Capabilities and the Theory of the Firm

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Introduction.

It is a long-established habit of economists (and other intellectuals) to unearth precursors who can help support their claims to legitimacy. Keynes offered Malthus and the mercantilists; Jevons dredged up Dionysius Lardner and Fleeming Jenkins. Such precursors are always easy to find. As Alfred North Whitehead is supposed to have written, "everything new has been said before by someone who didn't discover it." The implication is that discovery is a matter not of saying something for the first time but of saying it at the right time, that is, of offering a new idea precisely when the relevant intellectual community is prepared, for whatever reasons, to accept it.[1] But the very idea of "precursors" already implies an exercise in Whig history. We can understand those who came before us only to the extent that what they had to say fits the frame of our ideas today; and to the extent that their ideas do not fit the frame, our precursors are but imperfect, albeit perhaps influential, prefigurations of what we now know to be true.[2]

This essay seeks to locate the ideas of G. B. Richardson within the present-day discussion of the theory of the boundaries of the firm. In doing so, however, it seeks to avoid making of Richardson a precursor. Although it is quite true — and quite significant — that Richardson anticipated ideas that form the core of today's dominant explanation of the firm's boundaries (Teece 1990), it is also true that his ideas have not by any means been completely absorbed or appreciated, at least not within the main current of thought on this topic since

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[1] In that respect, innovation in matters intellectual operates in a manner similar to — and partakes of many of the same communications difficulties as — innovation in industry, on which see Robertson (1994).

[2] A good example of this is neoclassical scholarship on Frank Knight. See Langlois and Cosgel (1993).

Coase. Like most "precursors" properly read, Richardson is as much a critic as he is an ally.

The ways in which Richardson differs from the modern-day mainstream in transaction-cost economics go beyond the obvious, that is, the latter's comparative neglect of networks, inter-firm arrangements, and strategic relationships — topics recently seized by a growing, if peripheral, literature that is certainly well represented at this colloquium. At a more fundamental level, Richardson differs from the mainstream of transaction-cost economics in that,

- like Coase and Knight before him, Richardson sees the problem of (long-term) market contracting as a matter of difficult coordination rather than as a problem of "opportunism" in the face of contractual hazards, and in that
- Richardson effectively links together transaction costs and production costs, categories sharply partitioned by traditional price theory (which largely ignored the former) and by transaction-cost economics (which largely ignores the latter).

The result of these differences is that, as Loasby (1991) has observed, Richardson stands on its head a principal presumption of transaction-cost economics, namely that contractual relationships among firms must be fraught with the hazards and thus that integration must be widely desirable.

Production costs I: Pigovian price theory.

The appropriate place to begin a discussion of Richardson' s ideas, of course, is with Marshall. That is a task, however, that one can safely leave to others at this colloquium. Moreover, my objective is to locate Richardson not in the context of Marshall's ideas but of the main current of ideas. And, as Loasby (1976), Moss

(1984), and others have argued, what we think of as mainstream "Marshallian" theory today is in many ways more Pigovian than it is Marshallian. Rather than thinking in population terms as Marshall did, and constructing a "representative firm" that reflects the characteristics of the population of firms as a whole (rather than the characteristics of any particular firm), the neoclassical theory of the firm since Pigou begins with identical idealized firms and then builds *up* to the industry by simple addition. It is this later methodological standpoint, not any logical problem with Marshall's own conception, that led to the famous controversy over increasing returns early in the century.[3]

The "theory of the firm" in modern-day price theory builds on the Pigovian foundation. It begins with firms as production functions, each one identical, and each one transforming homogeneous inputs into homogeneous outputs according to given technical "blueprints" known to all. One effect of these assumptions has been to reduce the margins on which firms operate to two only: price and quantity. This in turn has led to the notion of "perfect" competition, in which a technically desirable set of assumptions replaces the common-sense notion of competition (Hayek 1948; McNulty 1968).

Now, price theory — whether appreciative[4] Marshallian or heavy-metal Pigovian — was never intended to be a theory of the firm as an organization or an institution. As Marshall understood, the firm in price theory is a theoretical

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[3] This is a point on which Richardson agrees: "the apparent necessity of finding some reason why long-run marginal costs should ultimately rise is created not by the phenomena themselves, but by the nature of the theoretical schema through which we have chosen to study them" (1960, p. 213).

[4] On the distinction between formal and appreciative theory, see Nelson and Winter (1982, p. 46).

link in the explanation of changes in price and quantity (supplied, demanded, or traded) in response to changes in exogenous factors (Langlois and Koppl 1991). It was never intended to explain industrial structure, let alone to serve as a guide to industrial policy. More to the point, using this sort of price theory to explain the boundaries of the firm is just plain illogical, since the firm's boundaries in price theory are a matter of assumption.

The specter of illogic has not stopped a good many people from trying, however. Since Pigovian price theory rules out by assumption any qualitative elements, it must interpret all of industrial activity in terms of price and quantity. And, since these are purely quantitative variables, the only issue is whether they are of the right magnitude, that is, whether price and quantity are socially optimal (which is good) or not socially optimal (which is bad). Qualitative elements like distinctive knowledge, ongoing relationships, or exchanges of information do not appear on the radar screen of price theory — or, rather, when they do appear, they are often interpreted as unfriendly bogeys. In what Williamson (1985) calls the inhospitality tradition, the least hint of a non-impersonal relationship among firms is viewed with suspicion, since the only possible purpose of non-arm's-length arrangements (when seen through the price-theory lens) is collusion to raise price above the social optimum and to lower quantity below it.[5]

The attempt to appraise institutions — including the kinds of inter-firm arrangements Richardson discussed — with an institution-free theory is an

[5] "Economic relationships are never perfectly competitive if they involve any personal relationships between economic units." (Stigler 1946, p. 24.)

enterprise that has extended even to questions of the firm's boundaries. There exists a large literature attempting to explain vertical arrangements of various sorts, including vertical integration itself, using only the tools of price theory. One long-standing bit of inhospitality lore held, for example, that a firm could "leverage" its monopoly position at one stage in the chain of production into another stage by tying the sale of its product to the purchase of an input. This is, of course, a fuzzy-headed idea, one that the Chicago School eventually cut to ribbons.[6] Posner (1979) has argued that the genius of the Chicago School in this respect lay in its rigorous and unflinching application of price theory.[7] And what price theory shows is that, in a world of pure neoclassical production costs alone, "market power" does not explain inter-firm contractual relationships (apart, perhaps, from simple collusion to raise prices) or the boundaries of the firm. This is, of course, quite to be expected, as it is a corollary of the proposition that, in a world of pure neoclassical production costs alone, *nothing* explains the boundaries of the firm.

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[6] A firm cannot raise the price of a tied complement above competitive levels without thereby raising above the rent-maximizing level the effective price of the monopolized good to which the complement is tied. When the two tied goods are substitutes in production at the same horizontal level, it is possible to conjure up situations in which tying might in theory reduce welfare (Scherer and Ross 1990, p. 566). But those would not be vertical arrangements.

[7] There is, however, another interpretation. Rather than applying price theory more rigorously, the Chicago School was arguably *broadening* price theory to include a wider range of phenomena. For example, the classic Chicago explanation for tying arrangements (Director and Levi 1956) is that they solve what is in effect a transaction-cost problem: tying allows a manufacturer to "meter" the output of a monopolized product in order to engage in price discrimination. The welfare implications of price discrimination are ambiguous, and such behavior is probably typically welfare enhancing. More to the present point, however, price discrimination (or, rather, the lack thereof) is a transaction-cost problem that tying helps mitigate.

Transaction costs.

Many economists, probably going as far back as Cantillon and Smith, have understood that the costs the firm faces are rather different in character from the fully known and purely technological costs of the production function. In this century, however, that recognition crystallized in a form that strongly challenged the price-theoretic formulation — while, in an odd way, simultaneously reinforcing it.

In 1937, Ronald Coase enquired into the nature of the firm and observed that, in the world of price theory, firms have no reason to exist. According to the textbook, the decentralized price system is the ideal structure for carrying out economic coordination. Why then do we observe some transactions to be removed from the price system to the interior of organizations called firms? The answer, Coase reasoned, must be that there is a "cost to using the price system." Thus was born the idea of transaction costs:[8] costs that stand separate from and in addition to ordinary production costs. It is transaction costs that explain, as it were, the institutional overlay of production. Production costs detemine technical (substitution) choices, but transaction costs determine which stages of the productive process are assigned to the institution of the price system and which to the institution of the firm. The two kinds of costs are logically distinct; they are orthogonal to one another.

One salutary effect of the invention of the idea of transaction costs is that it made clear the extent to which the price-theory approach tends to sneak institutional judgments in the back door. This is true even of the basic idea of

[8] Even though Coase did not actually use the term in the 1937 article.

supracompetitive pricing applied to antitrust policy. As I enjoy pointing out to my students, the very idea of monopoly pricing, which seems so obviously a pure artifact of price theory, is actually just a transaction-cost problem. The deadweight-loss triangle monopoly pricing creates is in fact an unexploited source of gains from trade, since, with an appropriate split of the rents, consumers could bribe the monopolist to produce at the social optimum in a way that is strictly Pareto improving. The reason that these gains are not exploited is that, in some institutional settings, it is costly for the consumers to organize and bargain with the monopolist: so costly, indeed, that these transaction costs — in the sense of Coase (1960) if not Coase (1937)[9] — outweigh the costs of the deadweight loss. And, as Demsetz (1969) has pointed out in a related context, to pronounce an inefficiency and call for government intervention in such a case is in fact to propose replacing one institutional structure with another without having taken the trouble to examine the full costs of either.

Coase's approach in "The Nature of the Firm," which Richardson mentions only in a footnote in "The Organisation of Industry," is in some ways different from and in some ways similar to Richardson's own. One clear difference is that Coase formulated a sharp break between firm and market, thus ignoring the various interfirm arrangements Richardson highlighted.[10] This was a significant methodological choice in that it directed attention for some years

[9] It is in fact an interesting question whether the "costs of using the price system" in Coase (1937) are transaction costs in the same sense as the bargaining and other costs given the name transaction costs in Coase (1960). Although I will try below to shed some light on the "transaction costs" in Coase (1937), answering the comparative question is beyond the scope of this paper.

[10] In his 50-year retrospective on "The Nature of the Firm," Coase (1988) cites this black-and-white dichotomy as perhaps his chief regret.

away from interfirm complexities. But there is in the end nothing about the idea of transaction costs that implies such a sharp dichotomy.

What are more interesting are the similarities between Coase and Richardson. Both are arguably concerned with the issue of qualitative coordination. Although it is not well recognized, the need for qualitative coordination of activities — indeed, coordination of activities over time — lies at the heart of Coase's conception of organization within the firm. "It may be desired to make a long-term contract for the supply of some article or service," Coase writes.

> Now, owing to the difficulty of forecasting, the longer the period of the contract is for the supply of the commodity or service, the less possible, and indeed, the less desirable it is for the person purchasing to specify what the other contracting party is expected to do. It may well be a matter of indifference to the person supplying the service or commodity which of several courses of action is taken, but not to the purchaser of that commodity or service. But the purchaser will not know which of these several courses he will want the supplier to take. Therefore, the service which is being provided is expressed in general terms, the exact details being left until a later date. ... The details of what the supplier is expected to do is not stated in the contract but is decided later by the purchaser. When the direction of resources (within the limits of the contract) becomes dependent on the buyer in this way, that relationship which I term a "firm" may be obtained. (Coase 1937, pp. 391-392.)

This is clearly close to Richardson's concerns, in *Information and Investment*, with the coordination of complementary investments. In Chapter IV, Richardson also considers the problems of executing fully specificed long-term contracts.

> The longer the future period which is envisaged, the more flexible will the entrepreneur's investment programme become; both the quantities, and frequently also the kinds of outputs and inputs will become a matter of subsequent decision according to the circumstances which come to prevail. Contracts which extend into this more distant period, therefore, are likely to diminish the

> entrepreneur's ability to modify his plans in order to meet unexpected developments, without at the same time producing a very substantial reduction in uncertainty. The point will be reached where the greater predictability yielded by contracts does not justify the loss of flexibility which they involve. Attempts to secure a more perfect coordination of complementary activities by means of binding agreements between firms, will, therefore, encounter a barrier, the existence of which is is the consequence of the inherent imperfectability of both technical and market information. Because of this, the efficiency of any economy, viewed as a system of communication, can never be made perfect; there is a resemblance in this respect to electrical networks, the efficiency of which for communication is limited by the irreducible element of random molecular motion known technically as 'noise'. (Richardson 1960, p. 81.)

For Richardson as for Coase, such "noise" — perhaps a better physical image for transaction costs than the more ususal one of friction — may lead to alternative institutional forms that include "agglomeration" (Richardson 1960, p. 84). And, for both writers, the relevant "costs of the price system" are costs of coordination over time.

Modern transaction-cost theory.

Since Coase, the economics of transaction costs as applied to organization has burgeoned into a major subfield in the discipline. Largely in a quest to make Coase's ideas more "operational," this literature has arguably both narrowed his explanantion for the firm and moved its focus away from issues of coordination, especially qualitative coordination. Oliver Williamson, the flagbearer of the field since the 1970s, cannot be accused of having a narrow conception of transaction-cost economics. But it was Williamson (1975) who introduced the idea of *opportunism* and made it coequal with *bounded rationality* as a pillar of the transaction-cost approach. The latter, which is Herbert Simon's famous term,

leads naturally to the Richardsonian concern with coordination. Because economic agents have cognitive limits,[11] in an uncertain world they cannot fully anticipate all future contingencies, which may make long-term contracting difficult. Relatedly, they may be afflicted with *information impactedness,* which means, more or less, that information important to a transaction can get stuck and not flow to where it is needed.[12] Opportunism, however, is a behavioral (or quasi-behavioral) postulate rather than a strictly cognitive or informational one. In part, opportunism is just self-interested or rent-seeking behavior, something tacitly assumed at some level by Coase, Richardson, and most others. But Williamson embellishes the idea to become "self-interest seeking with guile" (Williamson 1975, p. 9). The "guile" part surreptitiously mixes in some information impactedness again. It also arguably both narrows and amplifies the presupposition of rent-seeking behavior, implying, if not necessarily requiring, that agents craftily seek to take advantage of others at every turn in a manner not typically constrained by wider or longer-run considerations.[13]

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[11] And it is, of course, cognition, not rationality, that is limited. That Simon labeled the problem a limitation of "rationality" says much about his own conception of rationality (Langlois 1990).

[12] "Information impactedness is a derivative condition in the organizational failures framework. It is mainly attributable to the pairing of uncertainty with opportunism. It exists in circumstances in which one of the parties to an a exchange is much better informed than is the other regarding underlying conditions germane to the trade, and the second party cannot achieve information parity except at great cost — because he cannot rely on the first party to disclose the information in a fully candid manner." (Williamson 1975, p. 14.)

[13] The assumption of opportunism has come under most violent attack by sociologists, who have usually offered to substitute their own excesses in the direction of communitarian postulates. A sensible middle ground is Granovetter (1985), who argues that, although self-interested, behavior is "imbedded" in a network of relationships that go well beyond the boundaries of an individual transaction and that constrain in many cases the impulse to opportunism. I should add in Williamson's defense that he does mention trust and even atmosphere as important organizational variables [new article on org soc.]. As I will argue below, however, the postulate of opportunism, coupled with a comparative neglect of

In Williamson's work, especially his early work, opportunism and bounded rationality proved to be versatile tools that helped create a smorgasbord of explanations for organizational forms and features. Issues of coordination figured prominently in these explanations. For example, Williamson argued that internal organization may be a superior mode of coordination whenever boundedly rational transactors confront uncertainty.

> If, in consideration of these [cognitive] limits, it is very costly or impossible to identify future contingencies and specify, *ex ante*, appropriate adaptations thereto, long-term contracts may be supplanted by internal organization. Recourse to the latter permits adaptations to uncertainty to be accomplished by administrative processes in a sequential fashion. Thus, rather than attempt to anticipate all possible contingencies from the outset, the future is permitted to unfold. Internal organization in this way economizes on the bounded rationality attributes of decision makers in circumstances in which prices are not "sufficient statistics" and uncertainty is substantial. (Williamson 1975, p. 9).

What Williamson here means by prices not being "sufficient statistics" — a reference to his interpretation of Hayek (1945) on the virtues of the price system — is that internal organization may be superior in situations requiring qualitative coordination, that is, the transmission and use of information beyond price and quantity.

The breadth of Williamson's approach was met, however, with impatience from the larger profession, now becoming increasingly interested in moving, albeit gingerly, beyond the margins of price theory *strictu senso* into the economics of institutions. To most economists, even sympathetic ones, transaction-cost theory remained insufficiently "operational," meaning that it

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production-cost differences, has led transaction-cost economics to overemphasize the costliness of the price system (broadly understood).

was too rich to be crammed into a mathematical model. Williamson (1985) himself helped solve that problem when, along with Klein, Crawford, and Alchian (1978), he focused in on asset specificity as a variable first among (what had been) equals in explaining vertical integration.[14] Here was a variable that was quantifiable and whose relationship to the boundaries of the firm was clear: the greater the degree of asset specificity in a transaction, the higher the probability that the transaction would be internalized.

The logic is quite simple. Assets are highly specific when they have value within the context of a particular transaction but have relatively little value outside the transaction. This opens the door to opportunism. Once the contract is signed and the assets deployed, one of the parties may threaten to pull out of the arrangement — thereby reducing the value of the specific assets — unless a greater share of the quasirents of joint production find their way into the threat-maker's pockets. Fear of such "hold up" *ex post* will affect investement choices *ex ante*. In the absence of appropriate contractual safeguards,[15] the transacting parties may choose less specific — and therefore less specialized and less productive — technology. If, by contrast, the transacting parties were to pool their capital into a single enterprise in whose profits they jointly shared, the incentives for unproductive rent-seeking would be attenuated. And, because such unified organizations would choose the more productive specialized

[14] "The main factor to which transaction-cost economics appeals to explain vertical integration is asset specificity" (Williamson 1986, p. 189).

[15] For example, a hostage. See Williamson (1985, chapters 7 and 8).

technology, they would win out in the competitive struggle against the contractual alternative.[16]

As Williamson suggests, this logic depends as much on bounded rationality as it does on opportunism.[17] "Guile" serves little when information is perfect. And, in a world of certainty and unrestricted cognitive ability (if one could imagine such a place), it would be easy to write and enforce long-term contracts that preempt *ex ante* unproductive rent-seeking behavior *ex post* and thus obviate internalization. This insight, indeed, has inspired one important formal strand of the literature. The work of Oliver Hart and others (Grossman and Hart 1986; Hart 1988, 1989; Moore 1992) — called the incomplete-contracts literature or, increasingly, the "property rights" approach[18] — distinguishes two types of rights under contract: specific rights and residual rights. The latter are generic rights to make production decisions in circumstances not spelled out in the contract. In this literature, the choice between contract and internal organization reduces to a question of the efficient allocation of the residual rights of control when contracts are incomplete and assets highly specific. Suppose there are two parties cooperating in production, each bringing to the

[16] This way of putting it gives an explicitly evolutionary spin to the functionalist argument more typical in transaction-cost economics.

[17] Indeed, as I have long maintained, it is the bounded rationality part rather than the opportunism part that is the important factor in explaining internalization (Langlois 1984). Even if the parties were perfectly content always to split rents fairly and amicably, they would still be unable to write fully specified contacts in a world of what I call structural — that is, qualitative — uncertainty. Although the lack of opportunism would attenuate the need for internalization as a safeguard against intentional rent-seeking behavior, joint ownership may still have advantages in respect of flexibility and as a way of reconciling divergent visions of the uncertain future.

[18] We might more properly call this literature the "new" property-rights approach to distinguish it from the older literature of property rights emerging directly from Coase (1960) and associated with such names as Alchian, Demsetz, Furubotn, and Pejovich. On this older literature see De Alessi (1983).

arrangement a bundle of assets. If none of the assets is highly specific, opportunism is impossible *ceteris paribus*, as either party can liquidate at no cost as soon as troublesome unforeseen contingencies arise. If, however, assets are specific, or if opportunism becomes possible for other reasons, it may be efficient to place the residual rights of control in the hands of only one of the parties by giving that party ownership of both sets of assets.[19] In general, the owner ought to be the party whose possession of the residual right minimizes rent-seeking costs, which typically means the party whose contribution to the quasirents of cooperation is greater.

Another strand of the transaction-cost literature since Coase has reached a similar conclusion by a slightly different path. This strand has also emphasized opportunism and the hazards of contracting. In this case, however, the contractual hazards involved are not those of hold-up in the presence of highly specific assets but those arising from the costs of measuring the inputs to and monitoring the outputs of production.[20] A well-known milestone along this path was Alchian-and-Demsetz's (1972) analysis of monitoring team production. When individual contributions to joint production cannot be distinguished,

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[19] Hart and his colleagues hold that the possession of the residual rights of control necessitates ownership of the firm's capital assets, whether tangible or intangible. This allows them to do something few in the literature have been able to do: to *define* the boundaries of the firm crisply and consistently. For them, a firm is defined by the bundle of assets under common ownership. (This stands in contrast to the "nexus of contracts" view, which sees the firm as a far more fuzzy notion.) While I find Hart's approach appealing, I wonder, with Louis Putterman (1988), whether it is not in fact possible to possess the right to direct the production program (that is, the residual rights of control) without also possessing the firm's capital.

[20] Williamson (1985, p. 24) distinguishes his *governance* approach to transaction-cost economics from the *measurement* approach. I would also lump agency theory in with the measurement-cost approach, since that literature is also driven by monitoring costs (which are a form of measurement costs, namely, the costs of measuring performance *ex post*, as distinct from the *ex ante* measurement costs of searching or sorting inputs).

opportunistic contributors have the incentive to shirk, that is, to supply less effort than they contracted to supply. (Such shirking, and related problems in other formulations, are instances of *moral hazard* broadly understood.) Alchian and Demsetz propose that this problem be solved by assigning one party to be a specialist in monitoring — a boss — who possesses the rights to the residual income and is thus monitored by the market. *Voilà* the firm.

As Alchian and Woodward (1988) point out, transaction costs emanating from situations of moral hazard are ultimately related to those emanating from problems of hold up: both arise because cognitive limits create in contracts a certain "plasticity" that allows conduct *ex post* to deviate from what was agreed upon *ex ante*. In the hands of Barzel (1987), indeed, the moral-hazard approach tells a story quite similar to that of Hart, *et al*. Imagine again two parties cooperating in production. If the output of one of the parties is hard to monitor, that party is tempted to moral hazard. If in addition the shirking party's contribution to the joint quasirents is large, it may be efficient to assign the residual rights to this hard-to-monitor partner, who is then effectively disciplined by the desire to maximize residual income.[21] Although it is less clearly spelled out, Barzel's story is also one of incomplete contracts. Routine tasks are generally easy to monitor. The less routine the the agent's actions— the larger the uncertainty in the tasks the agent may be called upon to execute

[21] Also like Hart, Barzel (1987) believes possession of the residual rights should involve ownership of capital, in this case because capital ownership serves as a bond to guarantee the fixed-income claims of the other parties.

(Stinchcombe 1990, chapter 2) — the harder to monitor the agent and the harder to specify in a contract what the agent is supposed to do.[22]

In the end, then, we might argue that the modern transaction-cost literature has not in fact strayed too far from the concern with coordination over time in Richardson (and in Coase),[23] even if the literature has buried those concerns behind secondary concepts like asset specificity and moral hazard. Especially in *Information and Investment*, we can see Richardson's connection in particular to the asset-specificity literature, with which he shares a concern for the coordination of complementary assets. Yet, there are differences.

Richardson clearly understands the difficulties of inflexibility and lock-in posed by assets specialized to particular uses.

> Under any technological conditions, except the most primitive, production requires the service of skills, experience, and equipment which are highly specific in character. There may, of course, be occasion when the maximium adaptability, such as is conferred by investment exclusively in money, provides the expectation of greatest gain or smallest loss. ... Generally, however, it is only by allowing himself to be trammelled by a particular production programme that the entrepreneur can hope to make any substantial return. (Richardson 1960, p. 152.)

In chapter VIII, indeed, Richardson even offers measures of asset specificity, namely *separation loss,* which is the difference between value in sale and value in

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[22] Barzel's own example is of cooperation between a manufacturer and a "business expert." Because the business expert is the harder to monitor, says Barzel, he ought to become the entrepreneur and possess the residual claim. But this is because the business expert is the one whose tasks involve greater uncertainty and are more difficult to specify in a contract. That the expert can disguise shirking as bad luck (as Barzel puts it) is a manifestation of contractual incompleteness, not its cause.

[23] And let's not forget Frank Knight, on which see Langlois and Cosgel (1993).

use, and the *coefficient of dispensability*, which is the ratio of value in sale to value in use.

What is interesting, however, is that, unlike modern-day transaction-cost theorists, Richardson does not see asset specificity as leading principally to probems of opportunism and inefficient rent dissipation. Rather, asset specificity creates problems of coordination even when, as he seems to assume in the following passage, there is no opportunism.

> It may be very difficult ... to arrange that the terms of a long-term contract are such as to offer each of the parties a prospective return which is in proportion to the risks which they are assuming. One manufacturer might be asked, for example, to supply another with a specialized component, the manufacture of which requires heavy investment. If all went well, he would be assured of a market for his output for some years ahead, and at a price fixed by the terms of the contract; but, however profitable the sale of the final product, he could not expect more than this return. If, on the other hand, the purchaser's enterprise fared very badly, then the contract would likely be broken and the supplier would suffer loss. In order to obtain a more equitable distribution of possible gains and losses, a form of co-operation more intimate than that of a simple contract would be sought; the two companies might form a subsidiary in which they both possessed some equity interest or might decide wholly to amalgamate. (Richardson 1960, p. 84.)

In Richardson, it is not the threat of holdup that leads to integration (or, significantly, to other possible institutional forms, including joint venture). Rather, it is the inflexibility of highly specific assets that leads the contracting parties to choose an organizational form precisely *because* it allows them to redistribute quasirents *ex post*.

We can see this focus on qualitative coordination — so lacking in the asset-specificity literature — perhaps even more clearly in "The Organisation of Industry." Here Richardson talks of how the activities of contracting parties

nedd to be "co-ordinated both quantitively and qualitatively," and he notes that the neoclassical habit of thinking in terms of a fixed list of goods is partly responsible for the neglect of qualitative coordination (Richardson 1972, p. 884). And this need for qualitative coordination is at least coequal with the hazards of asset specificity in the explanantion of "governance structures" — like long-term subcontracting relationships — alternative to spot contracting.[24] The stability of a subcontracting relationship, he writes, is important for two reasons. "It is necessary, in the first place, to induce sub-contractors to assume risks inherent in a rather narrow specialization in skills and equipment; and, secondly, it permits continuing co-operation between those concerned in the development of specifications, processes and designs" (Richardson 1972, p. 885).

We might encapsulate the difference between Richardson and the present-day literature of asset specificity in the following way: Richardson is interested in the *coordination of production*, not merely in the *coordination of commitments*.[25] This wider orientation is perhaps more evident in "The Organisation of Industry" than in *Information and Investment*. The earlier work is centrally about commitments, albeit with an awareness of the larger problems of coordination. The later work, however, is less worried about the problem of commitments and more worried about the difficulties of qualitative coordination. The reason for this, I believe, is at least in part because the 1972 paper develops and emphasizes an idea present only embryonically in the 1960 book: namely, the idea of

[24] It is perhaps significant that Coase also rejects the centrality of asset specificity in explaining the firm. He notesthat, in formulating the thesis of "The Nature of the Firm," he considered — but then rejected — asset specificity as an explanation (Coase 1988).

[25] I am indebted to Sergey Rumyantsev for this terminology.

capabilities and its concurrent implication that productive knowledge is widely dispersed and non-homogeneous.

Production costs redux: capabilities.

As I have suggested, one effect of the invention of the concept of transaction costs has been a partition between those costs and the costs of production, a partition rigidly upheld (in principle) by both price theory and transaction-cost economics. Williamson, for example, maintains that, although he sees organizational structures as somehow resulting from the minimizing of the sum of production costs and transaction costs, his own analytical interest has lain in transaction costs alone (Williamson 1988, p. 361). That is, he (and most others) have sought to hold production costs constant and investigate the effects on organization form of differences in transaction costs *tous seuls*. This is by no means a nonsensical methodological position. In the end, however, production costs and transaction costs do affect one another, and they cannot be so neatly separated.

Indeed, the very notion of asset specificity brings production costs back in centrally, albeit in a somewhat *ad hoc* way. In the basic asset-specificity story, the nature of the rent dissipation that integration avoids is the inefficient choice of technology. Absent joint ownership of assets, the contracting party or parties at risk would choose a less-productive but more-liquid technology as a defense against holdup, thus dissipating quasirents in the same sense that residents of crime-ridden areas "waste" resources on locks and security guards in order to reduce the likelihood of becoming the victims of directly unproductive rent-

seeking activities. But what makes choosing more-liquid assets inefficient in this case is the old Smithian production-cost tradeoff. As Richardson puts it, the "sacrifice of adaptability which any act of real investment inevitably imposes should be regarded as simply the obverse side of the gains from specialization" (Richardson 1960, p. 151). Not merely is the division of labor limited by the extent of the market, it is limited by the *predictability* of the extent of the market. Organization matters, then, because various organizational forms have quite different abilities to eliminate sources of uncertainty — and therefore to support a more elaborate division of labor.[26]

But production costs and transaction costs are also arguably intertwined in a much more subtle and fundamental way. If one relaxes the rather stern assumption that productive knowledge is always in the nature of "blueprints," the line between production costs and transaction costs begins to blur.

As we saw, standard Pigovian price theory partakes of the epistemology of old spy movies, in which complete knowledge of how to build and launch an ICBM could somehow be transcribed onto a microdot and hidden under a postage stamp. Michael Polanyi (1958) has taught us, however, that knowledge is not all of a form that can be articulated in words or pictures for easy transmission. Much knowledge — including, importantly, much knowledge about production — is *tacit* and can be acquired only through a time-consuming process of learning by doing. In a world of tacit knowledge, having the same

[26] For example, the cooperating parties may choose a trading relationship "which is stable enough to make demand expectations more reliable and therefore to facilitate production planning" (Richardson 1972, p. 884). Consider also Alfred Chandler's (1977) notion that large American firms in the nineteenth century often sought vertical integration as a way of assuring predictable inputs in the service of "economies of speed."

blueprints as one's competitors is unlikely to translate into having the same costs of production.[27] Moreover, in a world of diffuse and variegated knowledge, the costs that can make transacting difficult — the costs that may lead to internalization or various other business institutions — may go beyond those that arise in the course of defending against opportunism. In such a world, economic activity may be afflicted with what I call dynamic transaction costs,[28] the costs that arise in real time in the process of acquiring and coordinating productive knowledge (Langlois 1992b; Langlois and Robertson 1995).

In order to understand this point, we need to recognize that production faces two rather different kinds of coordination problems, which I have already labeled problems of the coordination of commitments and problems of the coordination of production. The former arise, in effect, when flexibility inhibits specialization. The latter — the obverse side — arise when specialization inhibits flexibility, especially the flexibility to seize profitable opportunities.

As we have seen, the main current of the transaction-cost literature (and, in a larger sense, so-called industrial organization in general)[29] concentrates almost exclusively on problems of the coordination of commitments. And, again, such problems were a dominant concern in *Information and Investment*. Solutions to such problems typically follow the lines set out by Schelling (1960)

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[27] Indeed, having the same *equipment* may not guarantee the same production costs, as suggested by Polanyi's own example of the Hungarians unable to make function a light-bulb machine identical to one operating flawlessly in Austria.

[28] Loosely, and perhaps somewhat cryptically, dynamic transaction costs are the costs of not having the capabilities you need when you need them (Langlois 1992b).

[29] Problems of the coordination of commitments are tailor-made for game-theoretic modeling, an approach that arguably dominates the high-brow regions of the field of industrial organization today. See, for example, the textbook by Tirole (1988).

and defined, among other places, in the domain of constitutional economics (Buchanan 1990). In certain situations, interacting parties can increase their welfare (severally as well as jointly) by committing in a credible way to one particular course of action. Paradoxically (from a standard economic point of view), the parties can actually make themselves better off by *reducing* the size of their choice set. In the case of specific assets, the reasons for this should be clear. By following inflexibly a predictable course of action, one can reduce uncertainty, thus allowing others to plan effectively and encouraging efficient specialization One way to gain predictability is to follow codes of behavior, which, by restricting one's freedom of action, increase predictability (Heiner 1983; Langlois 1986). This is, of course, vintage Richardson, and the theme of his "Les Relations entre Firmes" (1965).

But it is also a theme in Richardson that flexibility too is valuable. The cost of specialization is the ability to adapt to an uncertain future, which may mean, in particular, foregoing profitable market opportunities and emerging technological possibilities. Specialization is certainly a matter of highly specific tangible assets. But, even in *Information and Investment*, Richardson is clear that transactional inertia (if we may call it that) is also a cognitive and behavioral matter. Production, as we saw, requires the service not just of plant and equipment but of "skills and experience" that are highly specific in character (Richardson 1960, p. 152). "From some points of view," indeed, "management itself, together with the skills, experience, and traditions which it embodies, may restrict a firm's freedom of manœvre as much as, if not more than, the fixed equipment which it owns" (Richardson 1960, p. 153).

Although it is not developed in the 1960 book, the idea of accumulated and inertial "skills, exprience, and traditions" prefigures the notion of *capabilities* introduced in the 1972 essay. Capabilities, Richardson says there (p. 888), are "the knowledge, experience, and skills" of the firm. It is, in fact, the emphasis on capabilities that distinguishes the theme of "The Organization of Industry" from that of *Information and Investment*. Taking issue with the representation of knowledge in the production-function approach, Richardson writes:

> Of course I realise that production functions presume a certain level of managerial and material technology. The point is not that production is thus dependent on the state of the arts but that it has to be undertaken (as Mrs. Penrose has so very well explained) by organisations embodying specifically appropriate experience and skill. It is this circumstance that formal production theory tends to put out of focus, and justifiably, no doubt, given the character of the optimisation problem that it is designed to handle; nevertheless, it seems to me that we cannot hope to construct an adequate theory of industrial organization and in particular to answer our question about the division of labour between firm and market, unless the elements of organisation, knowledge, experience and skills are brought back to the foreground of our vision (Richardson 1972, p. 888).

The reference to Penrose is, of course, to *The Theory of the Growth of the Firm* (1959), which appears to have crystallized for Richardson the idea idea of capaibilities that was embyonic in *Information and Investment*.

Richardson's entire discussion of capabilities in "The Organisation of Industry" is clearly indebted to Penrose. In her theory, firms consist of acquired pools of resources — including, importantly, managerial resources — that come in lumpy bundles. In order to take advantage of excess capacity in some of the lumps, the firm may expand or diversify into areas in which that capacity is useful. This in turn may lead the firm to acquire other complementary

capabilities, which will lead to further excess capacity, etc. In Richardson's terminology, production can be broken down into various stages or *activities*. Some activities are *similar*, in that they draw on the same general capabilities. Activities can also be *complementary*, in that they are connected in the chain of production and therefore need to be coordinated with one another. For Richardson (1972), the central problem of economic coordination lies in the fact that what is complementary need not be similar: "Where activities are both similar and complementary they could be co-ordinated by direction within an individual business. Generally, however, this would not be the case and the activities to be co-ordinated, being dissimilar, would be the responsibility of different firms. Co-ordination would then have to be brought about either through co-operation, firms agreeing to match their plans *ex ante*, or through the processes of adjustment set in train by the market mechanism" (Richardson 1972, p. 895).

Clearly, coordination — the matching, "in level or specification" (1972, p. 895), of complementary activities — could still be a matter of coordinating commitments. In many respects, this is the view taken by David Teece (1980, 1982, 1986), one of the few major scholars to have incorporated Richardson's ideas.[30] Unlike Richardson, who has switched from discussing the coordination of comlementary *investments* to discussing the coordination of complementary *activities*, Teece talks about complementary *assets* that might be *cospecialized* to

[30] It is interesting that, in developing a theory of firm diversification not unlike that of Richardson (1972), Teece refers only once to Richardson (in Teece 1982), and that reference is to *Information and Investment*. When I showed Teece a draft of what became Langlois (1988), his principal response, as I remember it, was that I had reminded him of the importance of Richardson (1972).

one another. As with Richardson's closely complementary activities, cospecialized assets may be difficult to coordinate. But, unlike Richardon, Teece is inclined, with the broader asset-specificity literature that has influenced him, to believe that cospecialized assets may be a cause of integration more than of cooperation, especially to the extent that integration allows an innovator to appropriate the gains from innovation in regimes in which intellectual property rights are ineffective.[31]

Thus, we might say that, for Teece, problems of coordination arise because markets (narrowly understood) exhibit *too little* "friction." Governance structures alternative to the market arise to prevent slippery innovative knowledge from escaping the grasp of its creators, just as, in the main current of the transaction-cost literature,[32] alternative governance structures emerge to protect transactors from the "plasticity" of contract. An admixture of Penrose, however, suggests the opposite possibility. Coordination problems may arise because markets — or, indeed, any structure of business institutions, including large vertically integrated firms — exhibit *too much* "friction." If Penrose and Richardson are right, the knowledge, skills, and traditions embodied in existing

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[31] Richardson (1972, p. 894n) seems much more sanguine about the workability of markets for licenses.

[32] Indeed, the formal economics of organization has lately begun to take cognizance of the idea of capabilities. But, rather than adopting the stance toward productive knowledge taken by Penrose and Richardson, it seeks to explain the tendency of firms to concentrate on specific activities in terms of problems of coordinating commitments. In Milgrom and Roberts (1992), for example, a commitment to a narrow strategy allows managers engaged in a coordination game to avoid dominated equilibria. And Rotemberg and Saloner (1994) use the incomplete-contracts framework to argue that a firm may choose a narrow strategy (and thus ignore profitable opportunities) because strategic breadth leads to implementation problems *ex post* that distort *ex ante* incentives. Rotemberg and Saloner (p. 1131) note that "increasing returns to specialization" — which comes closer to the Penrose-Richardson idea — may also be a reason for narrow strategies, but they do not investigate that possibility.

governance structures (be they firms, markets, or in between) may be too inflexible, especially in the face of major "Schumpeterian" change, to seize market and technological opportunites. In such circumstances, other governance structures that can muster the necessary capabilities may arise and prosper.

Morris Silver (1984) has suggested, for example, that much vertical integration arises not when firms venture into areas of similar capabilities but when firms are dragged, kicking and screaming, as it were, into complementary but dissimilar activities because only in that way can they bring about a profitable reconfiguration of production or distribution.[33] For example, consider the once-famous calculator-maker Bowmar. After losing a defense contract, Bowmar was looking for some way of selling its light-emitting diodes. The company tried to interest makers of larger calculators in using the LEDs, to no avail. So Bowmar designed its own hand calculator, and the rest was history (Schnaars 1994).[34] On the other side of the ledger, we might tell a similar story about IBM's motives for turning to the market rather than to its in-house capabilities in producing the original PC (Langlois 1992a). Paul Robertson and I (1995) have tried to think in some depth about the implications of these sorts of coordination problems.

I do not want to be read as implying that Richardson was in any way inconsistent in shifting his emphasis between 1960 and 1972. Both kinds of

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[33] Richardson recognizes this motive for integration when he writes that "[a]n entrepreneur may believe that only by gaining some degree of control over the firm responsible for some complementary investment will he be fully assured of it being undertaken; vertical integration may be carried out with this end in view" (Richardson 1960, p. 83).

[34] As, soon, was Bowmar, which went belly-up a few years later, the victim of larger firms wielding Teecean complementary assets. I am indebted to Paul Robertson for this example and the Schnaars reference.

coordination problems are important, and both can involve the qualitative aspects of coordination. We need to investigate both kinds of coordination problems, which may mean, for the profession as a whole, a major shift of emphasis away form problems of coordinating commitments toward problems of coordinating production. If we work hard, Richardson may yet be a precursor — of a theory we still have fully to develop.

Bibliography.

Alchian, Armen, and Harold Demsetz. 1972. "Production, Information Costs, and Economic Organization," *American Economic Review* **62**(5): 772-795.

Alchian, Armen, and Susan Woodward 1988. "The Firm Is Dead; Long Live the Firm: A Review of Oliver E. Williamson's *The Economic Institutions of Capitalism*," *Journal of Economic Literature* **26**(1): 65-79 (March).

Barzel, Yoram. 1987. "The Entrepreneur's Reward for Self-Policing," *Economic Inquiry* **25**: 103-116.

Buchanan, James M. 1990. "The Domain of Constitutional Economics," *Constitutional Political Economy* **1**(1): 1-18.

Chandler, Alfred D., Jr. 1977. *The Visible Hand: the Managerial Revolution in American Business.* Cambridge: the Belknap Press of Harvard University Press.

Coase, Ronald H. 1937. "The Nature of the Firm," *Economica* (N.S.) **4**: 386-405 (November).

Coase, Ronald H. 1960. "The Problem of Social Cost," *Journal of Law and Economics* **3**: 1-44.

Coase, Ronald H. 1988. "The Nature of the Firm: Origin, Meaning, Influence," *Journal of Law, Economics, and Organization* **4**(1): 3-47 (Spring).

De Alessi, Louis. 1983. "Property Rights, Transaction Costs, and X-efficiency," *American Economic Review* **73**: 64-81 (March).

Demsetz, Harold. 1969. "Information and Efficiency: Another Viewpoint," *Journal of Law and Economics* **12**: 1-22.

Director, Aaron, and Edward Levi. 1956. "Law and the Future: Trade Regulation," *Northwestern University Law Review* **512**: 81.

Granovetter, Mark. 1985. "Economic Action and Social Structure: The Problem of Embeddedness," *American Journal of Sociology* **91**(3): 481-510 (November).

Grossman, Sanford, and Oliver Hart. 1986. "The Costs and Benefits of Ownership: A Theory of Vertical Integration," *Journal of Political Economy* **94:** 691-719

Hart, Oliver D. 1988. "Incomplete Contracts and the Theory of the Firm," *Journal of Law, Economics, and Organization* **4**(1): 119-140 (Spring).

Hart, Oliver D. 1989. "An Economist's Perspective on the Theory of the Firm," *Columbia Law Review* **89**(7): 1757-1774.

Hayek, F. A. 1945. "The Use of Knowledge in Society," *American Economic Review* **35**(4): 519-530.

Hayek, F. A. 1948. "The Meaning of Competition," in *idem, Individualism and Economic Order*. Chicago: University of Chicago Press.

Heiner, Ronald A. 1983. "The Origin of Predictable Behavior," *American Economic Review* **73**: 560-95.

Klein, Benjamin, Robert G. Crawford, and Armen Alchian 1978. "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process," *Journal of Law and Economics* **21**(2): 297-326.

Langlois, Richard N. 1984. "Internal Organization in a Dynamic Context: Some Theoretical Considerations," in M. Jussawalla and H. Ebenfield, eds., *Communication and Information Economics: New Perspectives.* Amsterdam: North-Holland, pp. 23-49.

Langlois, Richard N. 1986. "Coherence and Flexibility: Social Institutions in a World of Radical Uncertainty," in Israel Kirzner, ed., *Subjectivism, Intelligibility, and Economic Understanding: Essays in Honor of the Eightieth Birthday of Ludwig Lachmann.* New York: New York University Press, pp. 171-191.

Langlois, Richard N. 1988. "Economic Change and the Boundaries of the Firm," *Journal of Institutional and Theoretical Economics* **144**(4): 635-657.

Langlois, Richard N. 1990. "Bounded Rationality and Behavioralism: A Clarification and Critique," *Journal of Institutional and Theoretical Economics* **146**(4): 691-695 (December).

Langlois, Richard N. 1992a. "External Economies and Economic Progress: The Case of the Microcomputer Industry," *Business History Review* **66**(1): 1-52.(Spring).

Langlois, Richard N. 1992b. "Transaction-cost Economics in Real Time," *Industrial and Corporate Change* **1**(1): 99-127.

Langlois, Richard N., and Metin M. Cosgel. 1993. "Frank Knight on Risk, Uncertainty, and the Firm: A New Interpretation," *Economic Inquiry* **31:** 456-465 (July).

Langlois, Richard N., and Roger G. Koppl. 1991. "Fritz Machlup and Marginalism: A Reevaluation," *Methodus* **3**(2): 86-102 (December).

Langlois, Richard N, and Paul L. Robertson. 1995. *Firms, Markets, and Economic Change: A Dynamic Theory of Business Institutions.* London: Routledge.

Loasby, Brian J. 1976. *Choice, Complexity, and Ignorance.* Cambridge: Cambridge University Press.

Loasby, Brian J. 1991. *Equilibrium and Evolution: An Exploration of Connecting Principles in Economics*. Manchester: Manchester University Press.

McNulty, Paul J. 1968.."Economic Theory and the Meaning of Competition," *Quarterly Journal of Economics* **82**: 639-56.

Milgrom, Paul, and John D. Roberts. 1992. *Economics, Organization, and Management*. New York: Prentice Hall.

Moore, John. 1992. "The Firm as a Collection of Assets," *European Economic Review* **36**: 493-507.

Moss, Scott. 1984. "The History of the Theory of the Firm from Marshall to Robinson and Chamberlin: the Source of Positivism in Economics," *Economica* **51**: 307-318.

Nelson, Richard R., and Sidney G. Winter. 1982. *An Evolutionary Theory of Economic Change*. Cambridge: Harvard University Press.

Penrose, Edith T. 1959. *The Theory of the Growth of the Firm*. Oxford: Basil Blackwell.

Polanyi, Michael. 1958. *Personal Knowledge*. Chicago: University of Chicago Press.

Posner, Richard A. 1979. "The Chicago School of Antitrust Analysis," *University of Pennsylvania Law Review* **127**: 925.

Putterman, Louis. 1988. "The Firm as Association versus the Firm as Commodity: Efficiency, Rights, and Ownership," *Economics and Philosophy* **4**(2): 243-66 (October).

Richardson, G. B. 1960 [1990]. *Information and Investment.* Oxford: Oxford University Press.

Richardson, G. B. 1965. "Les Relations entre Firmes," *Economie Appliquée* **18**(3): 407-430.

Richardson, G. B. 1972. "The Organisation of Industry," *Economic Journal* **82**: 883-96.

Robertson, Paul L. 1994. "Information, Similar and Complementary Assets, and Innovation Policy," Paper for the colloquium in honor of G. B. Richardson, January 4-6, 1995, St. John's College, Oxford.

Rotemberg, Julio J., and Garth Saloner. 1994. "Benefits of Narrow Business Strategies," *American Economic Review* **84**(5): 1330-1349 (December).

Schelling, Thomas C. 1960. *The Strategy of Conflict*. Cambridge: Harvard University Press.

Scherer, Frederick M., and David Ross. 1990. *Industrial Market Structure and Economic Performance.* Boston: Houghton Mifflin, third edition.

Schnaars, Steven P. 1994. *Managing Imitation Strategies: How Later Entrants Seize Markets from Pioneers.* New York: The Free Press.

Stigler, George J. 1946. *The Theory of Price*. New York: Macmillan, first edition.

Teece, David J. 1980. "Economies of Scope and the Scope of the Enterprise," *Journal of Economic Behavior and Organization* **1**(3): 223-247.

Teece, David J. 1982. "Towards an Economic Theory of the Multiproduct Firm," *Journal of Economic Behavior and Organization* **3**(1): 39-63.

Teece, David J. 1986. "Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing, and Public Policy," *Research Policy* **15**: 285-305.

Teece, David J. 1990. Foreword to the second edition of G. B. Richardson, *Information and Investment.* Oxford: Oxford University Press.

Tirole, Jean. 1988. *The Theory of Industrial Organization*. Cambridge: MIT Press.

Williamson, Oliver E. 1975. *Markets and Hierarchies: Analysis and Antitrust Implications*. New York: The Free Press.

Williamson, Oliver E. 1985. *The Economic Institutions of Capitalism.* New York: The Free Press.

Williamson, Oliver E. 1986. "The Economics of Governance: Framework and Implications," in R. N. Langlois, ed., *Economics as a Process: Essays in the New Insitutional Economics.* New York: Cambridge University Press.

Williamson, Oliver E. 1988. "Technology and Transaction Cost Economics: A Reply," *Journal of Economic Behavior and Organization* **10**: 355-363.