

A SYSTEMATIC ASSESSMENT OF THE EMPIRICAL SUPPORT FOR TRANSACTION COST ECONOMICS

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Transaction cost economics (TCE) is one of the leading perspectives in management and organizational studies, yet debate continues regarding its empirical support. In this paper, we take stock of the large body of extant research and provide a systematic assessment of empirical evidence. In all, 308 statistical tests from 63 articles, selected according to a set of clear criteria, were examined across various dimensions. We assess not only the level of empirical support for the theory, but also the degree of paradigm consensus present in the empirical literature. Our analysis shows that results are mixed: while we found support in some areas (e.g., with regard to asset specificity), we also found considerable disagreement on how to operationalize some of TCE's central constructs and propositions, and relatively low levels of empirical support in other core areas (e.g., surrounding uncertainty and performance). We conclude that a more thorough empirical grounding of the theory's foundation is crucial to its future development, and offer several strategies for doing this. Copyright © 2003 John Wiley & Sons, Ltd.

Since the publication of Oliver E. Williamson's seminal book, *Markets and Hierarchies* (Williamson, 1975), transaction cost economics (TCE) has become one of the leading perspectives in the study of management and organizations. Williamson's 1975 and 1985 books, two of the landmark pieces in TCE, have been garnering anywhere between 250 to 500 citations *yearly* since the early 1990s, far more than those to other classic works in organizational studies, such as institutional theory, organizational ecology, and resource dependence.¹ Indeed, Williamson (1991a: 90) has argued that TCE should form the basis of a 'core theory' of strategy, and an increasing number of phenomena

are being subsumed under the approach (Groenewegen and Vromen, 1996: 376). Despite this prominence, however, heated debate continues regarding the theory's empirical validity and applicability, as illustrated by the following exchange:

Williamson's arguments ... are not only inapplicable to most decision-making situations in firms but, if so applied, are also likely to adversely affect their performance. (Ghoshal and Moran, 1996: 16)

Transaction cost economics is an empirical success story. Ghoshal and Moran should come to terms with this. (Williamson, 1996: 55)

Any conclusion that TCE is an empirical success story appears to be premature. (Moran and Ghoshal, 1996: 69)

What is intriguing about this debate is that neither side brings much solid evidence to bear regarding the actual empirical support for TCE. Previous reviews of the empirical TCE literature,

Key words: transaction cost economics; meta-analysis; organizational forms

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¹ The Social Sciences Citation Index (SSCI) was used for this purpose. Detailed figures are available upon request.

meanwhile, have been largely unsystematic and almost exclusively narrative, with no explicit selection and evaluation criteria (e.g., Mahoney, 1992; Joskow, 1993; Shelanski and Klein, 1995). As a result, there is little in the way of comprehensive substantiation regarding empirical support for TCE, a situation which is perhaps common in fields where the 'evidence/theory ratio' is low (Holmstrom and Tirole, 1989: 63; Peltzman, 1991; Coase, 1992). Without a thorough assessment of empirical support, we contend, further debates such as the one cited above are not likely to be fruitful, with each side talking past the other and little progress being made.

In this paper, therefore, we seek to reconcile the gap between TCE's prominence as a theoretical framework and the lingering doubt about its empirical grounding. With clearly outlined procedures for selecting and evaluating empirical studies, we set out to gauge the level of support for TCE's core propositions and to thereby identify areas in which the theory is more (or less) successful. In order to situate the debate in a broader context, we also investigate the issue of paradigm consensus within the empirical TCE literature. In other words, we ask: Is there broad agreement on the identification and measurement of constructs and on the hypothesized relationships between constructs? We believe that consensus on these issues allows a theory to move forward in a systematic, cumulative fashion (Cole, 1983: 134; Pfeffer, 1993: 611; Collins, 1994). Given the relative lack of paradigm consensus within organizational studies as a whole (Pfeffer, 1993), and the resistance to building such consensus (e.g., Van Maanen, 1995), even a modest amount of consensus within TCE might help explain the rapid ascent of the perspective.

We begin by briefly summarizing the main tenets of TCE, *à la* Williamson, as they pertain to our review. Next, we describe our data and the procedures we used to select empirical studies for analysis. Finally, we present our results, discuss our findings, and draw implications for future research.

OVERVIEW OF TCE THEORY

Before describing our analysis, we first briefly outline the central tenets of TCE. While there have been many elaborations and extensions to the theory, we focus only on the core propositions elaborated by Williamson (1975, 1981, 1985,

1991b) regarding the governance of transactions. We neither seek to provide a comprehensive literature review, nor to review any of the critiques of TCE previously made (e.g., Perrow, 1981; Granovetter, 1985; Ghoshal and Moran, 1996). This narrow focus is deliberate, for our objective is to concisely outline the theory's main tenets, to gauge consistency on how these are operationalized, and to assess empirical support. In short, we do not seek to provide a theoretical analysis or critique, as these have been adequately provided elsewhere (for two recent examples, see Slater and Spencer, 2000, and Madhok, 2002); instead, we wish to let the empirical results speak for themselves regarding the foundations of the theory.

TCE, at its core, focuses on 'transactions and the costs that attend completing transactions by one institutional mode rather than another' (Williamson, 1975: 1–2). The transaction, a transfer of a good or service, is the unit of analysis in TCE, and the means of effecting the transaction is the principal outcome of interest (Williamson, 1985: 1). The theory's central claim is that transactions will be handled in such a way as to minimize the costs involved in carrying them out. Williamson (1991b) identifies three alternate forms of transaction governance: market, hybrid, and hierarchy. Each form is supported by a different form of contract law, and each employs its own coordination and control systems. *Market governance* corresponds to classical contract law, whereby the identity of the transacting parties is irrelevant and no dependency relation exists between them. Market transactions are governed by formal terms that are interpreted in a legalistic way, and are characterized by 'hard bargaining' between parties. In the *hybrid* form of governance, parties to the transaction maintain autonomy but are bilaterally dependent in a non-trivial way. The identity of the parties matters, in the sense that each could not be replaced costlessly by the other. Hybrid forms are supported by neoclassical contract law, which is more 'elastic' and adaptive than classical contract law. This governance form foresees unanticipated disturbances, provides a 'tolerance zone' within which misalignments are absorbed, requires information disclosure when adaptation occurs, and provides for arbitration (prior to resorting to the courts) in the event of disagreement. *Hierarchy*, or internal organization, is yet more elastic and adaptive. Here, adaptation to disturbances occurs mostly through fiat. Rather than relying on the courts, parties within a

hierarchy resolve disputes internally: they work out their differences themselves, or appeal unresolved disputes to the hierarchy for decision. This form of governance is supported by what Williamson calls the contract law of forbearance.

TCE maintains that there are 'rational economic reasons' for choosing the means of governing transactions (Williamson, 1985: 52). This is captured in what Williamson (1991b: 277) called the 'discriminating alignment hypothesis,' which holds that transactions, which differ in their attributes, are aligned with governance structures—i.e., market, hybrid, or hierarchy—in a discriminating (i.e., transaction-cost-economizing) way. In other words, the governance mode (hierarchy, hybrid, or market) that minimizes transaction costs is the preferred option. The principal attributes of transactions, according to TCE, are asset specificity, uncertainty, and frequency. First, the *asset specificity* of a transaction refers to the degree to which the assets used in support of the transaction can be redeployed to 'alternative uses and by alternative users without sacrifice of productive value' (Williamson, 1991b: 282). As asset specificity increases, redeployability decreases, which increases bilateral dependency and contracting hazards between parties. TCE predicts that the high-powered incentives of market forms of governance impede adaptability among transacting parties, and that markets are thus ill equipped to deal with these situations of high bilateral dependency. This results in maladaptation costs, and pushes transactions with high asset specificity into more integrated (i.e., adaptive) forms of governance. While this implies added bureaucratic costs, those costs are offset by the bilateral adaptive gains that result. TCE thus predicts that transactions with low asset specificity will be undertaken in the market, those with intermediate asset specificity in hybrid forms, and those with high asset specificity in hierarchical forms of governance (see Williamson, 1991b: 284, for a graphical representation of this).

The second important dimension of transactions is *uncertainty*. The effect of uncertainty on the choice of governance form, however, is conditional. When asset specificity is low, market governance should be preferred whatever the degree of uncertainty, since continuity matters little and new transaction arrangements can easily be arranged by both parties if necessary (Williamson, 1985: 59). When asset specificity is present to

a nontrivial degree, however, continuity between the transacting parties becomes important, and adaptive capabilities become necessary. In the presence of asset specificity, increases in uncertainty thus render market governance subject to costly haggling and maladaptiveness, and increase the relative attractiveness of hierarchies and hybrids (Williamson, 1985: 79). However, at high levels of uncertainty, the 'intermediate range' of asset specificity within which hybrid forms are preferred tends to shrink, and may even disappear (Williamson, 1991b: 292). This is because hybrid adaptations cannot be made unilaterally (as with market governance), or by fiat (as with hierarchy), but require mutual consent (Williamson, 1991b: 291). The result is that high uncertainty renders both market governance and hierarchies preferable to hybrids.

Finally, the *frequency* of the transaction operates in a similar way. Asset-specific transactions that occur frequently require constant monitoring effort in the market, while those that occur only occasionally need not be attended to continuously and do not merit the bureaucratic costs of establishing a hierarchy. Thus, in the presence of asset specificity, frequency also pushes transactions away from the market and into hierarchy (Williamson 1985: 79).

In summary, we set out to gauge the level of empirical support for these core tenets of TCE:

1. As asset specificity increases, the transaction costs associated with market governance increase.
2. As asset specificity increases, hybrids and hierarchies become preferred over markets; at high levels of asset specificity, hierarchy becomes the preferred governance form.
3. When asset specificity is present to a nontrivial degree, uncertainty raises the transaction costs associated with market governance.
4. When asset specificity is present to a nontrivial degree, increasing uncertainty renders markets preferable to hybrids, and hierarchies preferable to both hybrids and markets.
5. When both asset specificity and uncertainty are high, hierarchy is the most cost-effective governance mode.
6. Governance modes that are aligned with transaction characteristics should display performance advantages over other modes; for example, when both asset specificity and uncertainty

are high, hierarchy should display performance advantages over markets and hybrids.

There are, of course, numerous elaborations of TCE, which we have not covered. As a first step in assessing empirical support, however, we felt it most important and efficacious to test these main tenets, i.e., the core of TCE theory.

DATA AND METHOD

Our method differs from the traditional narrative review by being more systematic and explicit in its selection of studies and by employing quantitative methods of evaluation. Synthesizing existing evidence in this way can be a powerful tool in the building of knowledge, and can be as important as conducting new research (Light and Pillemer, 1984; Cooper, 1989). While more 'sophisticated' quantitative procedures than ours exist (Guzzo, Jackson, and Katzell 1987; Hunter and Schmidt, 1990), we sought to keep our methodology as simple and straightforward as possible in light of the exploratory nature of our analysis and the high degree of heterogeneity in our data (Light and Pillemer 1984).² Essentially, our goal was to identify a representative sample of journal articles that statistically test the core tenets of TCE regarding the governance of transactions. We neither sought to be comprehensive, in the sense of including *all* tests of TCE, nor to include applications of TCE removed from its core.³ Rather, we sought to isolate a large, yet manageable, sample of studies that test the core propositions of the theory as outlined above. This process involved several choices, which we outline below.

² While we considered employing some of the more advanced 'meta-analytic' techniques, we were precluded from justifiably doing so by the fact that our study (1) encompasses multiple dependent variables, and (2) includes a large number of heterogeneous measures of independent variables (as shown in Tables 4, 5, and 6). We felt that combining these into a single statistic would be neither advisable nor desirable at this stage of analysis (see Light and Pillemer, 1984: 99–100; Hunter and Schmidt, 1990: 497; for cautions against doing so).

³ For example, we excluded applications of TCE to the capital structure of the firm (i.e., use of debt vs. equity), the existence of formal HRM training programs within firms, and the effects of vertical integration on risk exposure. While interesting, we felt that such applications were somewhat removed from the original predictions of the theory regarding the governance of transactions, and would thus best be left to more specialized reviews.

The first choice made was to include only published journal articles, thereby excluding book chapters or unpublished work. Journal articles have been through a review process that acts as a screen for quality, allowing us to distill studies meeting a certain level of conceptual and methodological rigor. As Light and Pillemer (1984: 35) note: 'Restricting a review to published studies may enhance quality control. Most refereed journals have reasonably strict requirements for publication ... This process usually leads to a better technical product.' Furthermore, many electronic abstracting services cover only journals, making other sources much more difficult to locate systematically. While excluding unpublished work may lead to an overestimation of effects due to bias towards publishing significant results, Hunter and Schmidt (1990: 507–509) found that the results of published and unpublished studies were 'essentially identical' and that there exists 'no problem of availability bias' when including only published works. Finally, Cooper (1989: 58; emphasis ours) argued that relying on published results is appropriate 'when the published research contains several dozen, or in some cases several hundred, relevant works. In such an instance it is likely that while the published research may overestimate the *magnitude* of the relation, it probably will not incorrectly identify relation *direction*.' Because, as we explain below, we are concerned with establishing the direction of effects, we are less concerned about the (possibly negligible) bias introduced by sampling only from published studies.

The second choice made was to use both the ABI/Inform Global and the EconLit databases as search tools. ABI covers over 1300 journals and magazines, published in English, from around the world. We found ABI suitable for our purposes because of its multidisciplinary nature: in addition to its extensive coverage of economics, it covers other disciplines likely to publish work on TCE, such as law, management, marketing, organizational behavior, and public administration. Because it searches multiple disciplines at once, ABI was an appropriate and efficient database for our purposes. Yet, because TCE is rooted in economics, we also used EconLit in order to adequately cover journals in this field. EconLit covers over 500 journals. Both databases begin coverage before the birth of Williamsonian TCE: ABI/Inform in 1971 and EconLit in 1969.

Our next task was to select a sample of TCE articles from over 1 million articles compiled in ABI and EconLit. Our goal was to identify a *representative sample of studies that empirically tested the core tenets of Williamson's TCE*, as outlined above. In order to minimize subjectivity and arbitrariness, we sought a systematic, transparent, and replicable means of selecting studies for analysis. Since ABI and EconLit allow one to search for desired words in an article's database entry, we set criteria based on keywords which are likely to be found in the pieces pertinent to our focus. The first step was to isolate articles with *substantive* relevance—i.e., those concerned with the main tenets of Williamson's TCE. For this purpose, keywords central to the theory were chosen as search criteria. To begin, the keywords 'TRANSACTION* COST*' were used, where a '*' indicates that variations on the ending of the word were permitted. This produced over 2000 articles in both ABI and EconLit, though many of these were not relevant to the task at hand. For example, several referred to 'transaction costs' in the financial market or banking setting, without any mention of TCE or governance forms in general.

In order to eliminate such nonrelevant articles, additional keywords were used. In all, 12 additional keywords were chosen for the second step. These were the most frequently mentioned words or phrases in the index of Williamson's *The Economic Institutions of Capitalism* (1985), plus the author's last name: INTEGRATION, ORGANIZATION, GOVERNANCE, RATIONALITY, FRANCHIS*3, ECONOMIES OF SCALE, OPPORTUNISM, UNCERTAINTY, HIERARCHIES, MERGER*1, ASSET SPECIFICITY, and WILLIAMSON.⁴ The following criterion was then set: at least *one* of these additional (substantive) keywords was required, along with 'TRANSACTION* COST*' to be in the article's entry. For example, an article with 'INTEGRATION' and 'TRANSACTION COSTS' in its entry would be selected, but one with only 'INTEGRATION' or with only 'TRANSACTION COSTS' would not be selected.⁵

⁴ A '*' followed by a number indicates that variations of the given length were permitted. For example, 'FRANCHIS*3' would capture FRANCHISE as well as FRANCHISING.

⁵ Additional substantive keywords such as 'MORAL HAZARD*', 'M-FORM*', and 'ANTITRUST' were checked, but these did not lead to any additional articles meeting our criteria.

While this helped us home in on pieces with substantive relevance, many of these were not empirical. Thus, we introduced the following seven 'methodological' keywords as filters: DATA, EMPIRICAL, TEST, STATISTICAL, FINDING*, RESULT*, and EVIDENCE. The criterion was that an article's database entry must contain at least one of these seven methodological keywords. This left us with 317 articles in ABI and 201 in EconLit. Scanning the abstracts of these items, however, revealed that many pieces were *still* not appropriate for our purposes. Despite the steps taken above, some made no mention of data, while others referred to transaction costs in a non-TCE way. For example, one abstract (Seibert, Langhammer, and Piazzolo, 1996) read, 'a transatlantic free trade area could ... [lower] transaction costs,' and went on to describe the macroeconomic policy implications of free trade without any mention of organizational governance.

We thus sought a method of further refining our selection. Noting that many of the nonrelevant abstracts were the lone items from a particular journal, we set a criterion based on frequency of journal appearances: articles that were the lone representative from their journals at this stage of the search were dropped from the set. For example, of the 317 articles found in ABI to this point, 32 were from the *Journal of Economic Behavior and Organization* (*JLEO*), while only one was from the *Journal of Risk and Insurance*. We reasoned that 'single-journal' hits such as this latter item were less likely to be both substantively and methodologically relevant than those that were published in journals with multiple articles identified (such as the 32 in *JLEO*). A cursory review of these single items confirmed that many were indeed quite removed from the core theory—at best some were extensions of TCE beyond the question of governance forms, and many made only passing reference to TCE while actually testing something quite different. Adding the criteria that articles had to be from journals that yielded more than one hit reduced our sample to 242 in ABI and 78 in EconLit.⁶

⁶ Even if some of these deleted articles have relevance to core TCE, there is no reason to believe that, on the whole, they would be either more or less favorable to the theory than the articles retained. The list of journals dropped, which can be compared with the list of journals ultimately selected in Table 7, is available upon request.

The abstracts of these articles were then read. In order to be retained, an abstract had to satisfy two main criteria. First, it had to give an indication of empirical analysis, such as a mention of sample size, specific industries or firms, specific countries or time periods, specific tests or results, or analytic techniques. Second, an abstract had to use 'transaction costs' in the substantive context of core TCE as discussed earlier. For example, one abstract (Lyons, 1995) that read 'empirical tests of three hypotheses are developed arising from transaction cost theory' was retained because of the reference to TCE theory in the right context, while another (Rudin, 1986) that read 'Maxicare acquired HealthAmerica Corp. for \$372 million plus transaction cost' was rejected because its use of 'transaction cost' was not deemed pertinent. These two criteria—indication of data and substantive relevance—were applied conservatively: any doubt resulted in an article's retention. This step reduced the number of articles to 111 in ABI and 43 in EconLit.

The final step in our selection process was to retrieve and read these articles in their entirety. We coded bibliographic information, independent and dependent variables and their operationalizations, hypothesized relations, test results for each hypothesis, and additional information of relevance for each of the articles. In reading and coding these pieces, we could see that the process described above had indeed worked quite well in retrieving empirical tests of TCE's core relationships. Yet, we also found that some of the articles were *still* not appropriate for our analysis. Some did not have any adequate empirical data after all, while others were without any directly TCE-related dependent or independent variables. For example, Michael (1994) looked at the effects of physical distribution costs (rail and postal) on the relative amount of retail vs. mail-order sales of large retail firms. We excluded this article because we did not find that it fit within the framework of core TCE as we outlined earlier. Other articles were entirely descriptive, and did not present any results of statistical tests. For example, Garrette and Quelin (1994) looked at the different types of hybrid forms present in the telecommunications industry and built a typology of these forms—this article was excluded because no causal relationship between transaction costs and governance

form was tested.⁷ An article was excluded only if neither author could see an implication for core TCE.

The result was 53 articles in ABI and 21 from EconLit, with 11 articles in common, for a final total of 63. A summary of the selection process we have followed to obtain these 63 articles is presented in Table 1, and full citations are given in the references section. Overall, these articles were found in well-regarded journals known to publish TCE research, from across a variety of disciplines.

In sum, a series of filters were used to distill from the vast literature on TCE a set of articles containing empirical tests of the theory's central tenets regarding the governance of transactions. Our sample of 63 articles compares favorably to recent quantitative reviews in management/strategy: Stankovic and Luthans (1997) included 19 articles, Ketchen *et al.* (1997) reviewed 40, Dalton *et al.* (1998) had 54 and 31 (respectively) in the two relationships they considered, and Campbell-Hunt (2000) had 17. While our study neither includes nor seeks to include *all* tests of core TCE, we are confident that we have systematically and transparently generated a relatively large sample that is representative of the body of research we wish to review, and that by doing so we have gone well beyond previous (narrative) reviews of the theory.

RESULTS

The 63 articles thus selected for analysis contained 308 statistical tests of core TCE relationships. These statistical tests are our 'units of analysis.' Overall, of the 308 tests of core TCE, 144 (47%) were statistically supported, 133 (43%) produced statistically nonsignificant results, and 31 (10%) were statistically significant in the *opposite* direction to the theory.⁸ Below, we break down our results by independent variable, dependent variable, independent–dependent variable pair, journal, and year of publication.

⁷ We strongly considered including qualitative papers, but found no systematic way to code their results in a way that was comparable to quantitative tests.

⁸ We used a cut-off of $p < 0.05$ for statistical support. Of course, any statistically insignificant result may reflect methodological error rather than the theory itself. Detailed results are available from the first author.

Table 1. Summary of selection filters: ABI and EconLit

Filter type	Description	ABI result	EconLit result	Total
Substantive	All articles with 'transaction* cost*' in their title or abstract ('*' indicates variations on word endings permitted)	2234	2321	4555
Substantive	At least one of 12 additional keywords, based on Williamson's 1985 index, must also appear in title or abstract	664	533	1197
Methodological	At least one of seven keywords indicating empirical data or analysis must also appear in title or abstract	317	201	518
Substantive	Article must appear in a journal that has returned more than one item from the filters above	242	78	320
Substantive and methodological	Remaining abstracts read for both substantive relevance and statistical analysis	111	43	154
Substantive and methodological	Remaining full articles read for both substantive relevance and statistical analysis	53	21	74
Duplicates	Deletion of duplicate articles found in both databases			63

Independent and dependent variables

Independent variables coded were of two types: (1) measures of transaction costs or transaction characteristics that raise transaction costs (asset specificity, uncertainty, the interaction of asset specificity and uncertainty, frequency, and opportunism), and (2) measures of governance form (coordination between buyer and seller, vertical integration). Asset specificity (AS) was the most frequently considered independent variable, appearing in 107 independent statistical tests. Sixty percent of these tests were supported, while only 4 percent were significant in the direction opposite to TCE predictions. For example Anderson and Schmittlein (1984) found that asset specificity led to the use of an in-house salesforce rather than outside representatives. Uncertainty (U) was the second most analyzed independent variable, examined in 87 statistical tests. It is important to recall that TCE posits a contingent effect for uncertainty: only in the presence of asset specificity is it predicted to affect governance form. While it would be reasonable to assume that asset specificity was present 'to a non-trivial degree' (Williamson, 1985: 60) in all the studies in our dataset, most authors either overlooked this distinction entirely or simply assumed that asset specificity was present, and interpreted

the main effect of uncertainty as an indication of support (or non support) for the theory. Interpreted in this manner, only 24 percent of these tests were in the direction posited by TCE, while 16 percent were counter to the theory. For example, Andersen and Buvik (2001) found no evidence that uncertainty led to more integration between buyers and sellers in domestic transactions. Some studies *did* test for the effects of the interaction between asset specificity and uncertainty, however. Out of 30 such tests, 13 supported the theory, and four were significant in the opposite direction. It is notable that only seven of the 63 studies in our sample explicitly tested for this interaction effect, despite the fact that it is an important part of Williamson's framework.

Finally, some studies sought to measure transaction costs directly (i.e., rather than transaction characteristics such as asset specificity or uncertainty). Of the 51 tests with transaction costs as an independent variable, 45 percent were statistically supported. Our results for these and the other independent variables are summarized in the first panel of Table 2.

The second panel of Table 2 shows the results sorted by dependent variables. These were of three broad types: (1) governance form, (2) performance

Table 2. Results by independent and dependent variables

	# Tests	# Supported	% Supported	# Counter	% Counter
<i>A. Independent variable</i>					
Asset specificity	107	64	60%	4	4%
Uncertainty	87	21	24%	14	16%
Transaction costs of the exchange	51	23	45%	9	18%
Asset specificity * Uncertainty	30	13	43%	4	16%
Frequency	13	9	69%	0	0%
Degree of integration between buyer and seller	12	8	67%	0	0%
Opportunism	7	5	71%	0	0%
Vertical integration	1	1	100%	0	0%
Total	308	144	47%	31	10%
<i>B. Dependent variable</i>					
Hierarchy vs. market	117	53	45%	9	8%
Degree of integration between buyer and seller	67	40	60%	5	7%
Transaction costs—market exchange	27	11	41%	1	4%
Hierarchy vs. hybrid	26	10	38%	11	42%
Hybrid vs. market	23	6	26%	3	13%
Performance of market	12	8	67%	0	0%
Opportunism	12	6	50%	0	0%
Performance of hierarchy	10	1	10%	2	20%
Performance of hybrid	8	5	63%	0	0%
Greater degree of integration within hierarchy	4	2	50%	0	0%
Transaction costs—hierarchy	2	2	100%	0	0%
Total	308	144	47%	31	10%

of governance form, and (3) the level of opportunism or transaction costs present in exchange. The classic 'make or buy' (i.e., hierarchy vs. market) dichotomy was the most frequently examined dependent variable, present in 117 statistical tests. Fifty-three (45%) of these were supported, while only nine were significant in the opposite direction. For example, Walker and Weber (1987) showed that increased uncertainty led automobile firms to make rather than buy a component. TCE was less effective in predicting the choice of hybrids over markets, however, with only 26 percent of tests providing support. For example, Klein, Frazer, and Roth (1990) did not find support for the proposition that asset specificity leads to the use of alliances over market distribution (hybrid vs. market governance).

A higher level of support (60%) was found for predictions regarding the degree of integration between buyers and suppliers. For example, Heide and John (1990) found that increasing asset specificity led to more joint action between buyers and suppliers of industrial machinery. TCE

arguments were less successful, however, in predicting the dichotomous choice between hierarchies and hybrids. Of 26 tests with this dependent variable, 10 (38%) were significant in the direction predicted by the theory, while 11 results (42%) were counter to the theory. For example, while Robertson and Gatignon (1998) found that asset specificity led firms to select full integration over alliances, they also found that technological uncertainty was associated with the use of alliances rather than hierarchy. Together, these results suggest that TCE explanations are better at predicting integration *within* hybrid forms rather than the *replacement* of hybrid forms with hierarchies (see Hennart, 1993, for an explanation of why this might be true).

Twenty-seven tests had the transaction costs of market exchange as a dependent variable. Eleven of these (41%) were supportive of the theory. For example, Buvik and Andersen (2002) found that the asset specificity associated with transactions raised the costs of performance evaluation and monitoring in the market. Interestingly, only a

small number of tests in our sample examined performance as a dependent variable: 12 tests looked at the performance of market contracting, 10 examined the performance of hierarchies, and eight that of hybrids. Results for these and the other dependent variables are shown in the second panel of Table 2.

Independent–dependent variable pairs

Table 3 presents results for the key independent–dependent variable pairs found in our sample. These comprise 238 of the 308 tests in our dataset. The most common test was on the effect of asset specificity on the choice between hierarchy and market governance (45 tests). Fifty-eight percent of these tests were statistically significant in the direction posited by TCE. For example, John and Weitz (1988) found that asset specificity led firms to integrate forward into distribution. The next most tested relationship was between uncertainty and the hierarchy–market choice. Here, however, only nine of 37 tests showed that increasing uncertainty led to hierarchy being chosen over market governance, while almost as many (six) showed the opposite. For example, Russo (1992) found that uncertainty was negatively related to backward integration in the electric generating industry, contrary to the theory (assuming the presence of asset specificity). Twenty-one tests were on the effects of the *interaction* between asset specificity and uncertainty on the hierarchy–market choice, and 52 percent of these were supportive. No tests were found, however, on the effects of this interaction on the hierarchy–hybrid or hybrid–market choices. Strongest support, 79 percent, was for the relationship between asset specificity and buyer–seller integration. For example, Buvik and Grønhaug (2000) found that asset specificity led to greater coordination between buyers and sellers of industrial goods.

Measures of asset specificity, uncertainty, and transaction costs

To delve into these results further, and to assess how consistently the theory was operationalized across studies, we examined the various measures used for the three most common independent variables in Table 2: asset specificity, uncertainty, and transaction costs. As shown in Table 4, we found 27 different measures of asset specificity, which

we have grouped according to six higher-level categories (five of which correspond to Williamson's, 1991b: 281, dimensions). The most common measures used were specialized production assets (17 tests), specialized skills (12), and a composite measure of specialized assets and skills (17). The level of support for TCE propositions varied, however, with the operationalization of asset specificity. Support was strongest for specialized skills (75%). For example, Monteverde (1995) found that specific vocabulary, indicating the need for specialized knowledge, led to the vertical integration of product development and manufacturing in the semiconductor industry. Support was more modest for specialized physical assets (53%). One example of a supportive test was Coles and Hesterly's (1998a) finding that the need for specially designed equipment was positively related to the internal provision of a service within private hospitals. A relatively large number of tests (17) used a measure that combined specialized assets and skills, and 65 percent of these tests were supported. For example, Klein *et al.* (1990) found that this measure led to the use of a wholly owned subsidiary rather than an independent distributor. The full results for asset specificity are shown in Table 4.

As with asset specificity, there was considerable diversity in the measurement of uncertainty: we found 23 different ways to operationalize the construct, 13 of which we were able to group under the larger categories of market conditions, technology, and behavior. The most commonly used measure of uncertainty was the volatility of technology, appearing in 18 tests. Only three of these were supportive of the theory, however, and two were significant in the opposite direction. For example, while Majumdar and Ramaswamy (1994b) found that firms were more likely to integrate into distribution in the presence of rapid technological change, Robertson and Gatignon (1998) found that the rate of technological change was associated with the use of hybrids (alliances) rather than internal R&D. The second most commonly used measure of uncertainty was a composite of demand and price volatility. Here, two of eight statistical tests were in the direction posited by the theory: Pillings, Crosby, and Jackson (1994) and Artz and Brush (2000) found that uncertainty of this type increased the negotiation costs between buyers and suppliers. The full results for uncertainty are shown in Table 5.

Table 3. Results by main independent-dependent variable pairs

Independent variable	Dependent variable	# Tests	# Supported	% Supported	# Counter	% Counter
Asset specificity	Hierarchy vs. market	45	26	58%	2	4%
Asset specificity	Hierarchy vs. hybrid	6	3	50%	0	0%
Asset specificity	Hybrid vs. market	7	3	43%	1	14%
Asset specificity	Degree of integration between buyer and seller	24	19	79%	1	4%
Asset specificity	Transaction costs—market exchange	8	4	50%	0	0%
Uncertainty	Hierarchy vs. market	37	9	24%	6	16%
Uncertainty	Hierarchy vs. hybrid	11	4	36%	5	45%
Uncertainty	Hybrid vs. market	10	1	10%	1	10%
Uncertainty	Degree of integration between buyer and seller	13	3	23%	2	15%
Uncertainty	Transaction costs—market exchange	4	1	25%	0	0%
Asset specificity * Uncertainty	Hierarchy vs. market	21	11	52%	1	5%
Asset specificity * Uncertainty	Hierarchy vs. hybrid	0	—	—	—	—
Asset specificity * Uncertainty	Hybrid vs. market	0	—	—	—	—
Asset specificity * Uncertainty	Degree of integration between buyer and seller	4	2	50%	2	50%
Asset specificity * Uncertainty	Transaction costs—market exchange	5	0	0%	1	20%
Transaction costs of the exchange	Hierarchy vs. market	7	2	29%	0	0%
Transaction costs of the exchange	Hierarchy vs. hybrid	9	3	33%	6	67%
Transaction costs of the exchange	Hybrid vs. market	5	2	40%	1	20%
Transaction costs of the exchange	Degree of integration between buyer and seller	22	12	55%	0	0%
Total		238	105	44%	29	12%

We repeated this exercise for measures that sought to capture transaction costs directly, i.e., not as a function of transaction characteristics such as asset specificity and uncertainty.⁹ Eleven tests measured the costs associated with monitoring transactions. Four of these were supportive of TCE arguments; for example, Oxley (1999) found that monitoring costs led to the use of joint ventures as opposed to market contracting. Performance ambiguity was the second most frequent measure of transaction costs.¹⁰ Four of eight tests using this measure were supportive of TCE; for example,

Poppo and Zenger (1998) found that performance ambiguity decreased satisfaction with the performance of market contracting. The full results for transaction costs are shown in Table 6.

Journal and year of publication

The 63 articles in our sample come from 26 different journals across a variety of disciplines. Table 7 shows the distribution of these articles by journal. The largest number of articles, nine of 63, was found in *Journal of Economic Behavior and Organization*. These articles contained 50 statistical tests of core TCE arguments, 50 percent of which were supported—a number marginally higher than the overall support rate of 47 percent. Two management journals were the next largest contributors: *Strategic Management Journal* and

⁹ As much as possible, we have tried to stay true to the original authors' interpretations. In other words, if they claimed to be attempting to measure transaction costs, we coded it as such.

¹⁰ Interestingly, this measure was used to capture uncertainty in other studies. While we could have combined these results, we preferred to remain true to the original authors' interpretations.

Table 4. Asset specificity as an independent variable

Measure	# Tests	# Supported	% Supported	# Counter	% Counter
<i>Human assets</i>					
Specialized skills	12	9	75%	0	0%
Training needs	5	2	40%	0	0%
Complexity of firm, product, or process	5	2	40%	0	0%
Coordination needs between buyer and supplier	7	4	57%	0	0%
Importance of key buyers	1	0	0%	0	0%
Buyer loyalty	1	1	100%	0	0%
Confidentiality of information	1	0	0%	0	0%
Buyer heterogeneity	4	2	50%	0	0%
Lock in to incumbent suppliers	1	1	100%	0	0%
Subtotal	37	21	57%	0	0%
<i>Physical assets</i>					
Specialized assets for production	17	9	53%	4	24%
Technological complexity	4	1	25%	0	0%
Technological tacitness	3	1	33%	0	0%
Sunk costs in plant and equipment	4	4	100%	0	0%
R&D to sales ratio	1	1	100%	0	0%
Subtotal	29	16	55%	4	14%
<i>Human and physical assets</i>					
Composite measure of specialized assets and knowledge	17	11	65%	3	18%
Subtotal	17	11	65%	0	0%
<i>Product</i>					
Customized final product	4	3	75%	0	0%
Customized input component	3	3	100%	0	0%
Development cost of final product	1	1	100%	0	0%
Importance of product to buyers	1	1	100%	0	0%
Importance of ancillary services to buyers	1	1	100%	0	0%
Typical dollar amount of transaction	1	1	100%	0	0%
Subtotal	11	10	91%	0	0%
<i>Site</i>					
Gaseous input	4	1	25%	0	0%
Proportion of inputs shipped within 500 miles of plant	1	0	0%	0	0%
Subtotal	5	1	20%	0	0%
<i>Firm</i>					
Complexity of IT in business segment	3	2	67%	0	0%
Strategic importance of business segment to firm	2	1	50%	0	0%
Advertising to sales ratio	2	1	50%	0	0%
Brand equity of firm	1	1	100%	0	0%
Subtotal	8	5	63%	0	0%
Total	107	64	60%	4	4%

Academy of Management Journal, with six articles each. Here, support was somewhat lower: 38 percent and 35 percent respectively. *Journal of Business Research*, another management journal, also had a low support rate at 38 percent. Marketing journals, however, such as *Journal of Marketing*, *Journal of Marketing Research*, and *Journal of the Academy of Marketing Science*, had support rates somewhat higher than the average. Table 7 further segments results into two groups: those

from journals with two or more items in the final sample, and those with only one contributing article.¹¹ Levels of support were remarkably consistent across the two groups, suggesting that our aggregate results are not sensitive to the number of items per journal.

¹¹ Although journals with only one item were deleted at an earlier stage in the selection process, some with multiple items at that stage were reduced to a single item at later stages of selection (e.g., after abstracts were read).

Table 5. Uncertainty as an independent variable

Measure	# Tests	# Supported	% Supported	# Counter	% Counter
<i>Market conditions</i>					
Composite measure of demand and price changes	8	2	25%	0	0%
Demand changes	6	2	33%	0	0%
Price changes	5	0	0%	1	20%
Unpredictability of customers	5	3	60%	0	0%
Total transaction volume	1	0	0%	0	0%
Subtotal	25	7	28%	1	4%
<i>Technology</i>					
Volatility	18	3	17%	2	11%
Novelty	7	1	14%	2	29%
Competition in supply of needed technology	3	0	0%	2	67%
Subtotal	28	4	14%	6	21%
<i>Behavioral</i>					
Number of users/customers for the part or product	7	1	14%	3	43%
Cross-border transaction	1	0	0%	0	0%
Time from initial contact to transaction	1	1	100%	0	0%
Supplier unpredictability	1	0	0%	0	0%
Decision making uncertainty of buyer	1	0	0%	1	100%
Subtotal	11	2	18%	4	36%
Performance ambiguity of transacting parties	6	4	67%	0	0%
Regulatory uncertainty	4	0	0%	2	50%
Technological and market volatility (composite)	3	1	33%	0	0%
Component complexity	2	0	0%	1	50%
Transaction idiosyncrasy	2	1	50%	0	0%
Prior experience of firm in production category	2	0	0%	0	0%
Prior experience of firm with alliances	1	0	0%	0	0%
Currency risk	1	1	100%	0	0%
Firm risk	1	0	0%	0	0%
Political risk	1	1	100%	0	0%
Total	87	21	24%	14	16%

Table 6. Transaction costs as an independent variable

Measure	# Tests	# Supported	% Supported	# Counter	% Counter
Monitoring costs associated with transaction	11	4	36%	1	9%
Performance ambiguity of transacting parties	8	4	50%	2	25%
Costs to develop exchange relationship	5	3	60%	0	0%
Costs of guarding against opportunism	5	2	40%	0	0%
Complexity of transaction or alliance	4	3	75%	1	25%
Appropriability hazard	4	2	50%	0	0%
R&D intensity of transaction	4	2	50%	2	50%
Costs of switching transaction partners	3	1	33%	1	33%
Redeployability of assets used in transaction	3	0	0%	1	33%
Composite of costs to develop and monitor exchange relationship	1	1	100%	0	0%
Marketing intensity in product category	1	1	100%	0	0%
Alignment of governance form with TCE predictions	1	0	0%	0	0%
Cultural distance between transacting parties	1	0	0%	1	100%
Total	51	23	45%	9	18%

Table 7. Results by journal

Journal	Articles	Tests	# Supported	% Supported	# Counter	% Counter
<i>Journal of Economic Behavior & Organization</i>	9	50	25	50%	4	8%
<i>Strategic Management Journal</i>	6	37	14	38%	5	14%
<i>Academy of Management Journal</i>	6	17	6	35%	1	6%
<i>Journal of Business Research</i>	4	34	13	38%	1	3%
<i>Journal of Marketing</i>	4	14	7	50%	2	14%
<i>Journal of Law Economics and Organization</i>	4	11	7	64%	0	0%
<i>Journal of Marketing Research</i>	3	22	13	59%	3	14%
<i>Journal of the Academy of Marketing Science</i>	3	13	8	62%	3	23%
<i>Omega</i>	3	11	7	64%	1	9%
<i>Management Science</i>	3	9	6	67%	2	22%
<i>Journal of Corporate Finance</i>	2	17	5	29%	0	0%
<i>Administrative Science Quarterly</i>	2	7	4	57%	0	0%
Subtotal	49	242	115	48%	22	9%
<i>Industrial and Corporate Change</i>	1	21	3	14%	6	29%
<i>Journal of Institutional and Theoretical Economics</i>	1	6	5	83%	0	0%
<i>Rand Journal of Economics</i>	1	6	2	33%	0	0%
<i>Managerial and Decision Economics</i>	1	5	5	100%	0	0%
<i>Review of Economics & Statistics</i>	1	5	1	20%	0	0%
<i>Economic Inquiry</i>	1	4	2	50%	0	0%
<i>Journal of Industrial Economics</i>	1	4	2	50%	0	0%
<i>Organization Science</i>	1	4	2	50%	0	0%
<i>Journal of International Marketing</i>	1	3	3	100%	0	0%
<i>Accounting, Organizations and Society</i>	1	2	0	0%	1	50%
<i>Bell Journal of Economics</i>	1	2	2	100%	0	0%
<i>Research Policy</i>	1	2	0	0%	2	100%
<i>Journal of Management Information Systems</i>	1	1	1	100%	0	0%
<i>Review of Industrial Organization</i>	1	1	1	100%	0	0%
Grand total	63	308	144	47%	31	10%

Table 8 shows the distribution of results by year of publication. The years contributing the highest number of statistical tests to the sample—2000, 1998, and 1994—have levels of support of 29 percent, 39 percent, and 51 percent, respectively. Overall, there is no discernible trend in the level of support for the theory over our 20-year time period. Thus, while the theory has become increasingly influential over time, there has been no convergence of empirical findings that would indicate increasing agreement on baseline relationships.

DISCUSSION AND CONCLUSION

We have attempted to provide some substance to the long-standing debate over the empirical status of TCE. First, in addition to our methodological

approach, our aggregate findings are quite different from previous reviews. While Shelanski and Klein (1995: 335) concluded that the empirical literature is ‘remarkably consistent’ with the predictions of TCE (see also Mahoney, 1992), we found overall support to be at 47 percent. We found this surprising, especially given our conservative sampling methodology (i.e., selecting only published journal articles with clear and direct relevance to TCE). We expected that a theory of such prominence and disciplinary-spanning power would have clear-cut support. But perhaps our surprise was unfounded. While it is difficult to compare our results to those of traditional narratives, a cursory review of recent quantitative reviews in management studies reveals that other prominent theories in strategy do not fare very well: Campbell-Hunt (2000) found no statistically significant effect between the selection

Table 8. Results by year*

Year	Articles	Tests	# Supported	% Supported	# Counter	% Counter
2002 ^a	1	3	3	100%	0	0%
2001	4	15	10	67%	0	0%
2000	7	31	9	29%	4	13%
1999	5	29	13	45%	6	21%
1998	6	62	24	39%	8	13%
1997	5	16	10	63%	0	0%
1996	2	5	3	60%	0	0%
1995	8	27	12	44%	6	22%
1994	6	41	21	51%	0	0%
1993	1	2	1	50%	0	0%
1992	3	5	2	40%	3	60%
1991	2	8	4	50%	0	0%
1990	3	20	10	50%	3	15%
1989	2	7	5	71%	1	14%
1988	2	13	6	46%	0	0%
1987	2	8	4	50%	0	0%
1986	—	—	—	—	—	—
1985	1	5	1	20%	0	0%
1984	2	9	4	44%	0	0%
1983	—	—	—	—	—	—
1982	1	2	2	100%	0	0%
Total	63	308	144	47%	31	10%

* These results were compiled in mid-2000, when most articles had not been catalogued in on-line databases.

of generic strategies and performance, Dalton *et al.* (1998) found that board composition and board leadership had virtually no effects on performance, and Ketchen *et al.* (1997) found that only 8 percent of the variance in performance was explained by organizational configuration. Of course, owing to its exploratory nature, our study on its own does not provide the final word on TCE. In the meantime, however, our results keep us from unreservedly agreeing that the theory is an 'empirical success story' (Williamson, 1996: 55).

Second, we found that there was significant variation in support for the theory's predictions. As an independent variable, asset specificity fared best. This construct was quite successful at predicting the make-vs.-buy choice (58%), and was even better at predicting the degree of integration between independent buyers and sellers (79%). Results regarding uncertainty are less convincing: there does not seem to be a clear relationship between uncertainty and either the choice of governance form or the level of transaction costs (support for these relationships was well below 50% in all cases). In fact, there was almost as much evidence that increasing uncertainty led to results in the *opposite* direction predicted by the theory (e.g., towards less integrated governance forms).

But these results must be interpreted with caution: TCE predicts that uncertainty will only affect governance form when asset specificity is present to a nontrivial degree. While this was the case in all studies we looked at, few took this distinction into account explicitly. Results from studies that *did* test for interaction effects between asset specificity and uncertainty were also mixed, with support in the range of 50 percent.

Third, despite our relatively large sample of 63 articles and 308 tests, we found that some important TCE relationships have not received much empirical attention at all. Whereas asset specificity and uncertainty have received considerable scrutiny, other important TCE variables, such as frequency and performance, have not. Significantly, there was very little attention or support for TCE propositions regarding the relative performance of governance forms. For example, we could not find any tests of whether hierarchies outperform markets when both asset specificity and uncertainty are high or, conversely, whether markets perform better when these attributes are both low. Thus, while there is evidence that asset specificity leads to the choice of hierarchy over markets, we have no evidence (either way) on whether this choice is somehow 'efficient.' We found this lack

of empirical attention troubling, given the central position that the comparative performance of governance forms occupies within TCE.¹² Moreover, as can be seen from Table 3, there are 'gaps' in the empirical record. For example, across 63 studies, we could not find any tests of how the interaction between asset specificity and uncertainty affects the hierarchy–hybrid or the hybrid–market choice. Even for asset specificity alone, the empirical record is much thinner for these choices than for the hierarchy–market dichotomy. This, we believe, reflects the tendency for scholars to 'selectively apply' classic theories by focusing disproportionately on some relationships as opposed to others, to the point of presenting an 'unbalanced picture' of the original works (Mizruchi and Fein, 1999: 680). It must be emphasized that this is not a criticism of any of the *individual* articles reviewed here, but rather an expression of concern regarding the limited picture that empirical work on TCE *as a whole* has provided to date. Without more attention to, and support for, several of its key propositions, TCE will continue to suffer from doubts regarding its empirical standing.

Fourth, we found a significant amount of discrepancy and disagreement regarding the operationalization of core constructs and the interpretations of key relationships. This was apparent in both the articles ultimately selected, but even more so in those that we excluded. First, as can be seen in Tables 4, 5, and 6, there is great disparity in how core constructs such as asset specificity, uncertainty, and transaction costs have been measured. While there is some 'clustering' around common measures, it seems that these variables serve as rather large tents, under which a wide variety of transaction characteristics have been subsumed. While this may allow for flexible application of the theory, it also indicates a lack of consensus regarding its operationalization and may contribute to the confusion regarding its empirical standing (i.e., the level of support is highly dependent on the operationalization of the construct).¹³

¹² One study, by Silverman, Nickerson, and Freeman (1997), did attempt to address the 'discriminating alignment hypothesis.' They found that the alignment of governance form with transaction characteristics had no effect on survival rates (their measure of performance). However, the fact that recent work has begun to address the performance implications of TCE is encouraging; for example, see Leiblein, Reuer, and Dalsace (2002); Mayer and Nickerson (2002); and Nickerson and Silverman (2002).

¹³ This situation can be compared to that which exists for other prominent theories. For example, the concept of 'legitimacy'

Second, lack of consensus was particularly evident in the articles eventually excluded from our review. Even after applying several keyword filters and reading the abstracts of surviving articles, the majority of articles (58 of 111 in ABI and 22 of 43 in EconLit—see Table 1) proved irrelevant to the core theory upon detailed reading. Many of these studies claimed to be tests of TCE, and thus survived our filtering process, yet proved upon further inspection to be either tangential to the theory or a misapplication. Thus, it seems that TCE is often invoked and appropriated when in fact something quite removed from its core is being addressed. In fact, it may be precisely *because* of its malleability that the theory has gained such prominence, and that lack of strong consensus has not posed a barrier to diffusion. In most papers that we read from outside of economics and management studies, authors (i.e., nonspecialists) claimed to use TCE, but did not apply great care in specifying causal relationships or in operationalizing core constructs (e.g., Dansky, Milliron, and Gamm, 1996). Malleability, therefore, has been a double-edged sword: it has allowed the theory to spread rapidly, but has also resulted in many rather loose applications. In our view, greater consensus on core constructs and relationships would allow the theory to advance more consistently and convincingly across boundaries, albeit perhaps more slowly.

While we have endeavored to apply transparent and replicable criteria in selecting and analyzing studies, there remain some limitations to our method. First, our databases, ABI/Inform and EconLit, do not contain *all* relevant studies. Nonetheless, used together, we believe that they have allowed us to build a sample that is representative of all TCE work, not just that done in economics. Second, our keyword searches required several choices, just as a narrative review would. These choices, however, have been made explicit and are thus open to replication and critique. Third, we have eschewed the more complex meta-analytic procedures, due primarily to the broad scope of our

in institutional theory also encompasses multiple dimensions, with multiple measures under each dimension. This allows the theory to be applied flexibly to a wide variety of phenomena, but makes empirical results difficult to aggregate. Contrast this with the relatively less ambiguous core constructs in population ecology—age, size, density, founding, and failure—which, while promoting inter-study consensus and empirical clarity, also restrict the range of application.

review and the nature of our data. Finally, because we did not attempt to comprehensively gather data on alternatives to TCE, we cannot make any claims about the comparative success of the theory vs. competing theories. Moreover, we cannot incorporate results that may have implications for TCE that are reported in studies done within other literature streams. To address these issues, future work could focus on a single empirical phenomenon, such as joint ventures or the expansion to foreign markets, and then compare the success of *multiple* theories that make competing predictions. This would explicitly allow for the comparison of TCE with other perspectives. In spite of these weaknesses, however, we believe that our results remain informative, and can be used as a starting point for more fine-grained reviews. In summary, while our methodology involved several choices and limitations, our study does allow replication, extension, and disconfirmation—characteristics absent from previous reviews of TCE.

In his Nobel Prize lecture, Coase (1992: 79) aptly pointed out that ‘there is little doubt that a great deal more empirical work is needed’ in TCE. Yet a simple plea for *more* empirical work may not be enough, for it is quite likely to reproduce the same mixed results on an enlarged scale. Based on our findings, we offer five related strategies for pursuing empirical work in TCE. First, we suggest that future empirical research be firmly grounded, in terms of substance, on core TCE propositions. The problem here is twofold: one, some key propositions (e.g., relating to uncertainty) have been loosely interpreted; and two, some key variables have received very little scrutiny (e.g., performance). Explicit attention to the contingent nature of TCE predictions regarding uncertainty and to the discriminating alignment hypothesis are needed. The theory would be well served by filling in some of the sparse areas of Tables 2 and 3. This is not to argue against building extensions, but rather to call for a more solid base upon which these extensions can rest.

Second, great care should be taken in addressing the issues of operationalization and measurement. As shown in Tables 4, 5, and 6, there are numerous, perhaps too numerous, measures of key constructs. In addition to the concerns about their validity and reliability, we note that there is yet to be any gauging of between-measure consistency. As it stands now, the terms ‘asset specificity’ and ‘uncertainty’ do not provide shared and specific

understandings—these terms, as we found, mean many different things to different people. That is not to say that these constructs should not be applied to a wide range of phenomena, but rather that more care must be taken in defining what is meant by the constructs in a particular setting. In order for TCE to move forward, we believe that a higher level of consensus regarding the definitions and uses of its key constructs is more than desirable. Perhaps the results presented in these tables will contribute to that consensus.

Third, important methodological pitfalls must be avoided. For one, tests about the effects of governance forms on performance are problematic because they are likely to suffer from self-selection issues. Namely, unobserved variables may affect both organizational choice and performance, thus potentially biasing estimates (Masten, 1996). While some studies in our sample were explicit about controlling for this problem (e.g., Poppo and Zenger, 1998), others were not (e.g., Grover, Cheon, and Teng, 1996). If, as we recommend, future research focuses increasingly on the performance implications of TCE, then it is important that researchers be aware of such pitfalls and employ methodologies that account for them (see Poppo and Zenger, 1998; Silverman *et al.*, 1997; and Bigelow, 2002a). Similarly, most tests of the relationship between asset specificity and governance form are tests of the largest, surviving firms; in other words, they may suffer from survivor bias. One way to overcome this problem is by taking an ecological approach. For example, Bigelow (2002b) tested the same transaction over an entire population over multiple periods of observation, thereby precluding any survivor bias.

Fourth, the theory itself can be refined by specifying ‘scope conditions’ (Schoonhoven, 1981; Walker and Cohen, 1985). Given the mixed support TCE is currently garnering, it is critical to understand the conditions under which the theory works well and under which it does not. While we did not specifically code ‘non-TCE’ variables, our dataset did include some examples of scope conditions and moderating variables: Artz and Brush (2000) found that relational norms moderate the relationship between asset specificity and negotiation costs, Coles and Hesterly (1998a) found different results in public vs. private hospitals, Buvik and John (2000) found that trust could lower the transaction costs of exchange, and three studies (Gulati, 1995; Zaheer and Venkatraman, 1995;

Oxley, 1997) found that trust led to greater integration between transacting parties over and above transaction cost factors. A focus on contextual variables such as these would shift the debate from one of empirical 'success vs. non-success' to one of 'success under certain circumstances.'

Finally, we note that empiricists have not taken sufficient advantage of the possibilities for longitudinal work in TCE. Not only can TCE be applied across contexts, it can also be applied across time. In other words, as long as the *differential* costs of organizing transactions can be calculated over time for various governance forms, the core of TCE can be applied. For example, it is possible that new technologies can arise that lower the transaction costs present in markets. According to TCE, this would simply change the relative advantage of this governance form compared to hierarchy, and should result in the market form being selected more often. This is an empirical question that TCE is well-suited to address, yet we found little consideration of this dynamic nature of the theory in the 63 studies in our dataset (a notable exception was Fan, 2000). Indeed, the vast majority of the articles in our dataset were based on cross-sectional surveys that did not measure how changes in external conditions might affect the transaction costs associated with governance forms over time. In addition to addressing some of the methodological issues discussed above, we feel that longitudinal work along these lines would serve to sharpen the core theory.

In closing, we note that many classic works are said to be frequently cited, yet rarely read. As Latour (1987: 40) cautioned: 'a given paper may be cited by others for completely different reasons [and] in a manner far from its own interests.' Our analysis suggests a similar situation holds for TCE. TCE, it seems, is often appropriated to serve as a basis for analogues and a source of insights. And, more than occasionally, it is loosely interpreted and used as a metaphor, or even just as a ritual marker. This might be a positive development after all, and may be reflective of prominent theories in general. However, to go further from where we are, which we found to be on shaky ground, without solidifying the empirical foundation, does not appear sound for the sake of either TCE itself or for management and organizational studies as a whole. Perhaps it is about time to carefully take stock, an endeavor to which we hope to have contributed.

ACKNOWLEDGEMENTS

We gratefully acknowledge the helpful comments of Heather Haveman, Donald Hayes, Satoshi Kanazawa, Marc-David Seidel, Bob Stern, Pamela Tolbert, Michael Waldman, and two anonymous reviewers.

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