ("market-like" structures) appear to have the same impact on the choices between the more narrowly defined types of tighter (joint ventures) and arm's length (strategic alliances) contractual types.

Model 1 again uncovers a significantly non-linear relationship between quality scores and contract types. Models 2–7 show that, similarly to the results

presented in Table 3, the probability of observing an arm's length contract is the smallest for the firms from countries belonging to the middle of the legal and accounting systems quality spectrum (i.e., those between the 50th and 80th sample percentiles). Only differences in accounting systems quality, though, appear to be statistically and economically significant to determine the choices between joint ventures and strategic alliances. Estimating at independent variables' means, the coefficients of quality score-related variables from Models 2–5 suggest that, compared with companies with average-quality legal (accounting) standards, the decline in relative propensity to enter mergers - is 5% (22%) for firms with poor-quality legal (accounting) standards and 7% (25%) for firms with high-quality legal (accounting) standards.²³

Analysis of Deal Announcement Abnormal Returns to Equity of US Participants

Table 6 presents the results of the analysis of abnormal returns to equity of US participants surrounding deal announcements. Our definition of abnormal returns is

$$AR_i = R_i(-5, +5) - E[R_i(-5, +5)]$$

where $R_i(-5, +5)$ and $E[R_i(-5, +5)]$ refer to actual and expected returns for firm i from 5 days before to 5 days after the deal announcement date. The expected return for firm i is measured using a market model:

$$E[R_i(-5, +5)] = \alpha_i + \beta_i R_M$$

where R_M denotes return on market portfolio (proxied by the S&P 500 index) from 5 days before to 5 days after the deal announcement date.²⁴

Panel A shows that announcement abnormal gains are generally positive. In the case of joint ventures and strategic alliances, the mean abnormal return of 0.54% is statistically significantly different from zero (for business deals involving US firms, the financial literature has uncovered similar positive valuation effects – e.g., Chan, Kensinger, Keown, & Martin, 1997; McConnell & Nantell, 1985). Nevertheless, this return is not significantly different from the average bidder abnormal return surrounding the announcement of mergers equal to 0.33% (the insignificance of this mean abnormal return is consistent with previous literature on bidder gains in acquisition – e.g., Andrade, Mitchell, & Stafford, 2001; Bradley, Desai, & Han Kim, 1988; Jensen & Ruback, 1983; Moeller & Schlingemann, 2005; Rossi & Volpin, 2004).

Table 5 Probit analysis of determinants of strategic alliances vs joint ventures

Independent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Related participants	−0.0453 (0.067)	−0.0517 (0.036)	−0.0390 (0.115)	−0.0494 (0.045)	−0.0367 (0.138)	0.0448 (0.245)	0.0482 (0.212)
Industry growth opportunities	0.2588 (<0.001)	0.2567 (<0.001)		0.2612 (<0.001)		0.1691 (<0.001)	
Industry research intensity			6.6674 (<0.001)		6.5634 (<0.001)		4.2630 (<0.001)
US firm's assets						−0.0027 (<0.001)	−0.0027 (<0.001)
US firm's return on assets						−0.5709 (<0.001)	−0.5512 (<0.001)
Participant's GDP/capita	0.0204 (<0.001)	0.0486 (<0.001)	0.0481 (<0.001)	0.0517 (<0.001)	0.0511 (<0.001)	0.0576 (<0.001)	0.0570 (<0.001)
Cross-technology transfer	0.1147 (0.004)	0.1324 (0.001)	0.0573 (0.165)	0.1216 (0.002)	0.0502 (0.224)	0.1293 (0.029)	0.0843 (0.161)
Quality of legal system	0.3939 (<0.001)						
Quality of legal system × DLAWMI	−0.1656 (0.294)						
Quality of legal system × DLAWHI	0.2153 (0.477)						
DLAWMI		−0.0434 (0.136)	−0.0220 (0.453)			−0.0816 (0.076)	−0.0685 (0.137)
DLAWHI		0.0201 (0.512)	0.0311 (0.313)			−0.0030 (0.952)	0.0067 (0.893)
Quality of accounting system	0.0127 (<0.001)						
Quality of accounting system × DACTMI	−0.0132 (0.002)						
Quality of accounting system × DACTHI	0.0398 (0.039)						
DACTMI				−0.2136 (<0.001)	−0.1820 (<0.001)	−0.2409 (<0.001)	−0.2206 (<0.001)
DACTHI				0.0335 (0.300) ^{***}	0.0486 (0.135) ^{***}	0.0118 (0.895) ^{***}	0.0072 (0.936) ^{***}
N	14,659	14,659	14,659	14,659	14,659	6,018	6,018

***, **, *: Statistical difference between impacts of coefficients based on DLAWMI and DLAWHI (or DACTMI and DACTHI) significant at 1, 5, and 10% levels.

The dependent variable is equal to 1, if the business deal is a strategic alliance, and 0 if the deal is a joint venture. *Industry growth opportunities* are measured as median M/B ratio of assets [(MV of equity+total assets−BV of equity)/total assets] for all US companies with the same two-digit industry SIC code as the code of the joint venture (or strategic alliance), measured during the year of deal completion. *Industry research intensity* is measured as median R&D expenses normalized by total assets for all US companies with the same two-digit industry SIC code as the code of the joint venture (or strategic alliance), measured during the year of deal completion. *US firm's assets* are the total assets of the US deal participant in \$billion. *US firm's return on assets* equal EBIT/total assets of the US deal participant. *Participant country GDP* is the gross domestic product of the non-US deal partner during the year of deal announcement, as reported by *Penn World Tables*. *Quality of legal system* is an index representing the “rule of law” variable generated by Kaufmann et al. (1999). *Quality of accounting system* is an index generated by the Center for International Financial Analysis and Research. The deal is between related participants if the US and the foreign participant share the same two-digit SIC code. The deal involves cross-technology transfer if one of the participants transfers technology to another participant or to the alliance (this information is collected from the SDC database). *Quality of legal (accounting) system: low*, *quality of legal (accounting) system: middle*, and *quality of legal (accounting) system: high* measure the piecewise linear impact of *quality of legal (accounting) system* separately for three ranges based on the *quality of legal (accounting) system* percentiles: low (for values below the sample's 50th percentile), middle (for values between 50th and 80th percentiles) and high (for values above 80th percentile). See footnote 15 for the detailed definitions of the piecewise linear variables. DLAWMI (DACTMI) is a dummy variable equal to 1 for observations with value of the *quality of legal system (quality of accounting system)* greater than or equal to the sample's 50th percentile and lower than the sample's 80th percentile. DLAWHI (DACTHI) is a dummy variable equal to 1 for observations with value of the *quality of legal system (quality of accounting system)* greater than or equal to the sample's 80th percentile. The regressions control for industry and year effects (unreported in the table). p-values based on standard errors corrected for heteroskedasticity and country-level clustering are in parentheses.

Table 6 Analysis of US firms' abnormal stock returns around deal announcements

<i>Panel A: Abnormal returns (−5,+5)</i>			
<i>Sample</i>	<i>N</i>	<i>Mean abnormal return (%)</i>	<i>p-value</i>
Mergers	1,158	0.33	0.238
Joint venture or strategic alliances	4,977	0.54	0.002
Expected deal structure =0	2,132	0.26	0.192
Expected deal structure =1	4,003	0.63 ^a	<0.001

<i>Panel B: Regression analysis of determinants of abnormal announcement returns (−5, +5)</i>			
<i>Independent variable</i>	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>
ln(US firm's assets)	−0.0022 (<0.001)	−0.0022 (<0.001)	−0.0022 (0.004)
US firm's return on assets	0.0011 (0.594)	0.0009 (0.673)	0.0010 (0.636)
Related participants	0.0016 (0.633)	0.0037 (0.309)	0.0043 (0.236)
Industry growth opportunities	0.0054 (0.099)	0.0048 (0.139)	0.0047 (0.152)
Joint venture or strategic alliance	0.0035 (0.436)		0.0045 (0.323)
Expected deal structure		0.0093 (0.014)	0.0096 (0.011)

^aDifference between subsamples based on *expected deal structure* value significant at 10% level.

The abnormal returns are measured as the difference between stock returns and expected returns measured using the market model over the period from five days before to five days after the original deal announcement. *Industry growth opportunities* are measured as median M/B ratio of assets [(MV of equity + total assets − BV of equity)/total assets] for all US companies with the same two-digit industry SIC code as the code of the joint venture (or strategic alliance), measured during the year of deal completion. *US firm's assets* are total assets of the US deal participant in \$billion. *US firm's return on assets* equal EBIT/total assets of the US deal participant. The deal is between *related participants* if the US and the foreign participant share the same two-digit SIC code. *Expected deal structure* is a dummy variable equal to 1 if the US company entered the deal predicted by probit model utilizing the quality of accounting disclosure (Model 4 in Table 3). All regression models are controlled for industry and year effects (unreported in the table). p-values based on standard errors corrected for heteroskedasticity and country-level clustering are in parentheses.

We expect that if there exists an optimal organizational structure for each cross-border deal (as implied by our theoretical model), announcements of deals with expected organizational structures should be associated with significantly greater gains. We define a deal to have an expected organizational structure if its form is correctly predicted by probit model 4 (based on the quality of accounting disclosure) in Table 3.²⁵ This model correctly predicts 65% of deal structures. The results in Panel A support our predictions: deals with expected organizational structures generate a mean abnormal return of 0.63%, and significantly outperform deals with unexpected structures (with mean abnormal return of 0.26%).

The financial literature has documented that announcement abnormal returns are related to the size and profitability of participants, to the growth opportunities of the deal, and to the industry-relatedness of the deal partners. Therefore we specifically control for these factors, utilizing regression analysis. The results presented in Panel B

show that, even after controlling for other determinants of abnormal returns, there is no significant difference between gains to mergers and joint ventures or strategic alliances. However, deals with expected organizational structures significantly outperform asset combinations with unexpected structures by approximately 0.9%, affirming our prediction that each cross-border deal should be associated with an optimal, value-maximizing form.²⁶

CONCLUSION

Recent financial and economic research has documented significant differences in the development of legal and accounting systems in various countries. The flaws of those systems increase information asymmetry among economic actors, and decrease the efficiency of capital markets and arm's length contracts in general. As a result, legal and accounting system quality has been linked to economic growth, to asset values, and to the overall

benefits of diversification and the reliance on internal capital markets.

In this study we present a theoretical model designed to explain the impact of information asymmetry and institutions on the choice of organizational structure for combinations of assets of firms from different countries. That is, rather than the problems of whether to diversify, our focus is on the issue of how to diversify. Our model suggests that for countries with average-quality legal and accounting systems, market (arm's length) and firm (internal) contracts can coexist. For countries with better-quality legal and accounting systems, arm's length contracts edge out firm (internal) contracts.

We test the implications of our model empirically, using a sample of international joint ventures and strategic alliances with US firms as one of the participants (more open "market-like" contracts) and cross-border mergers involving US bidders (more close "firm-like" contracts) announced between 1985 and 2000. Our empirical findings support the predictions of our theoretical model.

Our theory appears to have important valuation consequences as well. We document that US firms entering organizational structures predicted by our model are associated with significantly greater abnormal stock returns around deal announcements. This finding suggests that each deal indeed has an optimal organizational structure maximizing shareholder value.

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NOTES

¹Differences among countries exist in terms of shareholder and creditor rights (concluding that common-law countries provide greater investor protection than civil-law countries; see La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998), the extent of required accounting disclosure (Ali & Hwang, 2000; Rajan & Zingales, 1998a), approaches toward capital market regulation (Glaeser, Johnson, & Shleifer, 2001), and the overall quality of law and tradition of order (measured by various agencies, e.g., International Country Risk Guide). Countries providing

stronger investor protection, better law enforcement, and stricter disclosure requirements and regulation are associated with bigger, more liquid, and more informative capital markets (La Porta et al., 1997). On the other hand, countries with a lack of protection and poor financial and disclosure laws suffer frequent investor expropriation (Johnson, La Porta, Lopez-de-Silanes, & Shleifer, 2000) and moribund financial markets, generating substantial information asymmetries (Glaeser et al., 2001).

²The World Development Report, 2002, *Building institutions for markets*, devotes an entire section to the financial intermediation sector as a set of institutions that support markets. See Section 4, pp 75–96 of this report.

³Recent finance studies (e.g., Desai et al., 2004) have linked international organizational structure choices to the level of optimal ownership. Since optimal ownership structure is often selected to mitigate information asymmetry (e.g., Jensen & Meckling, 1976, 1995), we consider our study complementary to that stream of finance research.

⁴Simon (1951), among others, argued that relational contracts are at the center of the employment relations, and Williamson (1975) argued that relational contracts are the key differentiator of firms and markets.

⁵See Holmstrom and Roberts (1998) for an excellent survey.

⁶This follows the usage in the management literature on the core competence of a firm, such as in Prahalad and Hamel (1990).

⁷We have decided to adopt the terminology "strength of integration" as opposed to "degree of integration", because degree of integration is often used to connote how vertically integrated a firm is with regard to inputs and outputs. This is quite a different focus from the one we have here.

⁸We refer to the US-based core and the foreign subsidiaries that are associated with it as a conglomerate.

⁹Strictly speaking, the cost parameter γ is also an argument in b_j^{**} . However, since this is not a choice variable for the firm, we suppress it to reduce notational clutter.

¹⁰The advantage of SDC databases is that they contain announcement and completion dates, identities of business partners, and information on the industry of combined assets for virtually all completed business deals over the period of our study. However, some deal-specific information (such as deal size), as well as data describing operations of the business partners – especially of those from outside of the US –

is often missing. Consequently, since we want to utilize information for the widest possible sample, most of our tests include only variables characterizing the deal's industry and the characteristics of countries of firms involved in SDC-covered deals. However, our results are very similar when we restrict our sample to include only business combinations where firm-specific Compustat data characterizing US firms can be added to our test specifications.

¹¹In addition to the *quality of legal system* and *quality of accounting system* variables, we performed the empirical analysis utilizing an inverse measure of *cost of debt recovery* for various countries (Djankov, La Porta, Lopez-de-Silanes, & Shleifer, 2002) as a measure of institutional quality. This variable is not the most appropriate for our model, because the Djankov et al. measures are more indicative of barriers to entry rather than information asymmetry or the costs of contractual governance, but the results utilizing this measure are similar to those presented in Tables 2–5, and are available from the authors upon request.

¹²It should be mentioned that the statistical significance for medians in Table 2 (as well as in Table 4) is based on the Wilcoxon test. Even though the median values may appear to be quite similar, it is possible for the Wilcoxon test to be significant if rank-ordered distributions of the two subsamples are different.

¹³In addition, our findings are also consistent with Blomström and Zejan (1991), who show that vertically diversifying US firms are more likely to enter organizational structures with shared ownership in order to acquire the expertise of their foreign partners and minimize the costs of information asymmetry associated with managing assets that do not belong to the core business of the US firm.

¹⁴*Industry growth opportunities* are measured as median M/B ratio of assets [(MV of equity + Total assets – BV of equity)/Total assets] for all US companies with the same two-digit industry SIC code as the code of the joint venture (or strategic alliance), measured during the year of deal completion. *Industry research intensity* is measured as median R&D expenses normalized by total assets for all US companies with the same two-digit industry SIC code as the code of either the US bidder (in the case of mergers) or the joint venture or strategic alliance, measured during the year of deal completion.

¹⁵The variables are defined as follows.
If *quality of legal (accounting) systems* < 50th percentile value, then:

Quality of legal (accounting) systems: low = Quality of legal (accounting) systems

Quality of legal (accounting) systems: middle = 0
Quality of legal (accounting) systems: high = 0

If *quality of legal (accounting) systems* ≥ 50th percentile value and *quality of legal (accounting) systems* < 80th percentile value, then

Quality of legal (accounting) systems: low = 50th percentile value

Quality of legal (accounting) systems: middle = *quality of legal (accounting) systems* – 50th percentile value

Quality of legal (accounting) systems: high = 0

If *quality of legal (accounting) systems* ≥ 80th percentile value, then

Quality of legal (accounting) systems: low = 50th percentile value

Quality of legal (accounting) systems: middle = 80th percentile value – 50th percentile value

Quality of legal (accounting) systems: high = *Quality of legal (accounting) systems* – 80th percentile value.

We selected these percentiles to have roughly the same number of deals in all three groups. If we used lower than the 50th percentile to identify the group with the lowest legal and accounting standards, this group would be relatively under-represented. However, our findings are not critically dependent on choices of 50th and 80th percentiles as model thresholds, and even alternative choices (such as terciles) lead to qualitatively similar results.

¹⁶The positive relationship between the likelihood of an arm's length arrangement and the quality of legal or accounting systems for countries in the below-median region is not a prediction of our model. There can be numerous other forces driving contractual governance choices that are beyond the ambit of our model. In fact, finance research generally predicts a positive relationship between institutional quality and arm's length arrangement (e.g., La Porta et al., 2000). The novelty of our analysis is actually the non-linearity that occurs for countries with average-to-high quality of legal or accounting systems.

¹⁷We measure the potentially non-linear impact of legal (accounting) standards on organizational structure choices by several dummy variables. DLAWMI (DACTMI) is a dummy variable equal to 1 for observations with value of the *quality of legal system* (*quality of accounting system*) greater than or equal to the sample's 50th percentile and lower than the sample's

80th percentile. DLAHWHI (DACTHI) is a dummy variable equal to 1 for observations with value of the *quality of legal system* (*quality of accounting system*) greater than or equal to the sample's 80th percentile.

¹⁸In addition, we analyzed the non-linear impact of *quality of legal system* and *quality of accounting system* variables by the inclusion of quadratic and cubic terms of these variables (for the full sample and several subsamples based on the high/low values of the *quality* variables). In most of our specifications, quadratic and cubic terms of *quality* variables were statistically significant and consistent with the hypothesis that arm's length transactions (joint ventures and strategic alliances) are associated with values of *quality of legal system* and *quality of accounting system* at the lower and upper end of the spectrum, whereas firm-like arrangements (mergers) are more likely for values of *quality of legal system* and *quality of accounting system* in the middle of the spectrum.

¹⁹The drop in the numbers of observations utilized in Models 1–5 and 6–7 is caused by the fact that many sample events tracked by the SDC database involve private US entities with data unavailable on Compustat.

²⁰Our results do not appear to be time-, industry-, or country-specific. In regressions in Table 3, year and industry fixed effects are included (though not reported in Table 3). p-values are based on standard errors corrected for heteroskedasticity and country-level clustering. At the same time, the significance of the results generated without fixed effects and without error clustering is similar to that reported in Table 3.

²¹Unlike our sample, which consists of newly formed mergers, joint ventures and strategic alliances, Desai et al. (2004) use panel data describing wholly vs partially owned affiliates of US companies.

²²The deal involves *cross-technology transfer* if one of the participants transfers technology to another participant or to the alliance (this information is collected from the SDC database).

²³Similarly to the analysis performed in Table 3, year and industry fixed effects are included (though not reported in Table 5). p-values are based on standard errors corrected for heteroskedasticity and country-level clustering. At the same time, the significance of the results generated without fixed effects and without error clustering is similar to that reported in Table 5.

²⁴Parameters α_i and β_i are estimated from linear regression utilizing returns from days –220 to –20 before the deal announcement date.

²⁵The results based on models utilizing the quality of law are similar, though they have lower statistical significance.

²⁶Other coefficients have generally anticipated signs (though only those for size are significantly different from zero). The significantly negative coefficient for size is expected, since the total synergies are typically spread over a greater equity base in the case of large deal participants. There is also some evidence suggesting that, at least in the case of mergers, larger bidders are associated with greater returns to targets (e.g., Billett & Ryngaert, 1997; Jarrell & Poulsen, 1989), possibly as a result of overpaying. A positive coefficient for the return on assets suggests that better-performing firms are associated with better business decisions. A positive coefficient for related participants is consistent with the literature suggesting that vertical diversification destroys comparatively greater value (Berger & Ofek, 1995; Rajan et al., 2000; Shin & Stulz, 1998). A positive coefficient for industry growth opportunities is consistent, for example, with the hypothesis that high-growth assets benefit from acquisition, thanks to additional access to financing (Smith & Kim, 1994). All models are controlled for industry and year effects (unreported in the table). p-values are based on standard errors corrected for heteroskedasticity and country-level clustering. At the same time, the significance of the results generated without fixed effects and without error clustering is similar to that reported in Table 6.

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APPENDIX

Case 1

When the renege constraint binds, we have

$$V[b_j, \beta_j^{**}(b_j), x] - V(\beta_j^*) - tx - rb_j = 0$$

or

$$\frac{b_j(2 - b_j)}{4\gamma} \cdot \frac{\text{var}(\mu)}{1 + \text{var}(\mu)} - tx - rb_j = 0$$

or

$$-b_j^2 k + (2k - 4\gamma r)b_j - 4\gamma tx = 0$$

$$-b_j^2 k + Yb_j - Z = 0$$

where

$$k = \frac{\text{var}(\mu)}{1 + \text{var}(\mu)}, \quad Y = 2k - 4\gamma r \text{ and } Z = 4\gamma tx$$

The solution to the optimization is the largest value of $b_j \in [0, 1]$ that satisfies the quadratic equation, yielding

$$b_j^{**} = \frac{Y + (Y^2 - 4kZ)^{1/2}}{2k}$$

$$\frac{\partial b_j^{**}}{\partial k} = \frac{1 + [(Y^2 - 4kZ)^{-1/2}](Y - Z)}{k} - \frac{Y + (Y^2 - 4kZ)^{1/2}}{2k^2} > 0$$

Thus b_j^{**} increases with $\text{var}(\mu)$.

Case 2

When the reneging constraint binds, we have

$$V[b_j, \beta_j^{**}(b_j)] - w - tx = rb_j$$

where

$$k = \frac{\text{var}(\mu)}{1 + \text{var}(\mu)}$$

or

$$\frac{1}{4\gamma} (2b_j k - b_j^2 k + 1 - k) - w - tx \geq rb_j$$

or

$$-b_j^2 k + Gb_j + H = 0$$

where

$$G = 2k - 4\gamma r \text{ and } H = 1 - k - 4\gamma(w + tx)$$

The solution to the optimization is the largest value of $b_j \in [0, 1]$ that satisfies the quadratic equation, yielding

$$b_j^{**} = \frac{G + (G^2 + 4kH)^{1/2}}{2k}$$

Since G decreases with r , and b_j^{**} increases with G , b_j^{**} decreases with r . As H decreases with w and tx , and b_j^{**} increases with H , b_j^{**} decreases with w and tx . And since k increases with $\text{var}(\mu)$, b_j^{**} decreases with $\text{var}(\mu)$.

Thus

$$\frac{\partial b_j^{**}}{\partial r} < 0, \quad \frac{\partial b_j^{**}}{\partial w} < 0, \quad \frac{\partial b_j^{**}}{\partial (tx)} < 0 \quad \text{and} \quad \frac{\partial b_j^{**}}{\partial \text{var}(\mu)} < 0$$

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