

The Theory of the Firm

An Introduction to Themes and Contributions

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The Theory of the Firm: an Introduction to Themes and Contributions

by

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I. Introduction*

Few practitioners and observers of economics would disagree with the proposition that the theory of the firm has become a favorite preoccupation of the modern economist. Of course, firms' market behavior has for a long time captured the attention of economic theorists. But the theory of the firm – in the sense of the body of theory that addresses the *existence*, the *boundaries* and the *internal organization* of the firm – has only picked up steam relatively recently. Thus, whereas the economics and business administration journals had close to no contributions on the theory of the firm only 25 years ago, today top economics journals, including those with a non-specialist orientation, such as *The American Economic Review* or *The Journal of Political Economy*, in close to each issue has at least one paper that deals with aspects of the theory of the firm.

Likewise, in business administration (particularly the strategy and organization theory fields), the theory of the firm has – for perhaps rather obvious reasons – become extremely influential. Thus, it is close to being conventional wisdom in, for example, firm strategy research that strategy issues such be framed as problems of efficient governance. To illustrate, the most quoted author in top business administration journals, such as *Academy of Management Review* or *Strategic Management Journal*, is Oliver Williamson, perhaps the best known flagbearer of the modern theory of the firm.

It is far from surprising, then, that the theory of the firm has already been the subject of a number of readers and collections, such as Putterman (1986), Barney and Ouchi (1988), Williamson and Masten (1995), Casson (1996), and Buckley and Michie (1996). Needless to say, the present collection of papers is different, and not just because it is more voluminous. Like most readers and collections on the theory of the firm, it incorporates the true and undisputed classics. However, not only the

* Discussions with Kirsten Foss, Henrik Lando and Steen Thomsen have been important for the writing of this paper.

older classics, such as Ronald Coase's "**The Nature of the Firm**"¹, or Armen Alchian and Harold Demsetz' "**Production, Information Costs, and Economic Organization**", may be found here, but also the more recent ones, such as Sanford Grossman and Oliver Hart's "**The Costs and Benefits of Ownership: A Theory of Vertical Integration**" (1986) or Paul Milgrom and Bengt Holmström's (1994) "**The Firm as an Incentive System**". Moreover, some of the latest cutting-edge research, such as Philippe Aghion and Jean Tirole's "**Formal and Real Authority in Organization**" (1997) and Raghuram Rajan and Luigi Zingales' "**Power in a Theory of the Firm**" (1998) have been included. Included here are also less well-known, but clearly very important papers, such as Harold Malmgren's "**Information, Expectations, and the Theory of the Firm**" (1961) or Stephen Cheung's "**The Contractual Nature of the Firm**" (1983).

Finally, and perhaps most importantly, the present collection is much more synoptic, and perhaps also more organized the way the modern theorist of the firm would naturally conceive of the field. Thus, with respect to the first point, the collection incorporates work on the knowledge-based theory of the firm, on firm strategy and on business history. This type of work is not normally included in other collections of papers on the subject. With respect to the second point, the material is organized in terms of whether, for example, a specific contribution belongs to the complete or the incomplete contracting tradition – the distinction that is now conventionally seen as the main one, at least within the explicitly contractual streams in the modern theory of the firm (I explain this in more detail later).

The incorporation of work on firm strategy and business history is not just motivated by the possibly more "applied" character of this work. Rather, in an emerging area, such as the theory of the firm, a continuous dialogue between "pure" and "applied" fields may be required for the healthy progress of this discipline. Thus, the works of business historians and strategy scholars is included here for the simple reason that "pure" theorists of the firm may have much to learn from these.

¹ In this introduction, I adopt the following convention: When I mention a paper that is also reprinted in the present collection, the title of the paper is set in **bold**.

For example, I conjecture that insights derived from work on “the capabilities (or competence) perspective” will increasingly influence the formal economics of organization. In contrast, I have refrained from incorporating material that merely aims at testing or illustrating theories of the firm; the focus is primarily on contributions to “pure” theory.

Thus, to sum up, the present collection has been organized according to the following criteria:

- papers that are generally acknowledged to be seminal must be included;
 - the ahistorical fallacy of including only the most recent contributions, in the mistaken belief that these also include all past wisdom, must be avoided, and older classic contributions should be included;
 - the papers must fall in logical, thematic clusters and all the major clusters on the theoretical scene must be represented;
 - since the intended audience for the collection also includes management scholars, papers of interest to this group should be included;
- all this under the restriction that the entire collection must have a manageable size.

II. The Emergence of the Theory of the Firm

A. The Neglect of the Firm

As Herbert Simon (1991: 27) recently noted, a mythical Martian, equipped with a telescope that reveals social structures and approaching the earth from space, would recognize organizations, rather than connecting markets, as “the dominant feature of the landscape”. Arguably, this ubiquity of organization in the real world has not until recently been reflected in economic research. This is all the more surprising, since all sorts of allocational and distributional decisions are taken within organizations,

decisions that are clearly within the scope of economic theory, and which may significantly influence market outcomes, or perhaps even have macro consequences.

Thus, one may legitimately wonder why it has taken economic theory such a long time to theoretically approach organizations, in the specific sense of providing economic rationales for the existence, the boundaries and the internal organization of organizations, including firms. Of course, along with households, firms have for a long time been a crucial part of the explanatory set-up of economics. For example, in basic price theory, firms are part of the apparatus that helps us trace out the effect on endogenous variables of changes in exogenous variables.

As Kenneth Boulding explains in his early overview paper, **“The Theory of the Firm in the Last Ten Years,”** the “... explicit recognition of the theory of the firm as an integral division of economic analysis” (1943: 791) must be ascribed to Chamberlin (1933) and Robinson (1933). This view, which one is likely to encounter even today, fails to incorporate the contribution of Coase (1937). It is also ignorant of the deep differences between Chamberlin and Robinson’s contributions, and clearly also unaware of the Marshallian tradition of concern with the business firm, a tradition which was more or less eliminated as a result of the success of the Cambridge neoclassical approach to the firm (Pigou, Robinson), as Scott Moss points out in **“The History of the Theory of the Firm from Marshall to Robinson and Chamberlin: the Source of Positivism in Economics”** (1984). Thus, Boulding is taken up with issues such as whether the entrepreneur really maximizes profit, the impact of uncertainty on his decisions, the theory of profits, and the firm in various market settings.

The modern theory of the firm, according to Boulding, “... is exactly analogous to the analysis of the reactions of a consumer by means of indifference curves. Indeed, a consumer is merely a ‘firm’ whose product is ‘utility’“ (1943: 799). We may infer that the theory of the firm around 1943 has been completely subordinated to price theory. The proverbial “production function view of the firm” (*alias* the neoclassical theory of the firm) had become dominant. In this view, the allocation of economic activity between markets, hybrid forms and organizations is a *datum*, all contracting action is performed by the auctioneer, and contractual disputes are disregarded because of a strong

underlying assumption of judicial efficacy (Williamson 1985: 7). Moreover, the behavior of the firm is assumed not to be dependent on its internal structure or its ownership structure. In basic neoclassical theory, ownership and institutions neither affect the objective of the firm, nor its knowledge base, technology or cost efficiency (as summarized by the set of production possibilities).

Thus, this view clearly had little room for examining comparative issues of economic organization, such as the existence of firms in a market economy, essentially because market-contracting perfectly solves all incentive and coordination issues. The reasons for these explanatory limitations are easy to discern. First, the basic role of firms in price theory is to completely eliminate autarky and thus maximize the scope of the price mechanism, as Harold Demsetz (1995) has recently pointed out. Second, for a long time economists simply saw, for example, analysis of the internal workings of the firm as lying outside the set of legitimate explananda and, perhaps, competence of economists. For example, Arthur Pigou explained that

... it is not the business of economists to teach woollen manufacturers to make and sell wool, or brewers how to make and sellr business men how to do their job. If that was what we were out for, we should, I imagine, immediately quit our desks and get somebody – doubtless at a heavy premium, for we should be thoroughly inefficient – to take us into his woollen mill or his brewery (Pigou 1922: 463).

Clearly, this is an argument in favor of a distinction between economics and business administration that is wholly centred on what are the relevant objects of inquiry: presumably Pigou thinks that economists can only claim competence on the economics of society-wide matters (such as Pigou's own work on welfare economics), and that economists simply have no business going into a detailed inquiry of individual economic agents; that belongs to the domains of inquiry of psychologists and engineers. Economists are concerned with understanding the organization of production and distribution through the pricing mechanism. And as Paul McNulty (1984: 233) observes

in **“On the Nature and Theory of Economic Organization: The Role of The Firm Reconsidered”**,

... the primacy of exchange is characteristic not only of the market economy but also of economic analysis. In economic theory, business firms differ from one another only in respect of the character of the markets in which they buy or sell, and are at bottom, simply connecting links in an economy.

This is not to say that the Pigovian attitude was not challenged. It was challenged, for example, by Andreas Papandreou in his 1952 paper **“Some Basic Problems in the Theory of the Firm”**. A major concern here was that as soon as the analyst leaves the contexts of atomistic competition or monopoly, he is faced with indeterminacy from oligopolistic interaction. The maximization postulate is simply too general to be helpful; more structure needs to be imposed on it, or – as some theorists argued (Cyert and March (1963) – the principle needs to be supplanted by bounded rationality. Therefore, it was argued that behavioralist theories of the firm (ibid.), which were in fact founded on the notion of bounded rationality, were theoretical rivals to the established neoclassical theory of the firm.

The classical rear-guard action against this position was performed by Fritz Machlup in his magisterial 1967 Presidential Address to the American Economic Association, **“Theories of the Firm: Marginalist, Behavioral, Managerial”**. Machlup’s basic point was that since behavioral and managerial theories of the firm were concerned with different *levels* of analysis relative to the neoclassical theory of the firm (the level of the individual firm vs the industry level), the former were not genuine theoretical rivals to the latter.

The valid aspect of the Machlup critique is, of course, that as one moves up in the hierarchy of levels of analysis, the more anonymous one’s *unit* of analysis is likely to be for simple reasons of analytical parsimony. However, if taken to be imply that price-theoretic principles were inapplicable to the firm level, the critique was misguided. In fact, the conviction that economics can be profitably used to examine, for example, the internal workings of the firm, and not just its external behavior, is of course the bedrock of modern theories of the firm, although some

contributors (such as Williamson 1985, 1996) emphasize the need to draw on insights from organizational studies, for example, insights on bounded rationality in organizations (e.g., Simon and March 1958).

B. Early Work on the Theory of the Firm

Frank Knight, in *Risk, Uncertainty, and Profit* (1921), was the first to explicitly argue that economic principles can render intelligible the different forms of business organization found in the real world. However, Knight was primarily interested in explaining the existence of profit and the connection between his theory of profits and his theory of the firm is not entirely clear. However, Knight hints at alternative explanations of the firm and internal organization, involving morally hazardous behavior (Barzel 1987), non-contractibility of entrepreneurial judgment (Langlois and Csontos 1993), and, the best known, the optimal allocation of risk (Kihlström and Laffont 1979). The latter theory was a critical point of departure in the classic paper by Ronald Coase, **“The Nature of the Firm” (1937)**, the paper that is now conventionally regarded as the founding paper in the theory of the firm.

It is not surprising that “The Nature of the Firm” has achieved the status of a true classic, for in this paper many, perhaps most, of the major themes of the modern theory of the firm are clearly anticipated. For example, Coase clearly argues for the centrality in the economics of organization of, in contemporary parlance, incomplete contracts and transaction costs (“the costs of using the price mechanism”), and he argues in favor of a basic contractual conceptualization of the firm and an efficiency approach to its explanation. Most importantly, perhaps, he defines the main tasks of a theory of the firm, namely to “discover why a firm emerges at all in a specialized exchange economy” (i.e. the *existence* of the firm), to “study the forces which determine the size of the firm” (i.e., the *boundaries* of the firm) and to inquire into, for example, “diminishing returns to management” (i.e., the *internal organization* of the firm). All this, Coase explains, can be reached by adding the category of “costs of using the price mechanism” to ordinary economics. “The whole

of the ‘structure of competitive industry’”, Coase explains “... becomes tractable by the ordinary technique of economic analysis” (1937:).

In following the program thus sketched, and certainly also in addressing the puzzles that Coase had left – notably the nature of the determinants of “the costs of using the price mechanism” –, most of the modern theory of the firm deserves indeed to be called Coasian. However, when reading Coase’s paper today, one is struck by the absence of references to *incentive conflicts*, arguably the main explanatory focus of today’s economics of organization.² Rather, Coase’s perspective emphasizes flexibility: in an uncertain world, there is a need for adaptation to more or less unanticipated events, and the employment relation, where “the factor, for a certain remuneration ... agrees to obey the directions of an entrepreneur *within certain limits*” (Coase 1937: ; *emph. in original*), may meet that need.³

For various reasons, some of them explained above, Coase’s seminal analysis was neglected for more than three decades in the sense that although its existence was known, it was not *used* (Coase 1972).⁴ However, a few seminal papers did appear in these Dark Ages for the theory of the firm, notably Herbert Simon’s 1951 paper, “**A Formal Theory of the Employment Relationship**” and Harald Malmgren’s ten years younger “**Information, Expectations and the Theory of the Firm**”. In his paper, Simon explains the employment contract as an incomplete contract where the employer offers a wage in return for which the employee agrees to accept the directions of the employer. The contract is incomplete in the sense that the two parties are unable to write an enforceable contingent contract that fully specifies what the employee must do as a function of the state of the world. The employee will accept such an open-ended contract to the extent that he expects the

² In this respect, at least, Knight is a truer precursor of today’s economics of organization, for he, and not Coase, views moral hazard as central to the explication of economic organization (Foss 1996).

³ The obvious problem with this explanation is, of course, that a standard argument in favor of the market has to do with the market’s superior adaptability/flexibility (Hayek 1945). Coase’s analysis does not allow to say when the firm can beat the market in terms of flexibility and *vice versa*.

⁴ One may in fact also discuss how well it really was known. For example, Thomas Marschak (1965) writing in *The Handbook of Organizations* about “Economic Theories of Organization” does not even mention Coase.

directions that he will receive to lie within his “zone of acceptance”. As in Coase (1937), flexibility is the main message of the analysis, as indeed it is in Malmgren’s paper.

Unlike Simon’s very focused piece, Malmgren’s paper roams over an extended terrain and draws on numerous influences, such as the work of Keynes, Hayek, Penrose and Richardson, in addition to Coase’s work. Malmgren (1961) is the first contribution to 1) “operationalize” the Coasian approach to the theory of the firm, 2) suggest that insights from knowledge-based approaches to the theory of the firm (represented by Penrose’s work), may be combined with ideas from the contractual approach to the firm, and 3) to approach in economic terms a number of concepts (such as “business culture”) the economic analysis of which has begun only recently. Addressing each one of these three points would have been a remarkable contribution from somebody writing in 1961; to address all three, and do so rather successfully, is extraordinary.

C. Taking Off

In spite of the work of Simon and Malmgren, there was very little cumulative development of the theory of the firm until well into the nineteen-seventies. An important reason for this – economists’ preoccupation with the competitive model – has already been mentioned. To this must now be added the relative absence of insights and tools that could further the theory of the firm. In Oliver Williamson’s terms (19.), Coase’s analysis still awaited its basic “operationalization”. Coase (1937) had listed several sources of those “costs of using the price mechanism” that give rise to the institution of the firm. In part, these are the costs of negotiating and writing contracts. The “most obvious cost of ‘organising’ production through the price mechanism is that of discovering what the relevant prices are” (Coase 1937:). A second type of cost is that of executing separate contracts for each of the multifold market transactions that would be necessary to coordinate some complex production activity. But Coase had given virtually no details on the determinants of these costs. It was clear, particularly after his 1960 contribution, “The Problem of Social Cost”,

that they somehow had to do with defective knowledge, or, in contemporary parlance, “private information”, but apart from that relatively little was known.

In retrospect, we can see that numerous developments in the nineteen-fifties and nineteen-sixties provided the conceptual basis (or, rather, several conceptual bases) on which to found the theory of the firm, insights and tools that weren't available to theorists in the earlier period. Importantly, these developments paved the way for an improved understanding of transaction costs and the incentive properties of alternative types of economic organization. Among these, partly overlapping, developments are

- Fundamental insights in social choice theory (Arrow 1951) – which, among other things, provided a rationale for leadership and hierarchical governance;
- The emergence of the streams of research prompted by the publication of Coase (1960), notably the related fields of law and economics and property rights economics (Alchian 1965), and much of it associated with UCLA and the University of Chicago. These fields promoted a comparative institutionalist approach (Demsetz 1969), provided the first working definitions of transaction costs as the costs of defining, exchanging and protecting property rights, made a link to relevant fields of law, such as contract law, and championed a basic efficiency approach, according to which observed economic organization should be seen as least cost responses to exchange problems.
- Work in industrial organization, by Chicago scholars and others, which rejected narrow technological and monopoly explanations of observed contracting practice, and adopted a comparative contracting, and proto-transaction cost, approach (e.g., Director and Levi 1956).
- Work on the managerial (Williamson 1964) and behavioral (Cyert and March 1963) theories of the firm which highlighted incentive-conflicts between owners and managers and between intra-firm agents respectively.
- Work on welfare economics and information economics by, notably, Arrow (1969, 1971, 1974) which emphasized various limitations of the market mechanism and

suggested that firms can be understood in terms of market failures which arise under conditions of externality, economies of scale and information asymmetries.

- Work that aimed at relaxing the extremely stylized picture of the market economy painted in general equilibrium theory (Debreu 1959), by, for example, making states of nature unobservable to some agents (moral hazard) or to the auctioneer (adverse selection) (Guesnerie 1992). Some of this work began in the contexts of comparative systems and public goods and later developed into the mechanism design literature.

Thus, work on the theory of the firm may be seen as part of broader attempt to move beyond the confines of the market institution and also inquire into the rationales and functioning of alternative institutions for resource allocation, as Christian Knudsen explains in his 1993 paper, “**Modelling Rationality, Institutions, and Processes in Economic Theory**” (see also Arrow 1987; Eggertson 1990; Furubotn and Richter 1997; Salanié 1997). Actually, “the theory of the firm” may be a too narrow term, since many of the relevant theories are also capable of dealing with intermediate arrangements, such as joint-ventures, franchising, etc., and in fact also with the market institution.

Although the attempt described above has sometimes been called “new institutional economics”, it is certainly not the case that all these different developments merged into a seamless theoretical web that could provide support for the emerging theory of the firm. On the contrary, work on, for example, property rights economics, Chicago-UCLA style, and work that aimed at relaxing the Arrow-Debreu model, were largely independent developments.

The fact that these developments took off independently and continued for a long time to develop independently also helps explaining the presence of different streams of research in the modern theory of the firm. For example, what is often called “nexus of contract theory” (the subject of section III) is largely an outgrowth of the nineteen-sixties’ (largely verbal) work in property rights economics, whereas “formal agency work” (the subject of section IV) is largely an outgrowth of formal work that aimed at making the Arrow-Debreu model more realistic. However, the

two bodies of theories are concerned with rather overlapping themes; what is different is perhaps most of all the style of theorizing.

Based on the above influences and developments, mid-nineteen-seventies work began to blossom within the theory of the firm. As mentioned, as late as 1972 Coase lamented that his 1937 paper had been “much cited and little used”, but at the time of Coase’s lamentation, serious work on the theory of firm had begun to take off, notably with Williamson’s 1971 paper “**The Vertical Integration of Production: Market Failure Considerations**” and Alchian and Demsetz’s paper from the year after, “**Production, Information Costs, and Economic Organization**”.

These two seminal contributions already marked the beginning of a branching in the Coasian theory of the firm, for in retrospect it is evident that they helped found distinct perspectives. For example, when Oliver Hart in “**An Economist’s Perspective on the Theory of the Firm**” (1989) introduces a distinction between “transaction cost economics” and “the firm as a nexus of contracts view”, he is referring to traditions that were largely founded by the Williamson and the Alchian and Demsetz papers, respectively.

Other approaches also took off in the beginning of the nineteen-seventies, primarily the team-theoretic approach of Marschak and Radner (1972) and the evolutionary theory of the firm (Nelson and Winter 1974), approaches that are represented in this collection under the headings of “The Firm as an Information Processor” (Section VII) and “The Knowledge-Based Theory of the Firm” (Section VIII). What has more recently become known as “contract theory” also began approximately in the beginning of the nineteen-seventies with the first contributions to formal principal/agent theory. This early work is represented here by Stephen Ross’ “**The Economic Theory of Agency: The Principal’s Problem**” (1973). Contract theory is represented in this collection by sections IV, “Formal Agency Work” and VI, “Incomplete Contracts: The Asset Specificity/Property Rights Perspective”. It is surveyed in Bengt Holmström and Jean Tirole’s “**The Theory of the Firm**” (1989) and in Oliver Hart and Bengt Holmström’s “**The Theory of Contracts**” (1987).

III. Streams of Research in the Theory of the Firm

A. Common Themes?

As indicated, the theory of the firm is far from homogenous, although formal economic work may be characterized by a certain convergence towards insights and analytical conventions developed in the context of contract economics. On the overall level, all theories of the firm may be reconstructed as beginning from the premise that it is necessary to introduce some spanners in the works of the perfectly competitive model (of, say, Debreu 1959), whether these be imperfect foresight, small numbers bargaining, haggling costs, private information, cost of processing information or inspecting quality, increasing returns, etc., in order to say something sensible about economic organization. With perfect and costless contracting, it is hard to see room for anything resembling firms (even one-person firms), since consumers could contract directly with owners of factors services and wouldn't need the services of the intermediaries known as firms.

This characterization is arguably too general to be helpful; on the other hand, it is hard to find more specific common themes that unite all of the contributions in this collection. Thus, one must look at the sub-fields (as reflected in the sections of this collection) for more precise unifying themes. For example, it is also fair to say that connecting principles unite at least the important sub-fields of nexus of contracts theory, formal agency work, and work on incomplete contracts from an asset specificity/property rights position.

One supposedly common theme that has often been highlighted by critics is that all work in these sub-fields begins from a view of human nature that goes beyond the conventional maximizing assumption. For example, one adds assumptions about the potentially opportunistic or morally hazardous behavior of contracting partners. However, it is not quite obvious how the borderline between, for example, "opportunistic" and "non-opportunistic" behavior should be drawn. And for the analysis of many problems of economic organization, a simple self-interest assumption may often be sufficient. It is both more precise and general to

say that the unifying theme of the above subfields is that all contracting problems, and therefore problems of economic organization more generally, are represented as stemming from *incentive conflicts*. It is worth spending some time on making this clearer.

Following Hurwicz (1972) and Wernerfelt (1994, 1998), we can in an abstract manner think of economic agents as choosing game forms and equilibria thereof for regulating their trade. Efficiency requires that if agents can find a game form and an equilibrium thereof that allows them to do better, they will do so. For example, we may think of two agents that confront the following two possible games, each one being a simple coordination game.⁵

	Game 1				Game 2		
	B				B		
	x	y		x	y		
x	1, 1	0, 0		x	1, 1	0, 0	
A			A				
y	0, 0	2, 2		y	0, 0	3, 3	

In this simple situation, Pareto efficiency requires, of course, that agents choose game 2 and play the (3,3) equilibrium. In such simple situations, problems of economic organization are normally taken to be absent, because of the absence of any incentive conflicts. However, it is easy to see that a slight modification of payoffs, as in game 3, may spell trouble.

	Game 3				Game 4		
	B				B		
	x	y		x	y		
x	2, 2	0, 0		x	2, 2	0, 0	
A			A				

⁵ The example is from Wernerfelt (1994).

	y	0,0	4,1		y	0,0	4-u,1+u
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The problem here is that the Pareto criterion is too weak to select a unique equilibrium, since both the (2,2) and (4,1) may be equilibria on this criterion.⁶ Now, obviously the (4,1) equilibrium has a higher joint surplus than the (2,2) equilibrium. Therefore, it will be in A's interest to bribe B to play the y-strategy. If u, the bribe, lies between 1 and 2, the equilibrium corresponding to both A and B playing y will be efficient, and, hence, be chosen. Thus, efficiency now implies that the agents agree on (contract on) maximizing and somehow splitting the joint surplus. In this situation a market failure occurs when bribes cannot be sustained in equilibrium. This may be dependent on the timing of the game. For example, if A gives B the bribe before the game begins, B will not choose the y-strategy, which means that A will decide not to give B any bribe. Or, A may promise B to pay the bribe after game, but B will realize that this will not be in A's interest, and will still choose the x-strategy. Although the (2,2) equilibrium is still efficient, it is not joint-surplus maximizing.

These market failures may be remedied through contractual means; for example, A may agree to pay B a compensation if he does not pay u, or B may agree to pay A a compensation if he does not choose the y-strategy after receiving u. However, such contracts may not always be feasible. Contracts fail in the sense that they cannot completely safeguard against the reduction of surplus/loss of welfare stemming from incentive conflicts (given risk preferences). Contract failure may take various forms. For example, contracts may be *incomplete* in the sense that some contingencies are left out for whatever reasons, such as information costs, the limitations of natural language, the unavoidable emergence of genuine novelties, etc. In the context of the example, A may be confronted with a contingency that is not covered by the contract, refuse to pay B the bribe, and B may have no recourse. Or, while it may be possible for partners to agree on contract terms, these may not be

⁶ Relatedly, where there are symmetric equilibria (same pay-offs), the choice of game forms, or equilibria thereof, is essentially arbitrary, because there is nothing in classic game theory to predict which game form or equilibrium will be chosen.

enforceable by a third party, such as a court. In the latter case, contract terms are said to be “non-verifiable”. Or, the costs of contracting may outweigh the gains. In all of these cases, it may not be possible to sustain the first-best outcome, that is, the one that unambiguously maximizes joint-surplus.

Given contract failure, the analytical enterprise is therefore one of comparing alternative contracting arrangements in terms of their implications for the joint surplus from a relation. For example, one may compare Nash equilibria that differ in terms of the underlying distribution of bargaining strengths (for example, as given by ownership patterns). The link to observed economic organization is established by asserting (but not demonstrating) that what is observed is also efficient, for example, because of the existence of effective selection forces rapidly performing a sorting among firms with different efficiencies or (implausibly) because agents are supposed to be so clever that they can always calculate and choose optimal economic organization.⁷ These and other explanatory aspects of the emerging theory of economic organization are treated in the papers in Section X (“Methodological Perspectives”).

Even within the set of theories of the firm that shares the above principles, there are rather marked differences.⁸ For example, in which way should the category of *transaction costs* be treated? Formal contributions prefer in general not to use the concept at all (or only in a verbal introduction) and to model not transaction costs per se, but rather the manifestations of transaction costs. Thus, one looks at situations involving contractual incompleteness, where this may be loosely rationalized (but not modelled) by pointing to some underlying transaction costs, for example, the ink costs of drafting long complex contracts. Such models are, however, often symmetric information, perfect foresight model (in the sense that agents can perfectly foresee the pay-offs from the relation). Or, one looks at

⁷ In the words of Hart (1990: 699): “... even though the agents are not capable of writing a contract that avoids hold-up problems, they are clever enough to understand (at least roughly) the consequences of their inability to do so”.

⁸ In fact, most of the discussion in the mainstream journals take place between proponents of theories within this set.

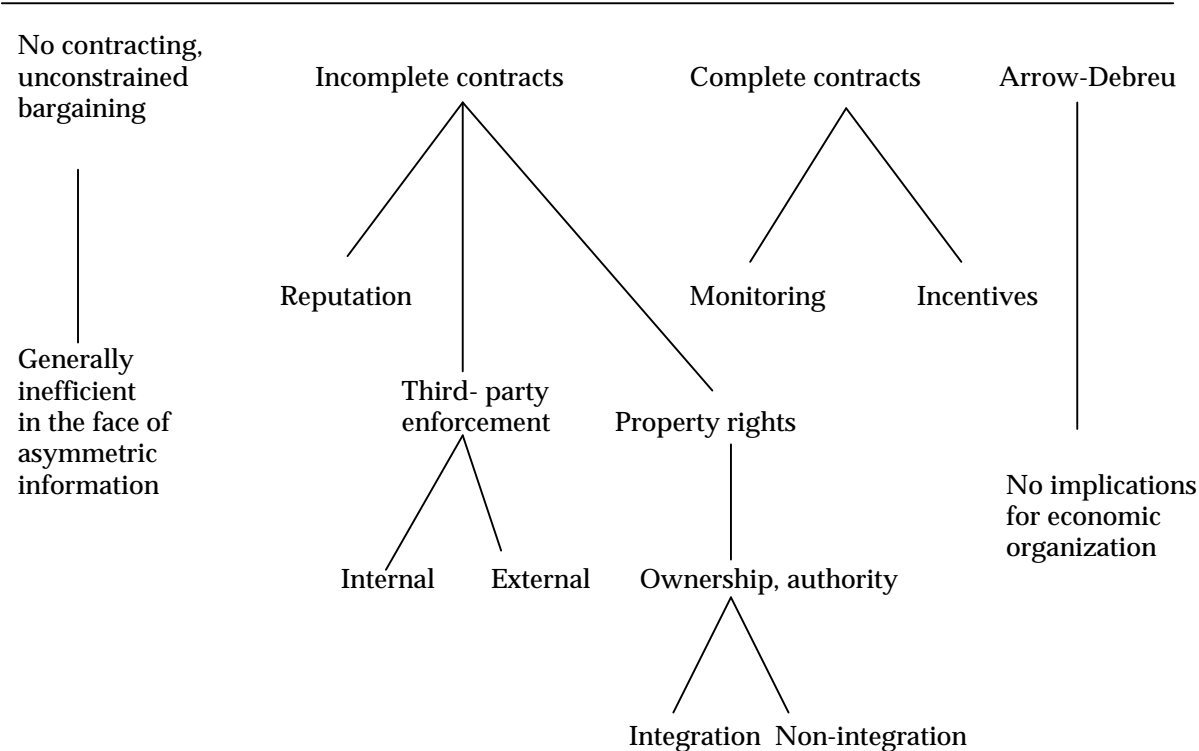
situations involving asymmetric information, which may also be rationalized by pointing to transaction costs, such as the costs of measuring effort. In contrast, contributions in the verbal mode highlight transaction costs and place them centerstage in the analysis.

Another, and – many pure theorists would argue – ultimately more important difference has to do with whether one begins from *complete* contracts, that is, contracts that have all relevant decisions depending on verifiable variables, or not (see Tirole 1994).

As a starting point, one may interpret this diversion in the literature as different departures from the Arrow-Debreu model (Guesnerie 1994; Foss, Lando, and Thomsen 1998): since firms cannot exist in this model, we must break with one or more of the Arrow-Debreu assumptions. Figure 1 illustrates this by providing a conspectus of assumptions about contracting and their implications for economic organization.

Figure 1
Contracting and Governance

“Tightness” of contracting ®



The extremes are defined by Arrow-Debreu contracting and no contracting/unconstrained bargaining, respectively. While Arrow-Debreu contracting will in general be unattainable, the non contracting/unconstrained bargaining situation is often inefficient, particularly in the case of bilateral asymmetric information which may lead to too little trade, essentially because of a bilateral monopoly problem.⁹ To avoid inefficient outcomes, parties will often prefer some sort of contractual constraint. Now, such constraints may be represented by either incomplete contracts or complete contracts. These two classes of contractual constraints depart, as it were, from a break with different basic assumptions in the Arrow-Debreu model. The two basic Arrow-Debreu assumptions in question are: 1) the assumption of complete contracting: Agents can foresee all future contingencies and can costlessly write contracts which cover all contingencies (so that there are no incomplete contracts), and 2) the assumption of symmetry of information concerning “states of nature” (so that there are no principal-agent incentive problems of either the moral hazard or adverse selection variety).

Incomplete contracting theories break with assumption 1), that is, they are founded on the assumption that it is for some reason costly to draft complex contracts, and that there is therefore a need for *ex post* governance. The theories covered by sections V (“Incomplete Contracts: The Coordination Perspective”) and VI (“Incomplete Contracts: The Asset Specificity/Property Rights Perspective”) belong unambiguously here, and one may also argue that the theories by sections VII (“The Firm as an Information Processor”) and VIII (“Knowledge-Based Perspectives”) naturally belong here, although their proponents seldom relate to the complete/incomplete contracts dichotomy. In particular, Williamson has for a long time put much emphasis on contractual incompleteness, and Grossman and Hart’s 1986 paper, “**The Costs and Benefits of Ownership: A Theory of Vertical Integration**”, made the incomplete contracting methodology fashionable among formal economists of organization.

⁹ Of course, reputation effects and self-enforcing agreements may sometimes reduce the severity of these inefficiencies.

Complete contracting theories break with assumption 2). Thus, they allow agents to write elaborate contracts characterized by *ex ante* incentive alignment, but only under the constraints imposed by the presence of asymmetric information and (divergent) risk preferences. Thus, although the contracts are complete, they are still different from Arrow-Debreu contracts (which may be called “perfect”). The theories covered by sections III (“The Nexus of Contracts View”) and particularly IV (“Formal Agency Work”) belong in the complete contracting category.

One way of interpreting the division of the literature is to cast it in terms of the troublesome transaction cost issue. Thus, one may say that the different branches of the literature have concentrated on different kinds of the transaction costs that Coase (1937) identified but didn’t explicate. For example, incomplete contracting theories typically emphasize the costs of writing contracts. Sometimes, but certainly not always, the costs of making *ex post* adaptations are also emphasized. This is particularly characteristic of Oliver Williamson’s work, such as his 1991 paper **“Comparative Economic Organization: The Analysis of Discrete Structural Alternatives”**.

In contrast, complete contracting theories neglects these costs and emphasize instead costs of monitoring and costs of setting up incentive arrangements (costs that are largely neglected in the incomplete contracting tradition). These perspectives are complementary, and should be integrated, and there are indeed signs that this integration process is slowly beginning, as exemplified by Bengt Holmström and Paul Milgrom’s paper, **“The Firm as an Incentive System”** (1994).

However, such differences between the “incentive conflict theories” vanish in comparison with the differences to the view of the firm as an information processor or the related view of the firm as knowledge-bearing entity. The latter view in particular, having largely originated in the outskirts of economics (business strategy, international business, technology studies, etc.) is considerably looser than most mainstream economics work on the theory of the firm. However, a rational reconstruction of the main themes of both the view of the firm as an information processor and of the firm as a knowledge-bearing entity is that in this body of

literature, all incentive conflict problem are suppressed in order to focus the costs of storing, using, producing and transmitting information and knowledge, as I argue in my 1993 paper, **“Theories of the Firm: Contractual and Competence Perspectives”**. One may therefore regard them as trying to fill the lacuna represented by the fact that “[n]eoclassical theory pays only lip service to the issue of communication” (Tirole 1988: 49) and treats the issue of differential production and organization knowledge in much the same way.

In the following sections, I explain in a somewhat more detailed manner, and with more reference to specific contributions, the contents of various streams within the theory of the firm. The streams into which the individual contributions are clustered are the following ones: The nexus of contracts stream, formal principal/agent work, incomplete contracts: the coordination view, incomplete contracts: the asset specificity/property rights view, the information processing view, and the knowledge-based view.

Admittedly, this clustering is in some cases relatively imprecise. For example, there are rather deep-seated differences between the work of Oliver Hart and that of Oliver Williamson (who are both put in the incomplete contracts: the asset specificity/property rights branch), not the least with respect to how rationality should be modeled, and they are therefore only reluctantly grouped together. And some principal/agent work may be argued to be merely formalizations of earlier verbal insights. Nevertheless, I believe the present clustering is the best possible. For example, in the case of Hart and Williamson, they share one overriding concern that sets them apart from other streams of research: the centrality in their stories of specific assets. Table 1 below provides an overview of the specific streams of research that may serve as a point of reference for the following. My own paper, **“Evolutionary Theories of The Firm: Reconstruction and Relation to Contractual Theories”** (1998), as well as Christian Knudsen’s paper, **“Modelling Rationality, Institutions, and Processes in Economic Theory”** (1993), provide complementary perspectives.

Table 1: Streams of research in the theory of the firm

	Conceptualization of the firm	Rationality	Contracting	Transaction costs considered
Nexus of contracts	A legal fiction	Maximizing	Complete	Ex post TC, e.g. monitoring and bonding costs
Formal principal/agent theory	No distinct conceptualization	Maximizing	Complete	Costs of monitoring
Incompl. contracts: coordination	An authority relation	Mostly bounded	Incomplete	Haggling and communication costs
Incompl. contracts: asset spec. and prop. rights	A collection of residual decision rights to physical assets	Williamson: bounded Hart: maximizing	Incomplete	Costs of drafting complex contracts
The information processing view	A team specialized in the collection and processing of information	Bounded	Incomplete	Costs of transmitting, storing, retrieving, etc. information
The knowledge-based view	A bundle of knowledge assets	Bounded	Incomplete	Costs of integrating knowledge in firms and transmitting knowledge across the boundaries of the firm

We can also portray the various streams in the modern theory of the firm in terms of the major dichotomies that characterize the literature. As already mentioned, one such dichotomy relates to whether modeling is cast in terms of complete or incomplete contracts. Another dichotomy that has mentioned in the preceding relates to whether or not a stream of research emphasizes incentive conflicts as crucial to understanding the major issues in the theory of economic organization, that is, one sort of coordination problems that are highlighted. For

example, team-theoretic contributions to economic organization suppresses incentive conflicts in order to focus on coordination problems relating to information transmission. Juxtaposing these two dimensions, we obtain the following table:

Table 2: Contracting and Coordination Problems

	Incentive conflicts crucial	Other coordination problems; incentive conflicts are taken to be unimportant or they are sidestepped
Complete contracting	Nexus of contracts theory, principal/agent theory	Arrow-Debreu?
Incomplete contracting	Incomplete contracts: the asset specificity and property rights perspectives	Incomplete contracts: the coordination view, the information processing view, the knowledge-based perspective

B. The Nexus of Contracts View

What is here called “the nexus of contracts view” derives its name from a passage in one of the best known contributions to this stream, namely Michael Jensen and William Meckling’s 1976 paper, “**The Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure**”:

The private enterprise or firm is simply one form of legal fiction which serves as a nexus for contracting relationships and which is also characterized by divisible residual claims on the assets and cash flows of the organization which can generally be sold without permission of the other contracting individuals (p. 311).

The claim that the firm is nothing but a legal person or fiction can be found in the founding contribution to this stream of research, Alchian and Demsetz’ “**Production, Information Costs, and Economic Organization**” (1972), in Eugene Fama’s “**Agency Problems and the Theory of the Firm,**” and, perhaps most forcefully, in Stephen Cheung’s “**The Contractual Nature of the Firm**” (1983).

Indeed, Cheung goes as far as doubting whether it is at all productive to use the very notion of “the firm”.

Thus, to these authors, it is essentially misleading to draw a hard line between firms and markets; as Cheung’s examples vividly illustrate, there are numerous difficulties of drawing such a line in practice, at least on the basis of economic reasoning. Although firms are surely legal entities, and although this of course has important economic consequences (e.g., limited liability, the right to deduct input purchases from tax statements, infinite lifetime, etc.), firms are nevertheless best as merely special kinds of market contracting. What may distinguish them relative to other market contracts lies primarily in the continuity of association among input owners. We may perhaps talk about a nexus of contracts being more “firm-like” when, for example, residual claimancy becomes more concentrated, but it is not in general productive to talk about “firms” as distinctive entities.

As Alchian and Demsetz (1972) explicitly argue, a consequence of this view is that the distinction between the authority-based and the price-based modes of allocation, so strongly emphasized by Coase (1937), is superficial. In reality, they argue, there is no basic difference between “firing” one’s grocer and firing one’s secretary, and what looks like a long, open-ended employment contract is in reality a cover for a continuous process of implicit negotiation between employers and employees.

However, the reason that the firm is a rather special instance of market contracting has to do with the technology of team production, that is, production with inseparable individual production functions. This implies that marginal products are costly to measure. In turn, this may create a free rider problem since team-production can be a cover for shirking. The solution to this problem is to appoint a monitor who is given the right to fire and hire members of the team, based on his observation of employees’ marginal productivities. Giving him rights to the residual income of the team furthermore means that he is given incentives to perform the efficient amount of monitoring. This arrangement results in the

distribution of rights known as “the classical capitalist firm”. Thus, the firm is explained in terms of the reduction of post-contractual measurement cost.

As has been pointed out many times since the publication of Alchian and Demsetz (1972), their view – and also those of other nexus of contracts writers to the extent that they echo Alchian and Demsetz – raises a number of problems. Thus, it is not clear why the monitor must be the employer of the firm where he performs his monitoring services (Holmström and Tirole 1989). He could be the employee of a firm, specialized in monitoring services. Moreover, why aren't the employees able to monitor each other? Is it plausible that specialization in monitoring eliminates (or strongly reduces) the problem of inseparable individual production functions? Is it really meaningless to speak of authority if the employer/monitor has the right to deprive the employee of the right to work with his tools and equipment to which the employee may be strongly specialized, as suggested by, for example, the property rights perspective developed by Grossman and Hart (1986). Finally, we seem to observe more firms in the real world that can be explained by team-production (e.g., conglomerates).

In spite of such problems, Alchian and Demsetz (1972) must still be considered a seminal contribution, not just because it still heavily cited, but also because it continues to inspire work. For example, Jensen and Meckling's 1976 paper, “**The Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure**”, which may have been even more influential than Alchian and Demsetz (1972), is in many ways an extension of the Alchian and Demsetz reasoning to more fully include the agency problem between owners and managers. However, a crucial difference is that Jensen and Meckling do not think of team-production as essential to explaining the corporation. Instead, the corporation is structured so as to minimize all sorts of agency costs, which they define as 1) the costs of monitoring, 2) bonding costs (i.e., credible commitments), and 3) the residual loss (evaluated relative to the actions that would maximize the principal's welfare). Using this definition, Jensen and Meckling focus on the agency costs of outside equity and debt, and defines optimal capital structure as the combination of debt and equity that

minimizes agency costs. Fama's "**Agency Problems and the Theory of the Firm**" (1980) and Fama and Jensen's "**Agency Problems and Residual Claims**" (1983) are both essentially critiques and extensions of the Jensen and Meckling paper, Fama highlighting the role of the managerial labor markets in disciplining firm management management, Fama and Jensen further elaborating on the division of labour between decision management and decision control.

Thus, much of the nexus of contracts stream has consisted of critical departures from Alchian and Demsetz. However, their paper also inspired formal work. An important example is Bengt Holmström's "**Moral Hazard in Teams**" (1982), itself something of a recent classic. Somewhat in contrast to Alchian and Demsetz, Holmström's discussion is taken up with the (monetary) *incentive problems* of team production.¹⁰ Under the assumption that the monitor is *uninformed* about individual effort levels under team-production, Holmström demonstrates that only under restrictive assumptions will the monitor be able to induce efficient effort levels. He can do this by devising sophisticated incentive mechanisms.

The starting point is the demonstration that in a team-production situation with unobservable effort levels, three rather basic requirements that one can sensibly ask of the incentive system cannot be met. These are Nash equilibrium, budget balancing (that is, the revenues should be fully distributed among the team-members by the incentive system) and Pareto optimality. Specifically, a budget-balancing incentive system cannot reconcile Nash equilibrium and Pareto optimality. The reason? The fact that every team-member equalizes marginal costs and benefits of additional effort, which implies that if one team member's effort generates some extra revenue for the team, he should be given that revenue in order to be properly motivated – but this cannot be done for all team-members under budget-balancing. In this perspective, the central advantage of the firm is that third parties (other units, shareholders) can be made sinks so that the team does not have to balance its budget.

¹⁰ Alchian and Demsetz had argued that a specialized monitor could eventually proxy individual effort levels rather precisely.

Thus, later formal work has lent a good deal of clarity and sophistication to early nexus of contracts insights. However, as the work of Yoram Barzel, for example, chapter 5, **“The Old Firm and the New Organization,”** from Barzel (1997) suggests, the nexus of contracts tradition is far from dead. Thus, Barzel launches a what is essentially a new theory of the boundaries of the firm. In his view, interest should center on the guaranteeing function of equita capital in determining the scope and size of the firm. Indeed, the scope of the firm is defined by its guarantee capital and by the scope of its guarantees. Those contracts whose variability is guaranteed by the equity are “inside the firm”. Owners of capital will only partake of a guaranteeing role if they are able to constrain those (e.g., employees) who can actually cause variability (damaging equipment, injure fellow workers, cause liability problems).

Michael Jensen and William Meckling’s **“Specific and General Knowledge, and Organizational Structure”** (1992) is also testimony that the nexus of contracts research tradition is still vital. They more explicitly bring in the notion of decision rights – which may have been comparatively neglected relative to the notion of residual claimancy in this stream of literature – and combines it with a perspective on local knowledge that is derived from Hayek (1945). Like markets, firms are repositories of local knowledge and a key organizational design problem is getting right the allocation of decision rights which translates into finding the optimal trade-off between losses from agency problems and benefits from a fuller use of local knowledge.

Historically, both nexus of contracts theory and principal/agent theories (or simply, agency theory) are often argued to reach back to early debates on the shareholders/managers relation. Following the observation by Berle and Means (1932) that ownership of US firms allegedly had become separated from management and control, managerialist theories modeled firm behavior as the maximization of managerial objectives (firm size, growth, sales maximization) under a profit constraint (Williamson 1964). The story that was told to rationalize this was that managerial objectives were positively correlated with managerial compensation

and power. The attendant conflict of interest is, of course, an example of an incentive or principal-agent conflict. However, it is perhaps more correct to think of early formal principal/agent work as stemming from work in general equilibrium theory that aimed at bringing the model closer to reality. In particular, formal principal/agent work begins from the assumption that certain states of nature are not observable or verifiable, a line of inquiry often associated with Arrow (1971).

C. Formal Principal/Agent Theory

Thus, formal work on agency theory takes off at about the same time as the nexus of contracts approach, but only fully picked up steam in the nineteen-eighties with all sorts of extensions of the basic model, such as layers of principal/agent relations, multiple agents, agents that carry out multiple tasks, agents that can collude, long term PA setting and much else. Many of these developments are surveyed in Hart and Holmström's 1987 overview paper, "**The Theory of Contracts**". Indeed, in the nineteen-eighties, principal/agent work became virtually synonymous with "contract theory", which, roughly speaking, is the class of formal representations of the situation in which an informed party trades with an uninformed party, and where the private information in question may either concern what the agent does (sometimes called "hidden action") or what his characteristics are (sometimes called "hidden information"). Moreover, the models may be classified according to the timing of the moves in the corresponding games (i.e., if the informed or the uninformed party moves first) (Salanié 1997). Conventionally, one distinguishes between *adverse selection* models (where the uninformed party is imperfectly informed of the characteristics of the informed party); *signaling* models, which has the same informational structure, but where the informed moves first; and *moral hazard* models, in which the uninformed party moves first but is imperfectly informed of the actions of the informed party (ibid.: 4).

A classic early contribution is Stephen Ross' "**The Economic Theory of Agency: The Principal's Problem**" (1973), which presents the problem in its paradigmatic form (and also coined the now standard terminology of principals and

agents). The agency problem (in its moral hazard manifestation) basically stems from a conflict between insurance and incentives. The theory of optimal insurance demonstrates that sharing profit between a risk-neutral principal and a risk-averse agent –the standard assumptions about risk preferences in the literature – has the risk-neutral principal bearing all of the risk (Tirole 1988: 35). This leads to the first-best outcome. However, this is only if incentive issues are set aside (or the agent has no choice of action). In the standard bilateral setting, the principal in fact cannot propose a first-best contract to the agent because the agent's action is assumed not to be verifiable; hence, cannot be written into the contract. The asymmetric information in question may be a matter of either hidden action or hidden knowledge (i.e., the principal does not know some characteristics of the agent that are relevant to the relation).

The (moral hazard) problem then is that the agent selects an action which has random consequences, and those consequences are verifiable, but the action and the state of nature (that both “produced” the consequences) are not. In this case, risk-sharing and incentive considerations will interact. The contract will specify a reward schedule so that the agent is paid by the principal as a function of the verifiable consequences. In general, such a contract will only be second-best. The first best (output maximizing) contract would be to let the agent compensate the principal with a fixed lump sum payment and to be awarded the residual; however, risk aversion on behalf of the agent will rule out this solution.

Holmström's 1979 paper, “**Moral Hazard and Observability**”, is another classic piece of work. He begins with the standard agency idea that when only pay-offs/outcomes can be observed, optimal contracts will be second-best because of the problem of moral hazard. However, creating additional information systems (such as accounting) or in other ways extracting extra information about the agent's actions or states of nature, it is possible to improve on contracts, even though the additional information may be imperfect. Holmström manages to derive a necessary and sufficient condition for additional information to be valuable. This is a clearly an important step towards an economic approach to such important phenomena as

accounting systems or management information systems. Thus, agency theory certainly is helpful for understanding important aspects of real firms' internal organization.

However, the reader may have noticed that in the present collection, principal/agent theory may be under-represented relative to the enormous number of contributions to this stream of research, particularly during the nineteen-eighties. The reason is that strictly speaking, principal-agent theories are not theories of the firm *per se*. Principal/agent theory is probably best understood as an extension of the neoclassical theory of the firm that inquires into the incentive conflicts that may hinder the firm from reaching its production possibility frontier. However, the reward schedules that may modify the effects of asymmetric information are independent of any particular organizational structure. In principle, a reward schedule for a legally independent supplier firm may be completely identical to an employee reward schedule. Thus, principal/agent doesn't allow us to discriminate between inter-firm and intra-firm transactions.

Nevertheless, principal/agent theory has brought a wealth of insights that are helpful for understanding contractual arrangements in general and the internal organization of firms in particular. However, sometimes the theory has been helpful in a rather paradoxical way, namely by pointing to phenomena that are clearly anomalous to economic reasoning and which therefore represent a challenge. An example is provided in Holmström and Milgrom's very rich 1991 paper, "**Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design**". They wonder why the payment schemes that are actually established by firms are often so different (usually much simpler) from what theory would predict. For example, why are incentives in firms often "low-powered" (to use Williamson's 1985 terms) and why do firms rely so much on fixed wages, even when good output measures are seemingly available? The answer essentially turns on agents working on multidimensional tasks or agents working on multiple tasks. In this situation, incentive pay not only influences efforts and allocates risk; it also directs the effort of agents among tasks. Some possibly essential tasks (or

dimensions of a task) may be very costly to measure for the principal; as a result, the principal risks that the agent will allocate all his effort to tasks (dimensions of a task) that are easier to measure. If principals want agents to allocate effort to all tasks (dimensions of a task), they may be better off offering a fixed wage, that is, low-powered incentives.

This line of reasoning is continued and extended in a later paper by the same authors, "**The Firm as an Incentive System**" (1994). Holmström and Milgrom here stress the importance of viewing the firm as "a system", specifically as a coherent set of complementary contractual arrangements which mitigate incentive conflicts. In their opinion, it is misleading to focus on any one single aspect of the coherent whole: the firm is characterized by the employee not owning the assets, by the employee being subject to a low-powered incentive scheme, and by the employee being subject to the authority of the employer. These "incentive instruments" are complementary: For example, in the presence of measurement costs, it is important that a person who does not own the assets which he uses is not subject to high-powered incentives, since he then is likely to care too little for the assets. Likewise, low-powered incentives make it important for the employer to be able to exercise authority over the use of the employee's time, since the employee will lack the proper incentive to be productive. Due to this complementarity it is logical that independent contracting has the exact opposite constellation of instruments from the employment relationship.

The choice between the two different incentive systems depends importantly on the extent to which every dimension of a person's contribution can be measured. When an important dimension is unmeasurable, it might be counterproductive to remunerate the person through a high-powered incentive scheme since the person is likely to allocate too little attention on the unmeasurable activity. Thus, according to Milgrom and Holmström lack of measurability is an important variable determining the size of the firm (see also Barzel 1997). They cite empirical evidence that sales-agents (the sum of whose productive contributions can be measured with relatively high accuracy) are independent and vice versa.

It should be mentioned that the Milgrom and Holmström model also incorporates the importance of the allocation of property rights to physical assets in determining bargaining powers and hence incentives, as in the class of models I consider later, those associated with the work of Williamson and Grossman-Hart-Moore model. Hence, it is not only a principal-agent but also an incomplete-contracting theory, and perhaps a sign of an increasing awareness of the need to join ideas from the complete contracting tradition with ideas from the incomplete contracting tradition. In that tradition, to which we will turn in a moment, the notion of authority has traditionally been very important, authority being understood as the right to pick some action that affects part or the whole of an organization (Simon 1951). However, the *right* to decide need not confer effective *control* over decisions, as Aghion and Tirole point out in “*Formal and Real Authority in Organizations*” (1997). In their story, which is indebted to the work of sociologist, Max Weber, *real* authority is determined by the structure of information in the organization. An increase in an agent’s real authority is assumed to promote initiative, but also to lead to control losses from the point of view of the principal. So there is a basic trade-off here that is quite akin to the analysis in Jensen and Meckling (1992).

D. Incomplete Contracts: The Coordination Perspective

This stream of research may be rationalized as highlighting an otherwise neglected aspect of Coase’s analysis in to a specific passage in “**The Nature of the Firm**”. After pointing out that the nature of the firm consists largely in substituting an employment contract for a spot contract in output, Coase suggests that the real costs of contracts may lie in their inflexibility. “It may be desired to make a long-term contract for the supply of some article or service,” he 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.)

A close reading of this passage suggests that Coase’s explanation for the emergence of the firm is ultimately a *coordination* one: the firm is an institution that lowers the costs of coordination in a world of uncertainty (see further Langlois and Foss 1998). Of course, this view is closely tied to the view of the employment contract as the defining characteristic of the firm.

As Herbert Simon (1951) points out in “**A Formal Theory of the Employment Relationship**”, an employee is distinguished from an independent contractor by the nature of his contract: While the employee is subject to the authority of the manager of the firm, an independent contractor acts autonomously. In his paper, Simon compares the employment contract and the market contract thus understood in terms of efficiency. Whereas the market contract specifies the action to be performed in the future and its price, the employment contract specifies a range of acceptable orders and establishes the right of the employer and the duty of the employee to accept orders within this range (“the zone of acceptance”). As in Coase, the advantage of the employment relationship lies in its flexibility. The action of the employee can be adapted to whatever state of nature will occur. Intuitively, the benefit of flexibility is greater the greater the uncertainty; the employment contract may in other words confer the benefits of real options, as Brian Loasby suggests in “**Organisational Capabilities and Interfirm Relations**” (1994). Simon also points

out that the employment relationship is to some extent reliant upon the employer's reputation for not abusing his authority, a theme later pursued by David Kreps in "**Corporate Culture and Economic Theory**" (1990; see also Kreps 1996). The need for trusting the employer is less if the employee is nearly indifferent between different tasks.

Many of these ideas are treated in Birger Wernerfelt's "**On the Nature and Scope of the Firm: A Adjustment Cost Theory**" (1997). Wernerfelt portrays governance mechanisms as gameforms chosen by rational agents to regulate their relations. The gameforms determine how players adapt to changes in the environment and communicate about these changes. His conjecture here is that different gameforms will be systematically characterized by different levels of costs of making adaptations. For example, in the case of the hierarchy, the employer and the employee avoid the costs of negotiating either a very complex agreement or a series of short term contracts. Instead, the parties negotiate a once-and-for-all wage contract. In this context, authority is simply an implicit contract which states that one of the parties should have the authority to tell the other what to do (as in Coase 1937). This gameform requires less bargaining over prices than the market gameform. The employment relationship is hence a game-form which parties decide to adhere to in order to save on communication (adaptation) costs. The agreement to play by the least costly adaptation-mechanism is upheld by the parties' concern for reputation in a repeated game.

E. Incomplete Contracts: The Asset Specificity/Property Rights Perspective

Incomplete contracts theory of either the asset specificity (Williamson and various associates) and the property rights (Hart and various associates) may both be understood as ways of making Coase's basic ideas "operational" (in Williamson's terms), and doing this by combining, as it were, ideas from the previous streams that we have considered here. Thus, from the nexus of contracts and the principal/agent theories comes the assumption of morally hazardous behavior – or "opportunism" – and from Coase and Simon comes the idea of incomplete contracts. The main

critique of these other approaches is that the ideas of Coase and Simon are not sufficient to discriminate between alternative types of economic organization because they suppress the notion of moral hazard/opportunism, and the nexus of contracts/principal-agent perspectives are criticized for the reliance on complete contracting. These theories all fail to consider the organizational implications of *ex post* opportunistic behavior in the presence of relation-specific investment – the main focus of interest of the theories considered in this section.

Williamson

In a string of influential contributions, Williamson (e.g., 1971, 1975, 1985, 1996) has built an impressive theory that while built on Coasian foundations also incorporate ideas from psychology and contract law.

The behavioral starting points in Williamson's theorizing are, first, Herbert Simon's concept of *bounded rationality*, which to Williamson implies the presence of contractual incompleteness and a need for adaptive, sequential decision-making. Second, there is *opportunism*, which is defined as "self-interest seeking with guile". The implication of opportunism is that contracts will often need various types of safeguards, such as "hostages" (e.g., the posting of a bond with the other party). Williamson's term for contracts and the safeguards they embody is "governance structures", and the basic idea is to assign transactions to alternative governance structures on the basis of their transaction properties. Having primarily focused on markets and hierarchies as the predominant governance structures (cf. Williamson 1975), Williamson has in the last decade to an increasing extent directed attention to intermediate forms (such as joint-ventures or franchising), what he calls hybrids (Williamson 1991). These three basic types of governance structures are seen as outcomes of economizing decisions, involving multi-dimensional transactions.

In addition to uncertainty (which is "frozen"), the dimensions of transactions that are primarily determinative of the costs of those transactions are frequency and asset specificity. The first contribution to emphasize the importance of asset specificity is, however, not to be found in Williamson's but is rather Klein, Crawford and Alchian's 1978 paper, "**Vertical Integration, Appropriable Rents, and the**

Competitive Contracting Process”, in which the importance of asset specificity is linked to the concept of appropriable quasi-rent:

Assume an asset is owned by one individual and rented to another individual. The quasi-rent value of the asset is the excess of its value over its salvage value, that is, its value in its next best *use* to another renter. The potentially appropriable specialized portion of the quasi rent is that portion, if any, in excess of its value to the second highest-valuing *user* (Klein, Crawford and Alchian 1978:).

Following Klein, Crawford and Alchian, asset specificity has increasingly become the central character in Williamson’s analysis. Specific assets open the door to opportunism. If contracts are incomplete due to bounded rationality, they must be renegotiated as uncertainty unfolds, and if a party to the contract (say, a supplier firm) has incurred sunk costs in developing specific assets (including human capital), that other party can opportunistically appropriate an undue part of the investment’s pay-off (“quasi-rents”) by threatening to withdraw from the relationship. This situation leads to a Pareto-inferior outcome, for example, a no-trade outcome.

In Williamson’s work, the problem is often portrayed as essentially informational: it is defective information that is at the root of the inability of independent agents to establish efficient contracting. A Pareto-improvement may then be brought about vertical integration, as discussed already in Williamson’s 1971 paper, **“The Vertical Integration of Production: Market Failure Considerations”**. As he explains internal organization may realize certain advantages over market contracting

... when conflicts develop, the firm possesses a comparatively efficient resolution machinery. To illustrate, fiat is frequently a more efficient way to settle minor conflicts (say differences of interpretation) than is haggling or litigation (Williamson 1971: 114).

Although it has been present in Williamson's work from the beginning, this advantage in particular has come to play an increasing role in Williamson's work. Thus, he argues that internal organization is characterized by its own implicit contract law, what he calls "forbearance". Whereas divisions will not normally be granted standing for a court, corporate headquarters and headquarters function as the firm's "ultimate court of appeal". For example, in "**Comparative Economic Organization: The Analysis of Discrete Structural Alternatives**" (1991), Williamson points out that disputes which arise within the firm, for example, between different divisions, may be easier to resolve than disputes arising between firms which sometimes require the use of the court-system.

The upshot of Williamson's theory of the firm essentially is that there more to integration than simply the concentration of ownership rights: authority partakes of an important role as arbitrator in the face of conflicts and disputes over unforeseen contingencies, and there is a qualitative and quantitative differences between the information structures that are available under market contracting and those that are available in the firm. It is essentially these claims that are disputed by the (new) property rights theorists of the firm.¹¹ In the words of Grossman and Hart (1986: 691):

... the transaction cost-based argument for integration does not explain how the scope for such behaviour changes when one of the self-interested owners become an equally self-interested employee of the other owner.

Hart: The New Property Rights Approach

As already indicated, the ideas elaborated by Oliver Hart, John Moore and others over the last fifteen years or so may be seen as a formal version and development of elements found in Williamson's work, although there are also subtle, but nevertheless important, differences. Two classic contributions to this stream that are included in the present collection are Grossman and Hart's "**The Costs and Benefits**

¹¹ "New" to distinguish these theorists from "older" property rights theorists such as Coase, Alchian, Demsetz, etc.

of Ownership: A Theory of Vertical Integration” (1986) and Hart and Moore’s **“Property Rights and the Nature of the Firm”** (1990).

As in Williamson’s work, a central assumption is that because of transaction costs/bounded rationality, contracts must necessarily be incomplete in the sense that the allocation of control rights cannot be specified for all future states of the world. Following legal convention, *ownership* is defined as the possession of residual rights of control, that is, rights to control the uses of assets under contingencies that are not specified in the contract. Somewhat more precisely, one may say that by control is here meant the ability to exclude other agents from deciding on the use of certain assets. It is these control rights that according to Hart and his associates determine the boundaries of the firm: a firm is defined as a collection of jointly owned assets.

The basic distinction between an independent contractor and an employee, that is to say, between an inter-firm and an intra-firm transaction, turns on who owns the physical assets which the agent utilizes in his work. An independent contractor owns his tools etc., while an employee does not. The importance of asset ownership derives from the fact that the willingness of an agent to undertake a *non-contractible* investment (say, exertion of effort or investment in human capital) which is specific to the asset depends on who owns the asset. If the agent who undertakes the investment does not own the asset, she may, as in Williamson’s work, be subject to a hold-up by the owner. On the other hand, the ability to deprive an agent of the piece of capital with which she works (and to which she may be heavily specialized) is what provides a room for authority.

Efficiency then dictates that the agent who is to make the most important (non-contractible) asset-specific investment should own the asset. It is not that opportunism can be avoided by internal organization/integration *per se*. Integration may shift incentives for opportunistic behaviour, but it does not remove such incentives. Given this, one should choose the ownership arrangement that *via* its impact on incentives minimizes the consequences of opportunism.

Extensions

Relative to the work of Williamson and his associates, the main contributions of the (new) property rights theory consist in clearer definitions of the boundaries of the firm and authority, and an arguably improved understanding of the issue of “who should integrate whom”, all of which is cast consistently in terms of the single unifying principle of maximizing joint surplus from a relation through the choice of ownership rights.

On the other hand, one may argue that much of the richness in Williamson’s theorizing has been sacrificed on the altar of formalization (see Kreps 1996). In particular, the stress put by Williamson on ex post governance is almost completely lost in the property rights theory. Some of this may hinge on the different behavioral assumptions that underlie the two theories.¹² Incomplete contract theorists explicitly deny the need for a notion of bounded rationality (cf. Hart 1990). In contrast, to Williamson contractual incompleteness is clearly derived from bounded rationality, whereas to the property rights theorists it is a matter of an assumed non-contractability of the use of the assets in a relation. In the latter case, a Pareto-improvement may be brought about by reallocating residual rights of control, but changes in organization structure and other information channels are not likely to have welfare consequences. To Williamson, on the other hand, organization structure and information channels very strongly influences the boundedness of rationality (Williamson 1970). By economizing on rationality, organization structure (which may be influenced by integration) may have welfare consequences.

The point that ex post governance considerations do not loom large in the property rights theory is related to relative neglect of the employment relation in the theory. Although the theory provides a strong reason for the difference between being employed by a firm and being self-employed, employees are not, strictly speaking, part of the firm in the property rights story (because employees cannot be owned). But as Rajan and Zingales point out in “**Power in a Theory of the Firm**” (1998: 388), “... there is a sense in which employees ‘belong’ to an organization ... This sense of belonging arises from the expectation ‘good citizens’ of an organization

have that they will receive a share of future organizational rents”. This sort of belonging can be rationalized by invoking the concept of “access”, which means that agents are allowed to work with critical resources, specialize themselves relative to these resources and and make themselves valuable in this way. Since a specialized employee can control her own specialized human capital, she now has additional power, although she doesn’t possess more residual rights of control. In this story, access may sometimes provide better incentives than ownership.

Rajan and Zingales elegantly manage to incorporate relatively “soft” aspects of organizations, such as power and the development of capabilities, into the incomplete contracts approach. In general, there are clear opportunities to make room for softer aspects of organization in the context of the incomplete contracts approach. When it is difficult to write complete state-contingent contracts, for example, when certain variables are either ex ante unspecifiable or ex post unverifiable, people often rely on “unwritten codes of conduct”, that is, on implicit contracts. These may be self-enforcing, in the sense that each party lives up to the other party’s (reasonable) expectations from a fear of retaliation and breakdown of cooperation.

This is exactly the line of inquiry pursued in David Kreps’ **“Corporate Culture and Economic Theory”** (1990). Roughly, Kreps argues that employers and employees may be seen as playing a prisoners dilemma-game, that with repeated plays a cooperative norm – which is interpreted as corporate culture – may be established, and that this established norm tells employees (as well as outside contractors) that firm management will not opportunistically take advantage of them. The firm is seen in Kreps’ paper, not as a collection of physical assets but rather as a carrier of reputation capital. However, although Kreps certainly takes important steps towards incorporating “softer” aspects of organization, he doesn’t break with the basic heuristic of conceptualizing the firm as an institution that exist on account of its ability to dampen incentive conflicts. That important insights in

¹² To some extent, this also relates to the formalization issue, since bounded rationality is notoriously hard to put in formal terms.

firm organization may be reached without any reference to incentive conflicts is a main theme in next section's set of theories.

A different way of incorporating softer aspects of organizations that also stays relatively close to the spirit of the incomplete contracts/new property rights approach is provided by Benjamin Klein in "**Vertical Integration as Organization Ownership**" (1988). However, he argues that rather than focusing on individual human or physical assets in the analysis of the boundaries of the firm, attention should be directed to what "organization ownership". It may be granted that there are important legal differences between using an employee and using an independent contractor, but the employer-employment relationship is not, Klein argues, the essence of the firm (cf. also Coase 1991a). Striking a Hart-like chord, it is simply unclear what a transition from, say, an arms-length market transaction to an employment relation accomplishes, particularly when human capital is inalienable. Klein's answer to the puzzle is that vertical integration may imply a certain degree of ownership of human capital after all. For an organization can obtain ownership of another organization's organization capital, that is, the firm-specific knowledge embodied in the organization's team of employees (what is sometimes called "capabilities"). This can alleviate the hold-up problem, for the simply reason that it is (after integration) hard for the now integrated team to hold up the acquiring organization. The costs of collective action may be prohibitive and the hold-up attempt may be illegal. The focus on team and team knowledge lead naturally to a different stream in the modern theory of the firm, namely the view of the firm as an information processor.

F. The Firm as an Information Processor

The conceptualization of the firm as an information processor may be rationalized as a response from economics to the organization theory perspective(s) (e.g., Simon and March 1958) that one important function of the firm is too adapt to and process new information. In this perspective, the essence of organization is coordinated response to outside variability. To the extent that "new information" (often in conjunction

with bounded rationality) is stressed in this understanding, one may argue that in terms of the complete/incomplete contracting schism, the view of the firm as an information processor belongs to the incomplete contracting camp (Radner 1996).

In most versions, the information processing view of the firm it builds rather directly on the early work by Marschak and Radner (1972), a classic contribution on team-theory that was published at about the same time that work on the theory of the firm in general began to take off. This book pointed to an approach to economic organization that was completely different from the nexus of contracts view or the transaction cost view that developed simultaneously. It is a view in which incentive conflicts are disregarded, or at least assumed to have been solved, so that the members of an organization share the same organizational goals. For some time enthusiasm over the new theories of the firm that all centered on incentive-conflicts swamped interest in team-theoretic issues, but recently interesting work that focuses on coordination in a team-theoretic framework has emerged. Some of the best of this recent work is included here.

On the overall level, it is characteristic of these contributions that instead of incentive conflicts, the information acquiring and processing activities and capabilities of members of the organization are modelled. Perhaps more explicitly than in most other theories of the firm, in the information processing view the firm is seen as being located in a changing and uncertain environment, information about which must be collected, processed and possibly disseminated by organization members who are less than perfect in carrying out these activities. In other words, attentional and processing capacities are modeled as scarce resources, which is one way of coming to grips with the notion of bounded rationality. And one advantage of organization in this view is that it can economize on bounded rationality by making members specialize in collecting and processing different types of information.

More precisely, the firm is seen as a communication network that is designed to minimize both the cost of processing new information and the costs of communicating this information among agents. Communication is costly because it

takes time for agents to absorb new information sent by others, but this time may be reduced by specializing in the processing of particular types of information. For example, in Bolton and Dewatripont's 1994 paper, "**The Firm as a Communication Network**", each agent handles a particular type of information, and the different types of information are aggregated through the communication network. When the benefits to specializing outweigh the costs of communication, teams (firms) arise. And the trade-off between specialization and communication helps determining the optimal size of the team/network. Moreover, Bolton and Dewatripont argue that in order to economize on overall communication costs, an efficient network must have a centralized design in the shape of a pyramidal form, because centralization avoids duplicative communication (each agent send his information to at most one other agent). The hierarchy is one such pyramidal form. Thus, Bolton and Dewatripont take an important step towards a team theory-based answer to the main questions of the theory of the firm, that is, the issues of the existence, boundaries and internal organization of the firm.

However, it must be admitted that team theory-based work on the theory of the firm is at its strongest when it comes to analyzing the internal organization of the firm, such as organization structure. Important representatives of such analysis are Masahiko Aoki's paper, "**Horizontal vs Vertical Information Structure of the Firm**" (1986), Jaques Cremer's "**Common Knowledge and the Coordination of Economic Activities**" (1990), and Martin Carter's "**Information and the Division of Labour: Implications for the Firm's Choice of Organisation**" (1995). Aoki uses team theory to compare two types of organization structure, namely the more formal hierarchies typifying US firms on the one hand and the more informal organizational structures characterizing Japanese firms. In the former structure, management is assumed to possess perfect a priori knowledge of the technological possibilities of shops but it is incapable of perfectly monitoring various unexpected events that may influence these technologies and is also incapable of rapidly implementing corrective actions at the shop level. In the latter structure, on the other hand, production decisions are rather coordinated horizontally, that is, among semiautonomous shops that are assumed to have only imperfect a priori knowledge of technologies. On the other

hand, they gradually learn how to respond to emergent events by better using on-the-spot knowledge.

Carter's paper links up with Aoki's but suggests a much broader repertoire of organizational possibilities and is more detailed with respect to the analysis of which information is available to individuals and how they process this information. For example, there is a possibility of observational errors, which taken together with the variability of what agents observe and the expected economic value of observations determine the firm's overall pay-off. However, the pay-off is influenced by the differences in the information that is available to firm members and how information is transmitted, that is, on organization structure. Finally, Cremer addresses what is a clear complement to these models, namely the need for a body of shared knowledge that can help coordinating local decisions, which, he suggests, may be interpreted as a representation of corporate culture. However, such bodies of shared knowledge (codes, standards....) are very costly to develop and costly to change. They therefore help accounting for the observed persistence in firms' strategies (for example, with respect to diversification). These phenomena are main points of interest in the next set of theories to be considered.

G. Knowledge-Based Perspectives

The origins of what has become known as “the knowledge-based perspective”¹³ are to be found in many different fields of inquiry, most of them in the borderline between economics and business administration, such as strategy research, international business and technology studies. The perspective also draws heavily on evolutionary economics (Nelson and Winter 1982), as explained in Dosi and Marengo's “**Some Elements of an Evolutionary Theory of Organizational Competences**” (1994). On the other hand, a knowledge conceptualization of the firm helps addressing the issues of “**Why Do Firms Differ, and How Does It Matter?**”, to use the title of Richard Nelson's 1991 paper. A theory of essential firm

¹³ The perspective is sometimes also referred to as “the capabilities”, or “competence” or “resource-based” perspective.

heterogeneity, supplied by the knowledge-based approach, is a necessary component of evolutionary stories of industry dynamics, because these are stories of population dynamics. The link to strategy research has to do with the emphasis on knowledge assets: if firms control different knowledge asset, these are also likely to be associated with different efficiencies; thus, some of these may yield long-lived rents.

The perhaps first comprehensive statement of its main themes appears already in Edith Penrose's "**Research on the Business Firm: Limits to the Growth and Size of Firms**" (1955). As Penrose explains, firms may be understood as collections of resources and services derived from these resources, all organized under an administrative framework. A main argument in the paper (and also in her 1959 book) is that such a conceptualization is necessary for understanding the growth processes and diversification activities of firms. Through various learning processes, mostly on the level of the management team, existing activities are routinized and therefore releases resources. These excess resources can then be used as a stepping stone for related diversification, and we have a basic story of the multiproduct firm.¹⁴

However, as David Teece points out in "**Towards an Economic Theory of the Multiproduct Firm**" (1982) this story only holds when combined with transaction cost reasoning that identify the market failures that hinder excess resources being traded rather than used internally. In "**Understanding Corporate Coherence: Theory and Evidence**" (1994), Teece, Richard P. Rumelt, Giovanni Dosi, and Sidney Winter further elaborate a Penrosian story of the horizontal boundaries of the firm, and finds empirical evidence for it.

After Penrose, the next step forward in the development of the knowledge-based perspective, is represented by G.B. Richardson's 1972 paper, "**The**

¹⁴ And since learning processes are going on continuously, excess resources are produced on an equally continuous basis and there is no optimal size of the firm. However, because of the managerial constraint (new managers need to be socialized into the firm), there may be an optimum rate of growth of the firm. This is sometimes called "the Penrose effect".

Organisation of Industry". He introduces the term "capabilities" to talk about the necessarily limited range of productive knowledge firms and individuals possess. 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 both a technical and an economic sense) in that they are connected in the chain of production and therefore need to be coordinated with one another. Juxtaposing different degrees of similarity against different degrees of complementarity produces a matrix that maps different types of economic organization. For example, closely complementary and similar activities may be best undertaken under unified governance.

Richardson thus suggests that capabilities are determinants of the boundaries of the firm. This is a theme that is also pursued in Harold Demsetz' "**The Theory of the Firm Revisited**". Demsetz argues, first, that the existence of the firm can be explained in terms of letting the more informed direct the less informed. This saves on the costs of transmitting knowledge. Second, the boundaries of the firm can be explained in much the same way, since one way to economize on knowledge transmission costs is to produce and sell goods that do require less information to use than is required to produce them. Thus, the knowledge required to make use of steel (to use Demsetz' example) may be vastly different from the knowledge required to produce steel; therefore, steel is sold. The exchange of title to goods is thus dependent on the allocation of specialized production knowledge. More specifically, economic organization may be rendered intelligible in terms of economizing with expenditures on transmitting knowledge – ideas that Demsetz argues are alternative to transaction cost economics. In particular, the assumption of opportunism is not necessary to explaining economic organization. Building on, and extending, Demsetz' reasoning, Conner and Prahalad in their 1996 paper, "**A Resource-based Theory of the Firm: Knowledge Versus Opportunism**", argue that the organizational mode through which individuals cooperate influence the amount, type and quality they apply to productive activities. This is almost as far as one can

get from the Hart position that what matters is property rights to physical assets and that information structures may be chosen endogenously.

The upshot of these contributions is that problems of economic organization may crucially reflect the possibility that a firm may control production knowledge that is, in important dimensions, strongly different from what others control rather than incentive conflicts. Thus members of one firm may quite literally not understand what another firm wants from them (for example, in supplier contracts) or is offering them (for example, in license contracts). Because of the extreme specificity and tacitness of much productive knowledge, one firm may have difficulties understanding another firm's capabilities; and both firms separately and together may know more than their contracts can tell. In this setting, the costs of making contacts with potential partners, of educating potential licensees and franchisees, of teaching suppliers what it is one needs from them, etc., become very real factors determining where the boundaries of firms will be placed.

In "**Transaction-Cost Economics in Real Time**" (1992), Richard Langlois coin the term "dynamic transaction costs" for these costs, and argue that they are in a different category from the transaction costs usually considered in the literature; they don't stem from incentive conflicts, but rather from all sorts of communication problems between firms. In his story, coordination problems may arise because capabilities exhibit too much "friction": the knowledge, skills, and traditions embodied in existing governance structures (be they firms, markets, or hybrids) may be too inflexible, especially in the face of major "Schumpeterian" change, to seize market and technological opportunities. In such circumstances, other governance structures that can muster the necessary capabilities may arise and prosper. For example, large-scale, systematic innovation (innovation that involves neighbouring stages of production) may often only be undertaken by the vertically integrated corporation; the dynamic transaction costs of using the market are prohibitive.

H. Perspectives from Business History and Firm Strategy

That important connections exist between the theory of the firm and strategy research may be indicated by the fact that the knowledge-based perspective, which was reviewed in the preceding section, has largely been developed in the intersection

between strategy research and economics. The development of the knowledge-based perspective may be seen as part of broader tendency in business administration to increasingly rely on reasoning from economics. Particularly in strategy research, it is an increasingly widespread conviction that economic theories of the firm constitute a set of perspectives that is particularly helpful for informing research here, as discussed in Anju Seth and Howard Thomas' **"Theories of the Firm: Implications for Strategy Research"** (1994).¹⁵ Consider Rumelt, Schendel and Teece's (1994: 9) discussion of firm strategy:

Because of competition, firms have choices to make if they are to survive. Those that are *strategic* include: the selection of goals; the choice of products and services to offer; the design and configuration of policies determining how the firm positions itself to compete in product markets (e.g., competitive strategy); the choice of an appropriate level of scope and diversity; and the design of organization structure, administrative systems, and policies used to define and coordinate work ... It is the integration (or reinforcing pattern) among these choices that makes a set a strategy.

The modern economics of organization has clearly something to offer with respect to a number of these choices, particularly those having to do with the design of internal organization, obviously a favorite theme in the principal-agent branch of the modern economics of organization. And issues relating to, for example "scope and diversity" may be treated in terms of the issue of the boundaries of the firm. In theory of the firm, as we have seen, the boundaries of the firm are normally defined in terms of ownership: if firm A has ownership rights over asset a and firm B does not, asset a is inside the boundaries of firm A and outside the boundaries of firm B. More generally, the boundaries of firm A are defined by those assets that firm A owns.

¹⁵ The beginning of this conviction may perhaps be found in Rumelt (1984). He argued that "... it appears obvious that the study of business strategy must rest on the bedrock foundations of the economist's model of the firm" (1984: 557), this model being defined by the transaction cost economics of Coase (1937) and Williamson (1975).

The issue of the boundaries of the firm relates to a number of strategic issues, such as the firm's sourcing of resources (e.g., internal or external procurement of technology), supplier relations, the terms at which resources are acquired (e.g., the firm may internalize activities if it can carry them out more cost efficiently), appropriation of rents (e.g., internalization may be an appropriation strategy), etc. To put it briefly, virtually all issues of corporate strategy, and many of business strategy, involve the boundaries of the firm.¹⁶

A specific example of the use of modern theories of the firm is Torger Reve's "The Firm as a Nexus of Internal and External Contracts" (1990) which in fact manages to draw not only on principal/agent and transaction cost economics, but also on the knowledge-based perspective. Reve uses these theories to argue that the efficient boundaries of the firm are determined not only by incentive issues but also by knowledge-based considerations. Whereas Reve thus finds much merit in, for example, transaction cost economics, Ghoshal and Moran, in the two twin papers included here, "**Bad for Practice: A Critique of Transaction Cost Theory**" (1996) and "**The Essence of the Megacorporation: Shared Context, not Structural Hierarchy**" (1995), strongly criticize particularly Williamson's brand of transaction cost economics. They argue that transaction cost economics is likely to be "bad for practice", because treating people with the cynical expectation induced by transaction cost economics, namely that they are in fact potential opportunists, is likely to turn into a self-fulfilling prophecy. From this perspective,

Rational control and blunt incentives – the two handmaidens of hierarchy – impede the development and utilization of local knowledge for local initiatives, whereas the sharp incentives of markets limit the lateral sharing of knowledge (Ghoshal, Moran and Almeida-Costa 1995: 752).

Indeed, empirical evidence from big companies (the authors mention Asea-Brown-Boveri), purportedly suggest that these companies do not fundamentally use

¹⁶ However, not all strategic choices are easily treated within the economics of organization. This is the case of, for example, choices relating to the selection of goals, the choice of products and services to offer, and last, but certainly not least, the issue of how to establish "... the integration (or reinforcing pattern) among these choices that makes a set a strategy" (I return to this issue later).

“rational control and blunt incentives” in the workings of their internal organization. Rather, they try hard to construct a “shared context”, that is, an internal institutional context that not only act as a coordinating device, but more fundamentally influence the values and ambitions of employees. Firms that aim at combining low-powered incentives with such a shared context have a competitive advantage relative to firms that rely on more blunt incentive mechanisms and on monitoring employees.

The Ghoshal and Moran papers exemplify that the firm strategy field not just *uses* economic theories of the firm but also provide feedback and critical reactions. Alfred Chandler’s 1992 paper, “**Organizational Capabilities and the Theory of the Firm**”, is a striking example. Once an enthusiastic supporter of transaction cost economics, this *doyen* of business historian now endorses a more explicitly knowledge-based view. As he argues, it is “... the specific nature of the firm’s facilities and skills [that is] the most significant factor in determining what will be done in the firm and what by the market” (p.86), that is, essentially the argument made by capabilities theorists such as Richardson. An application of this argument to a set of concrete historical episodes is done in Langlois and Robertson’s “**Explaining Vertical Integration: Lessons from the American Automobile Industry**” (1989). Somewhat in contrast to Chandler and Langlois and Robertson’s reasoning, Raff and Temin in “**Business History and Recent Economic Theory: Imperfect Information, Incentives, and the Internal Organization of Firms**” (1991) suggest that recent contract theory is actually helpful to the business historian.

IV. Concluding Comments

Having surveyed a number of streams of research in the modern theory of the firm, it is time to end up by briefly speculating on where the theory of the firm may go in the future. It is hard to take issue with the claim that that the modern theory of the firm (or broader, of economic organization) represents one of the important instances of scientific advance in economics during the last two decades. One may argue that the reason it is hard to argue against this is for the simple reason that the theory of the firm is merely a part of a broader attempt to expand the coverage of economics

and refine its tools. There is some truth in this view; however, it does neglect the extent to which work on the theory of the firm has often lived a life of its own and underestimates the very accomplishment of coming scientifically to grips with a central economic phenomenon that for a long escaped both the interests of economists and their abilities.

Although one may thus feel justified in hailing the modern theory of the firm as a major scientific step forward, the theory has certainly received a fair dose of criticism, some of which, for example, from traditional sociologists and marxists, is *external* in nature, being based on completely different underlying perspectives. Traditionally, economists have given short shrift to this kind of critique. It may be harder to neglect the sort of critique put forward by key persons in the development of the theory of the firm.

For example, Ronald Coase (1991) strongly criticized the reliance in the perhaps dominant theory of the firm – the Williamson-Hart view – on asset specificity and opportunism, and argued that modern theories of the firm does not make adequate provision for the activity of managing. Although Coase did not go into the issues in detail, the thrust of his critique is that neither opportunism nor specific assets are needed to tell a convincing story about why there should be firms in a market economy. A related critique has been forward by Demsetz (1988). And in their paper “**Economic Theories of the Firm: Past, Present, and Future**”, Paul Milgrom and John Roberts (1988: 450), surely two of the most important formal contributors to the modern theory of the firm, made the following observation and prediction:

The incentive based transaction costs theory has been made to carry too much of the weight of explanation in the theory of organizations. We expect competing and complementary theories to emerge - theories that are founded on economizing on bounded rationality and that pay more attention to changing technology and to evolutionary considerations.

This is an “internal” critique, whose importance should not be underestimated. First, Milgrom and Roberts clearly indicate (ten years ago!) that the incentive conflict heuristic may exhibit strongly decreasing returns. Second, and related, they point to

the possible emergence of alternative theories that are founded on different modeling heuristics. With respect to the first issue, Milgrom and Roberts warning has not produced resonance among mainstream researchers in the theory of economic organization; the incentive conflict heuristics continues to hold sway of the field, although there has lately been some renewed interest in team-theory. With respect to the second issue, we may perhaps think of the knowledge-based perspective as representing a set of competing and complementary "... theories that are founded on economizing on bounded rationality and that pay more attention to changing technology and to evolutionary considerations". Indeed, one may think of the major themes of the knowledge-based perspective as virtually identical to the soft spots of the mainstream theory of economic organization. What are these soft spots? A brief catalogue of these may include

- the relative inattention paid to issues of management, strategy and leadership (Coase 1991; Miller 1992);
- the over-concentration on transaction costs to the near exclusion of production costs which are taken as identical for the same task across a population of firms when in reality firms are likely to have different production costs for the "same" task (Demsetz 1988; Langlois and Foss 1998);
- the lack of attention to path-dependency which may lead the theorist to think of organizations as much more flexible than they in reality are (Winter 1988);
- the lack of attention to determinants of economic organization that are not related to incentive conflicts, such as information processing and organizational "codes", "languages", etc.;
- the tendency to take a too piecemeal approach, whereby transactions are examined one at a time so that the interaction effects among transactions are missed (Winter 1988), and last, but certainly not least,
- the neglect of organizational learning (cf. Williamson 1998) and other dynamic phenomena and issues, such as innovation (Williamson 1985).

It is striking that most of the soft spots can be reduced or related to the bounded rationality issue. Thus, many of the above points have to do with heterogeneity among firms (e.g., path-dependence, different production costs) and coordination that is not necessarily a matter of getting the incentives right, but perhaps rather in, for example, creating a shared context for intra-firm agents. Learning and innovation rather clearly involves the bounded rationality. In general, there are powerful arguments why economists must ultimately come to grips with bounded rationality (Conlisk 1996), such as the well-known infinite regress problem in connection with the optimal collection of information, the fact that real agents often violate the axioms of basic decision theory, etc.

The relevance of ideas on bounded rationality may be illustrated by a fundamental problem in much of the modern economics of organization: How are efficient types of organization selected in reality? It is a basic postulate of the modern economics of organization that real-world agents will indeed structure their dealings in accordance with the theory's predictions (e.g., Williamson 1985). But how can this be justified? One idea has been to rely on (untheorized) selection forces that weed out ill-adapted types of economic organization. We now know that social selection forces cannot in general be relied upon to produce efficient results. The other main approach is to simply assert that agents can rationally calculate pay-offs associated with alternative types of economic organization (e.g., firms vs markets) and choose the efficient one (technically, agents can perform dynamic programming). Now, this assertion is hard to square with the basic assumption of incomplete contracts, which typically (but not necessarily) involves some notion of unforeseen contingencies. Herein lies a major problem whose solution may await the development of precise models of bounded rationality.

The problem, of course, is that the very notion of bounded rationality is more about what it is *not*, namely maximizing rationality, than what it actually *is*. For example, in Williamson's work there is very little attempt to actually *model* bounded rationality in a way that would be satisfactory to the formal contract economist (e.g., Tirole 1998?). It is taken as a sort of background condition that explains, for

example, why contracts are incomplete, why there is a need for adaptability, and why *ex post* governance is necessary. One may observe in this connection that formal contract theory also relies on a similar type of reasoning. For example, some knowledge is simply postulated to be asymmetrically distributed and to remain so. The underlying transaction costs that produce this outcome are not explicitly modelled. So it is not necessarily an argument against bounded rationality to argue that it is not explicitly modelled; all theorizing, to be manageable, blackboxes some phenomena that are in fact given to analysis. Nevertheless, it would be nice to have something more definite than merely defining bounded rationality as virtually any deviation from maximizing behavior.

A first try in this direction may arguably may be found in some contributions to what has been called in this collection “the information-processing view of the firm”. Progress may arise from attempts to treat both information processing problems and incentive conflicts in the same formal model, even if these are likely to be rather complex. For example, there may be important trade-offs between information processing and incentive problems that are not captured by contemporary models. In general, it may be conjectured that progress within the field will not just come from refining and testing existing theories, but also from a good deal of cross-fertilization. This is so for a number of reasons. Arguably, the research traditions represented in the presented collection are to a large extent complementary. Treating (some of) them in a unified model that can express each tradition as a special case is certainly a case of scientific progress. Moreover, cross-fertilization and dialogue will reduce unnecessary “parallel research”. For example, one may argue that some recent work in what is called in the present collection “knowledge-based theories of the firm”, is (in spite of some of the rhetorics) in reality transaction cost reasoning in disguise. In fact, some attempts to bring ideas from diverse perspectives do exist. For example,

- Within a team theory setting, Itoh (1987) discusses how information processing capacities may be a strategic resource to firms, thus forging a clear link to the knowledge-based theory of the firm.

- In their 1991 paper ,“Technological Change and the Boundaries of the Firm,” Lewis and Sappington analyze the firm’s make-and-buy decision under the assumption that its subcontractor is known to have lower innate production costs *but* the firm is better able to monitor and control its own production activities. This set-up thus allow firms to have different capabilities in the sense of having different production costs, and it also arguably considers capabilities in the sense that it models explicitly one kind of differential capability: superior ability to monitor internal production.
- Aghion and Tirole (1995) address the issue of core competence – a favorite theme in the knowledge-based literature – by means of a incomplete contract set-up

However, the relative paucity of integrative contributions is testimony to the complexities involved in theoretical integration. Hopefully, this collection of papers can ease that task by making clearer existing differences, and by conveying the message that all present research traditions in the theory of the firm work of good ideas.

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