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The Emergence of the Modern Theory of the Firm

Abstract

We discuss the emergence of the theory of the firm (in the Coasian sense); survey and discuss the main currents of the theory of the firm, and discuss what has determined the emergence of the theory of the firm. We argue that advances in the theory of the firm have been strongly influenced by conceptual innovations in (mainstream) economics in general and by the ongoing division of labour in economics in tandem with a recognition of the importance of a number of empirical anomalies. The substantive borrowing from neighbouring disciplines, such as business history, law, psychology, organizational sociology and business administration has been relatively limited and *ad hoc* (although some scholars, notably Williamson, have made more substantive use of these disciplines than others). The fact that the theory of the firm has stayed relatively close in to the (changing) economic mainstream and that its substantive borrowing from neighbouring disciplines has been relatively limited underlie and explain much of the "external" critique of the theory (i.e., the critiques of sociologists, heterodox economists and management scholars).

Introduction

Seen in the light of the history of economics, the theory of the firm is a relatively recent phenomenon. Indeed, the very meaning of the term appears to have undergone some subtle, but not unimportant changes. Thus, the "theory of the firm" as that term would have been understood by Arthur Pigou or Jacob Viner is something rather different from the meaning that Ronald Coase, Oliver Williamson or Oliver Hart would — we suppose — ascribe to it. This reflects the change of the theory of the firm from being concerned with developing a vital component of price theory, namely firm behaviour, to being concerned with the firm as an interesting subject in its own right.[1]

At the same time the basic *explananda* of the theory of the firm has changed, from the firm's pricing decisions, combination of input factors, etc. to the questions of why firms exist, and what explains their boundaries and internal organization (Holmström and Tirole 1989). In this paper, we argue that this ability to explain a host of new issues relating to economic organization has been driven by a number of developments that are largely internal to the economics discipline. Some of these developments are parallel, and some are more deep-seated than others. Among the latter ones is the numerous developments in micro-economics since the World War II, both in terms of conceptual innovations and the actual deployment of such innovations in economic explanation (e.g., the economics of property rights, human capital...), as well as their integration into established microeconomics in the form of "tooled knowledge."[2]

The increased division of labour in economics has also played a role for the emergence of the theory of the firm, not only in the sense that its emergence is in itself an instance of specialization, but also because of the parallel emergence of neighbouring fields, such as labour economics, corporate governance, corporate finance, and public choice theory with which the theory of the firm has had interaction and from which inspiration has been gained. Relatedly, since at least the beginning of the 1970s economists have become more interested in "micro" issues more generally, rather than the more holistic or aggregate concepts that had dominated some fields. This tendency is perhaps most conspicuous in the renewed emphasis on "micro-foundations" in macroeconomics and growth theory over the last three decades. New developments in micro-econometrics (associated with James

[1] Of course, this does not mean that the modern theory of the firm is developed in complete separation from more aggregate issues. For example, Coase (1992) sees it as an integral part of the "institutional structure of production," Hart (2000) has applied his property rights approach to bankruptcy law, Williamson (1987) emphasizes the antitrust implications of transaction cost economics, agency approaches (Jensen and Meckling 1976) play an important role in the understanding of corporate governance systems, etc.

[2] Ironically, while these advances in tooled knowledge are partly the result of the increased use of formal methods in economics, it was the rise of formalism in economic theory that was largely responsible for the neglect of the firm's characteristics in the first place. In other words, if the purpose of economic theory is prediction, not explanation, then treating the firm as a production function or a price taker is perfectly acceptable, as long as it generates accurate predictions (Friedman 1953: 150).

Heckman and Daniel McFadden, for example) are overshadowing similar developments in time-series and macro-econometrics. However, many of the new specialized sub-fields in economics have arisen as a consequence of addressing some new, hitherto relatively neglected micro-phenomenon. In different ways, fields such as industrial organization (with which the theory of the firm is often seen as strongly overlapping) and labour economics manifest this tendency.

A certain, limited interaction with neighbouring disciplines has also played a role for the development of the theory of the firm. Thus, Oliver Williamson's interaction at Carnegie-Mellon University with the likes of Herbert Simon, Richard Cyert and James March as well as his reading of Alfred Chandler's (1962) accounts of American business history did play a role for the development of the transaction cost economics approach (Williamson 1996b). Still, it is surely debatable how deep the impact on the theory of the firm of insights from fields such as psychology, sociology, business history and business administration have really been. The overwhelming tendency has been to show how economics may give alternative accounts of organizational phenomena, or, in the case of business history, take un-theorized insights as grist for the organizational economics mill. Some economists have made more explicit attempts to develop an interdisciplinary approach to organization. Williamson is the most obvious example. Thus, Williamson has actively sought to incorporate what he considers to be crucial insights of not only psychology and business history, but also law (e.g., Williamson 1979). However, Williamson's subtle use of the work of legal scholars such as Ian Macneil is hardly reflected in other parts of the theory of the firm, or, if they are, they are blackboxed under the heading of "costly verifiability."

To cite another relatively recent example, agency theory and labour market economist Robert Gibbons (1999) argues in a paper published in the top business administration journal, *Administrative Science Quarterly* that the reason why business administration scholars, notably in organizational sociology, and economists are increasingly capable of communicating is that economics has significantly developed its problem-solving capacity. They are therefore better able to address and frame the kind of problems that organizational sociologists are taken up with. For example, notions of informational cascades enable the economist to make sense of the notion of "mimetic isomorphism" in new institutionalist sociology (DiMaggio and Powell 1983).[3]

As we tell the story in this chapter, the evolution of the theory of the firm has never taken place far away from the economic mainstream. On the contrary, it has in fact been much driven by advances in the mainstream, and the relatively limited borrowing from other disciplines that has taken place has usually been strongly adapted to conform to central mainstream tenets. To be sure, the theory of the

[3] Communication gaps between economists and sociologists remain, however. The main problem is that many phenomena economists treat as explanandum (e.g., culture), sociologists take as explanans, and vice versa.

firm may have been revolutionary in the (somewhat limited) sense of introducing new explananda to economics, but it is generally true to say that it has not been revolutionary in the sense of representing a radical break with any of the main tenets of mainstream economics. This is arguably the case even of Williamson's brand of transaction cost economics, in spite of his repeated insistence that bounded rationality is categorically different from maximizing rationality.[4] Seen in this overall light, it is not surprising that the theory of the firm has drawn so much external criticism: Many of the foremost critics of economics have historically been recruited from the ranks of sociologists, psychologists and business administration scholars, and to a certain extent advances in the theory of the firm may well be seen by such scholars as imperialistic attempts to take over (parts of) their fields. For example, organizational sociologists have strongly protested what they see as invasions that do not do justice to the essential phenomena, for example, because the model of decision in economics (i.e., the expected utility model) is too constraining to do justice to the complexity of real decision processes and because economics routinely work with an overly cynical view of nature (Donaldsson 1995; Perrow 1979).[5] These kinds of critiques have occasionally also been adopted or independently developed by economists, usually heterodox economists, that are critical of the theory of the firm.

Still, there has also been considerable internal debate within the theory of the firm itself, in spite of the overall field having developed much as a part of mainstream economics. To some extent, this is because "mainstream economics" was far from monolithic at the time the theory of the firm took off,[6] and some debate may reflect different positions in mainstream economics. Thus, important parts of early agency theory (Alchian and Demsetz 1972; Jensen and Meckling 1976) developed in a largely non-formal mode, whereas other parts (e.g., Wilson 1968; Ross 1973) was entirely formal. While it is the case that many of important early contributions to the theory of the firm were largely non-formal (e.g., Knight 1921; Coase 1937; Alchian and Demsetz 1972; Williamson 1971, 1973, 1975; Jensen and Meckling 1976; Fama 1980; Cheung 1983), and some parts — notably Williamsonian transaction cost economics — continue to be developed and applied in a mainly non-formal mode, the theory of

[4] Claims about the revolutionary nature of the theory of the firm in its transaction cost manifestations as well as the broader corpus of economic theorizing ("new institutional economics") that the theory of the firm is part of can be found in, for example, Coase (1992) and Furubotn and Richter (1997). Most mainstream economists, however, seem to believe that the essential insights of Coase and Williamson's approach are captured in the formal incomplete-contracting models inspired by Grossman and Hart (1986) and Hart and Moore (1990). For a contrary view see Williamson (2000: 605-607).

[5] Ferraro, Pfeffer and Sutton (2005) and Ghoshal (2005) also accuse economic theories of the firm of being ideologically biased towards markets and laissez-faire.

[6] Whether it is less monolithic today is hard to tell. Some of the old traditional dividing lines, for example, between MIT and Chicago, may have largely disappeared. However, new dividing lines may have emerged, for example, between formal behavioral economists and non-behavioral economists, or between economists whose commitments to the Walrasian model are strong and game theorists or experimentalists who are not committed to this model.

the firm taken as a whole has become much more formal. The now dominant vehicle for building theory within this subfield is non-cooperative game theory, a set of tools that found very little application in economics at the time that the theory of the firm took off. These differences in how to build theory, between formal and verbal approaches, motivate some debate, for example, parts of the critique (Kreps 1996; Williamson 2000) of the incomplete contracting/property rights approach of Grossman, Hart and Moore (Grossman and Hart 1986; Hart and Moore 1990). Thus, the familiar argument that formalizing verbal accounts lead to a loss of substantive content has been applied in this context (Kreps 1996).

To sum up, in addition to describing the main currents in theory of the firm, concentrating on key contributions, and discussing strengths and weaknesses of these currents, the present paper argues that

- Advances in the theory of the firm have been strongly influenced by conceptual innovations in (mainstream) economics in general and by the ongoing division of labour in economics in tandem with a recognition of the importance of a number of empirical anomalies, such as the inability to make sense of vertical contractual restraints (cf. Williamson 1985, 1987).
- The field has become increasingly formal, and this underlies much recent debate, such as the debate on the incomplete contracting approach.
- The substantive borrowing from neighbouring disciplines, such as business history, law, psychology, organizational sociology and business administration has been relatively limited and *ad hoc*. However, some scholars (notably Williamson) have made more substantive use of these disciplines than others.
- The fact that the theory of the firm has stayed relatively close in to the (changing) economic mainstream and that its substantive borrowing from neighbouring disciplines has been relatively limited underlie and explain much of the "external" critique of the theory (i.e., the critiques of sociologists, heterodox economists and management scholars).

The Relative Neglect of the Firm in Economics

As Herbert Simon (1991: 27) 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, and

perhaps even have macro consequences. One may therefore legitimately wonder why the theory of the firm as something broader than a component of price theory has taken such a long time to emerge.

Assuredly, almost since the inception of economics, many economists have had things to say *about* the firm. However, the recognition that a theory *of* the firm is necessary is — seen in the perspective of the history of economics — a recent recognition. In the same way, it is in fact possible to say much *about*, for example, earthquakes without arriving at a theory *of* earthquakes in the sense of a theory that explains the reasons for the occurrence of earthquakes. By the same token, much can be said about firms from an economic perspective (e.g., the size of the individual firm, size distributions of firms, market behavior, market power....) without saying anything theoretically grounded about the *reasons for* the existence of firms, the reasons for their size, boundaries, internal organization, incentive mechanisms, etc. in terms of, for example, causal explanation or lists of sufficient reasons. The relatively detailed account of firms' production and selling decisions found in intermediate microeconomics may exemplify a theory about, but not of, the firm.

Similarly, one can do economics *with* firms without having a theory *of* the firm or even without saying much *about* the firm. In this kind of theorizing, the firm is close to being a *primitive* in the mathematical sense. (Gerard Debreu's approach to the firm in *Theory of Value* (1959: chapter 3) may exemplify this approach.[7]) Of course, many economists have done economics *with* firms, and some economists have had much to say *about* firms long before the beginning of the 1970s. However, few economists were working on the development of theories *of* the firm, in the modern sense, until recently. And if we by "economic theory" understands what has been called "mainstream economics", "neoclassical economics", "microeconomics", etc., it is hard to dispute that economic organization was in general a much neglected subject area until relatively recently in the history of economic doctrines. In fact, if a recent writer (to be discussed later) is correct, the firm in its corporate form (rather than the one-person firm) for a long time constituted a Kuhnian *anomaly* (Kuhn 1970) for economics (Schrader 1993).[8]

Why the Neglect?

It may be argued that there is a strong *empirical* reason for the neglect of the firm: The fact that the firm was theoretically neglected is accounted for by pointing to the relative empirical unimportance of the

[7] Strictly speaking, Debreu does not operate with the concept of "firm" (as normally understood), but with that of "producer", "...i.e., an economic agent whose role is to choose (and carry out) a production plan" (1959: 37) and it is clear from the context that this agent is a person. In this setting, "the theory of production" essentially becomes reduced to a study of assumptions on the production set (convexity, possibility of inaction, continuity, etc.).

[8] This description applies not only to economic theories of the firm, but also to economic theories of other institutions as well. In other words, one can do economics with consumers, markets, money, laws, and so on without having explicit theories of why people consume, how markets emerge, etc. Until recently, only a few economists explored the theoretical foundations of these institutions (e.g., Menger (1892) on money). The new institutional economics seems to be paying them greater heed, however.

firm, for example in the sense of how much of the total transactions that were mediated by and took place inside firms. Thus, for long there simply was not an overwhelming *need* for economics dealing intimately with the firm; the economics of market exchange rightly took priority. Something like this explanation is suggested by David Schrader (1993: 4-5), who argues that

> The development of a theory of the firm was not simply a natural outgrowth of the economic doctrines presented in *The Wealth of Nations*. Rather, it constituted a serious attempt to accommodate the old economic theory to a significantly different kind of economic phenomena.

If taken to mean that there was little explicitly on the firm in, for example, *The Wealth of Nations* or in David Ricardo's *Principles of Political Economy and Taxation* because firms were empirically unimportant at the time of writing of these books, the argument seems somewhat dubious. Assuredly, the corporation as we know it did not exist at the time of the writing of *The Wealth of Nations,* although the seeds had been planted. But firm organization, and certainly large firms, did exist, and the classical economists were aware of this; for example, they were heavily engaged in debating the British Factory Acts (Blaug 1958).

However, a more precise version of the argument could be that for long the large, vertically integrated, and perhaps also diversified, firm was not empirically important. Thus, analyzing the market behavior of anonymous "firms" was not necessarily a bad approximation to empirical realities. In the terminology of Imre Lakatos (1970), this reason invokes *external history*, since it refers to developments that are "outside" of economic theory, as it were, when accounting for changes in this theory.

If taken at face value, however, the argument under consideration here would presuppose a lag of theory behind empirical reality that is simply not credible. This is so, because there is not very far from 100 hundred years between the beginning of the existence of the modern corporation in the United States (Chandler 1962, 1977, 1990) and the beginning of the modern economic theory about the modern corporation. Moreover, economists have for a long time been very much aware of the existence of the large corporation, in particular in their capacities as expert witnesses in antitrust cases (Philips and Stevenson 1974). It seems that we have to look elsewhere, namely to the internal development of econonmics, for an explanation.

Internal Reasons for the Neglect of the Firm in Economics

The primacy of market exchange. Economics began to a large extent in an aggregative mode, as witness, for example, the "Political Arithmetick" of Sir William Petty, and the dominant interest of most of the classical economists in distribution issues. Analysis of pricing, that is to say, analysis of a phenomenon on a lower level of analysis than distributional analysis, was to a large extent only a means to an end,

namely to analyze the functional income distribution. This may even hold true in the case of Adam Smith, who provided some quite explicit and dynamic analysis of price behavior (1776: chapter 7).

The marginal revolution meant of course that distributional issues very much disappeared from the picture (excepting John Bates Clark's work), to some extent because the new theories were conducted on lower levels of analysis than the economy-wide level that seemed necessary for distributional analysis. However, the marginal revolution also implied that much had to be done to get the new subjective theory of value on a scientifically sound footing. Among other things, this implied a concentration on, first, consumer choice, and, second, the theory of markets in a pure exchange economy.

Strictly speaking, the basic principles of exchange could be derived and understood without incorporating the troubling production side. Thus, none of the central economists that are usually singled out as the founding fathers of the marginalist revolution — Carl Menger, Leon Walras and William Stanley Jevons — had much to say on the firm[9]; of the one or two first generations of marginalist economists, only Alfred Marshall extensively discussed business organization.

The primacy of the investigation of markets also implied that problems encountered during this investigation were primary; and because economists got bogged down in all sorts of problems, theorizing organizations had to wait until approximately 1970. Many economists today would argue that economics did not really possess a rigorous and scientifically satisfactory conceptualization of the price mechanism until the advent of the Arrow-Debreu model (Debreu 1959). Given this, it is not surprising that an economic approach to economic organization had to wait until 1970.[10]

Legitimate explananda. A related theoretical explanation is that for a long time economists simply saw, for example, analysis of the internal workings of the firm as outside the set of legitimate explananda and, perhaps, competence. That is, economists should not approach economic organization, possibly because they would not know how to do this. 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 sell beer, or any other 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 woolen mill or his brewery (Pigou 1922: 463).

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[9] While Menger (1871) did not develop an explicit theory of the firm, his discussions of goods of higher and lower orders make implicit reference to firms. For instance, Menger includes "supervision of the execution of the production plan so that it may be carried through as economically as possible" as a key attribute of entrepreneurship and discusses the relationship between the entrepreneur and his "helpers."

[10] For a reading of the modern economics of organization as a natural outgrowth of the Arrow-Debreu model, see Guesnerie (1994).

Clearly, this is an argument in favor of a distinction between economics and business economics that is wholly centered on what are the relevant objects of inquiry: presumably Pigou thinks that economists may only claim competence on the economics of society-wide matters (such as Pigou's own work on welfare economics), and that economics has no business going into a detailed inquiry of individual economic agents.[11] Moreover, going into "his woolen mill or his brewery" would seemingly imply leaving the sphere of exchange and entering the sphere of production; but economists are not engineers, they are economists, and

> The technical arts of production are simply to be grouped among the *given* factors influencing the relative scarcity of different economic goods. The technique of cotton manufacture ... is no part of the subject matter of economics (Robbins 1934: 33).

However, Robbins admits that there can be an economic theory of production in the sense of a theory of, for example, the changes of techniques under the impact of changes in relative prices. But this subordinates production to the exchange nexus. Specifically, economists are concerned with understanding the organization of production and distribution through the pricing mechanism. And as Paul McNulty (1984: 233) observed,

> ... 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.

The argument from survival. Radicalizing an earlier argument by Armen Alchian (1950), Milton Friedman (1953) asserted that the selection forces on the supply side of the market were so powerful that they could be relied upon to eliminate all non-maximizing firms. Thus, whatever the initial motivations of firms, these motivations would rapidly converge upon profit maximization, whether conscious or unconscious, through the economic analogue to the evolutionary mechanism of differential reproduction and survival. Clearly, the argument may be interpreted to imply that being occupied with, for example, the internal organization of firms is a superfluous activity. As Joseph Stiglitz (1991: 15) stated:

> Many economists argued that there was no need to look carefully into the black box called the firm: firms maximized profits (stock market value); if managers didn't they would be replaced; and firms that didn't maximize wouldn't survive. Accordingly, what went on

[11] This attitude is still rather prevalent among economists, although it is gradually weakening under the impact of the explosion of research in industrial organization and the theory of economic organization during the last 15 years or so. The last full-fledged statement of something like Pigou's 1922 position is probably Machlup's 1967 Presidential Address, "Theories of the Firm: Marginalist, Behavioral, Managerial".

inside the black box was mere detail. The behavior of the firm could be described completely without knowing of those details.

The tools and insights of economics. A further argument may be that even if economists had taken an interest in analyzing firms as legitimate explananda, the insights and tools of mainstream economics were for a very long time simply not suited for this. Since existing tools only really fitted relatively simple situations of market exchange (perfect competition, monopoly), they were of little help in connection with the type of small-numbers exchange under asymmetric information and with strategic behavior that most modern theorists would consider to be at the heart of the theory of economic organization.[12] Underlying insights in asymmetric information, risk allocation, etc. were not formulated with sufficient precision to be helpful. An argument that may be invoked in support of this argument is that we witness the emergence of the theory of the firm with some lag after the emergence of the relevant tools and insights (i.e., in the 1970s and 1980s). This argument will, with various modifications, underpin much of the following account of the emergence of the theory of the firm.

External Reasons for the Neglect of the Firm in Economics

While we think the internal factors described above are the most important, we recognize the possibility that advances in the economic theory of the firm arose as responses to external pressures. For instance, Williamson reports that his early thinking on vertical contractual relations was strongly influenced by his experiences as special economic assistant to the head of the Antitrust Division of the US Department of Justice in 1966-67. (His 1968 article, "Economies as an Antitrust Defense," was originally prepared as a memo to Antitrust Division Head Donald Turner [Williamson 1996a: 360]). His dissatisfaction with economists' understanding of vertical restraints (in particular, franchise restrictions) let him to formulate an alternative explanation for hierarchical governance.

Another possible example is Ghoshal's (2005) claim that the increasing influence of economic analysis in the MBA curriculum is a response to increased market demand for economic consulting services. For example, Porter's (1980) "five forces" model owes much of its influence to its strong appeal to practitioners. Based on industrial organization analysis, this model provides theoretically and empirically grounded tools that can be applied by any businessman for the purpose of organizing and interpreting industry level data about those firms against which the businessman's firm has to

[12] This description does not apply to all economists, but only those within the Marshallian neoclassical mainstream. Why other economists (Austrian, "old" institutionalist, etc.) did not develop an explicit theory of the firm requires an alternative explanation. For Mises (1949), the distinction between "catallactics," the study of market exchange in which money prices facilitate economic calculation, and "praxeology," the study of human action more generally, may be relevant. Most issues of internal organization would be outside the realm of catallactics, though still potentially understandable as praxeological phenomena. [Maybe this is too brief to make sense?]

compete or with which it has to bargain. No other social science framework can offer a similar service.

The Pre-History of the Theory of the Firm

The Rise of the "Neoclassical Theory of the Firm"

Many writers have recognized that important elements of the modern theory of economic organization were anticipated in the work of the classical economists (e.g., Becker & Murphy 1992). For example, Adam Smith and Charles Babbage's discussions of factory production implicitly invoked team-production (Leijonhufvud 1986). Louis Putterman (1986: 26) goes so far as to argue that Karl Marx (1906) "... belongs firmly in the camp of Coase, Simon and Williamson" by strongly insisting on a sharp delineation of firms and markets. However, on the whole, the classical economists certainly did not present any explicit efficiency rationales for the existence, boundaries, etc. of the firm (on the contrary, Marx held a power explanation). Moreover, they had very little to say about firm behavior. Rather, they tended to concentrate on the activities of entrepreneurs (Machovec 1995). As already indicated, the first generations of marginalists also neglected the firm (cf. Schrader 1993). In fact, McNulty (1984: 240) argues that

> The perfection of the concept of competition, beginning with the work of A.A. Cournot and ending with that of Frank Knight, which was at the heart of the development of economics as a science during the nineteenth and early twentieth centuries, led on the one hand to an increasingly rigorous analytical treatment of market processes and on the other hand to an increasingly passive role for the firm.

A clear example of the historical development that McNulty describes concerns Alfred Marshall. Given Marshall's desire to import elements from classical economics to the supply side of his theoretical structures, it was unavoidable that the Smithian theme of the division of labor should play an important role. The progressive division of labor implies increasing heterogeneity. Heterogeneity is clearly recognized in Marshall's industrial analysis (Marshall 1925); for example, Marshall points out that some firms have more energetic management than other firms. This raises the problem of linking the firm level and the industry level. Marshall's famous response was the introduction of the representative firm, that is to say, the firm that has long-run costs equal to the industry, constant size, and earns a normal profit. This construction allowed him to bridge the firm and the industry level, to combine the dynamic and the static, to bring together change and equilibrium, to align, perhaps, the biological analogy with the mechanical analogy. The first (and decisive) blows to Marshall's construct was dealt by Pigou (1928), who introduced the equilibrium firm to economics (Moss 1984) and by Robinson (1933) who assumed that not only were all firms in an industry in equilibrium, they were also identical. Thus, any firm could be

"representative." However, all of that in Marshall that had a "developmental", managerial, historical, perhaps even "evolutionary" element was suppressed. The fully adapted, fully informed equilibrium firm substituted for the learning and heterogeneous disequilibrium firm.

Boulding (1942) argued in an early overview paper that 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). One may take issue with this as a matter of historical accuracy,[13] but what is more important, Boulding goes on to note that the Chamberlin-Robinson approach "... 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 *anno* 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 established. In the production function 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 behaviour of the firm is not dependent on its internal structure or its ownership structure. Indeed, in basic neoclassical theory, ownership and institutions neither affect the objective of the firm, nor its knowledge base, technology nor cost efficiency (as summarized by the set of production possibilities).

Thus, the basic neoclassical view has 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 (Demsetz 1995) has pointed out. Second, for a long time economists simply saw, for, analysis of the internal workings of the firm as lying outside the set of legitimate explananda and, perhaps, competence of economists. On this view, 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.[14] As Paul McNulty (1984: 233) observes,

[13] One may criticize this view, first, for completely neglecting Marshall, second, for failing to mention Coase (1937), and, third, for not recognizing that what Chamberlin and Robinson did was primarily to make much more sophisticated the neoclassical analysis of the market institution. Although they did make more precise the analysis of the firm's profit-maximizing decisions, analyzing the firm *per se* was, unlike in the case of Coase, not their basic purpose.

[14] What Mises (1949) calls "catallactics." See note 12 above.

> ... 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.

Challenges to the Neoclassical Theory of the Firm

This is not to say that this attitude remained unchallenged. It was challenged, for example, by Papandreou (1952) who argued that 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 behavioralist organization theorists argued (Simon 1955; March and Simon 1958; Cyert and March 1963) – the principle needs to be substituted by bounded rationality. Not surprisingly, it was often argued in the 1960s that behavioralist theories of the firm (ibid.) were theoretical rivals to the established neoclassical theory of the firm, since they were based on a different concept of rationality and, in contrast to the neoclassical theory of the firm, undertook a detailed inquiry of the internal workings of the firm. Others made similar claims on behalf of the managerialist theory of the firm (of, e.g., Baumol 1962, Williamson 1963), claiming that this theory was a theoretical competitor relative to the neoclassical theory of the firm because of its much more careful consideration of managerial objectives.

The classical rear-guard action against these ideas was performed by Fritz Machlup in his magisterial 1967 Presidential Address to the American Economic Association. 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 are inapplicable to the firm level, Machlup's critique was misguided. In fact, the conviction that economics is useful for examining issues such as the internal workings of the firm, and not just its external behaviour, is of course the bedrock of modern theories of the firm, although some contributors (such as Williamson 1985, 1996b) emphasize the need to draw on insights from organizational studies, for example, insights on bounded rationality in organizations (e.g., Simon and March 1958).

Early Work on the Theory of the Firm: Knight and Coase

Frank Knight, in *Risk, Uncertainty, and Profit* (1921), was probably the economist 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. Nevertheless, Knight hints at alternative explanations of the firm and internal organization, explanations involving morally hazardous behavior (Barzel 1987), non-contractibility of entrepreneurial judgment (Langlois and Csontos 1993; Foss 1993), and (this is the best known explanation) the optimal allocation of risk (Kihlström and Laffont 1979). The latter theory was in fact 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.[15]

It is not surprising that this paper has achieved the status of a true classic. It is written in a simple, engaging way, and makes it important point with effortless ease. More importantly, in this paper many, perhaps most, of the major themes of the modern theory of the firm are clearly stated. 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, 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."

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.[16] 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: 391; emph. in original), may meet that need.[17]

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[15] For an argument that Coase may have misunderstood Knight here, see Foss (1996a).

[16] 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 1996a).

[17] 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 us to say when the firm can beat the market in terms of flexibility and *vice versa*.

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 and acknowledged, it was not *used* (Coase 1972).[18] For a long time, it did not give rise to a cumulative theory development. However, a few seminal papers did appear in these Dark Ages for the theory of the firm, notably Simon (1951). 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 directions that he will receive to lie within his "zone of acceptance."[19]

Advances in "Tooled Knowledge"

There was essentially no 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 (1985), 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 and with the issues relating to the definition and enforcement of property rights, but apart from that relatively little was known.

However, in retrospect, we can see that a number of theoretical developments in the nineteen-fifties and nineteen-sixties combined to provide the conceptual basis (or, rather, several conceptual bases) on

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[18] 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.

[19] Another important, but neglected paper, is Malmgren (1961). Unlike Simon's focused piece, Malmgren's paper roams over an extended terrain, draws on numerous influences, such as the work of Keynes, Hayek, Penrose and Richardson, in addition to Coase's work, and presents a wealth of insights. Thus, Malmgren (1961) is the first contribution to 1) "operationalize" the Coasian approach to the theory of the firm, 2) suggest that ideas on firm capabilities may be combined with ideas from the contractual approach to the firm, and 3) to treat in economic terms a number of concepts (such as "business culture") the economic analysis of which has begun only recently. Assuredly, 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 in a way that still inspires, is extraordinary. On Malmgren's paper, see Foss (1996b).

which to found the theory of the firm — insights and tools that were not 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 rigths economics (Alchian 1965). 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 (notably 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 (Baumol 1962; Williamson 1963) and behavioral (Cyert and March 1963) theories of the firm which highlighted incentive-conflicts between firm 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 externalities, 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, the modern theory of the firm may 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 (see also Arrow 1987; Eggertson 1990; Furubotn and Richter 1997; Salanië 1997). In fact, "the theory of the firm" may be a too narrow term, since most modern theories of the firm also relate to intermediate arrangements, such as joint-ventures, franchising, etc., and in fact also

with the market institution. Although much of the modern theory of the firm and related areas have have sometimes been called "the new institutional economics", it is certainly not the case that all the different theoretical developments listed above merged into a seamless theoretical web that could provide unambigious 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" is largely an outgrowth of the nineteen-sixties' (almost exclusively verbal) work in property rights economics, whereas "formal agency work" is largely an outgrowth of often highly mathematical 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.

The Takeoff of the Theory of the Firm

On the basis of the above influences and developments, work began to blossom within the theory of the firm in the mid-nineteen-seventies. As already mentioned, as late as 1972 Coase lamented that his 1937 paper had been "much cited and little used". However, at the time of Coase's lamentation, serious work on the theory of firm had begun to take off, notably with Williamson (1971) and Alchian and Demsetz (1972). 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 Hart (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). 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 (Ross 1973).

Streams of Research in the Theory of the Firm

Common Themes?

As indicated, the theory of the firm is far from homogenous, although recent formal 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 behaviour of contracting partners. However, it is not quite obvious how the borderline between, for example, "opportunistic" and "non-opportunistic" behaviour 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 exemplifying this.

An Example

We illustrate with a simple example (borrowed from Wernerfelt 1994) showing the basic logic of "incomplete contracting" theory. It is illustrated by the strategic-form games shown in Figure 1. We choose this representation not for its own sake, but rather because it brings out many of the crucial underlying assumptions in the modern theory of the firm

[Figure 1 here]

Following Leonid Hurwicz (1972), one can imagine economic agents choosing game forms, and the resulting equilibria, for regulating their trade. Efficiency requires that agents choose the game form and equilibrium that maximizes the gains from trade. The two players begin by confronting Game 1. The problem here, of course, is that the Pareto criterion is too weak to select a unique equilibrium,

since both {up, left} and {down, right} may be equilibria on this criterion. However, the {down, right} equilibrium has a higher joint surplus than the {up, left} equilibrium, so that it will be in A's interest to bribe B to play {right}. Given complete contracting, as in agency theory, u, the sidepayment, can be chosen ($1 < u < 2$) to implement the equilibrium where A plays {down} and B plays {right}. However, given incomplete contracting, the side payment may not be sustainable in equilibrium. Whether this occurs or not may be critically sensitive to the timing of the game. For example, if A gives B the bribe before the game begins, B will not play {right}, 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 play {left}.

The inefficiency may be remedied by contract; for example, A may agree to pay a penalty to B if he does not pay u, or B may agree to pay a penalty to A if he does not play {right} after re-ceiving u. However, such contracts may not always be feasible. Contracts cannot completely safeguard against the reduction of surplus or loss of welfare stemming from incentive conflicts (given risk preferences). Contractual imperfections 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 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 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 unambigiously maximizes joint surplus.

The analytical enterprise is therefore one of comparing alternative contracting arrangements, all of them imperfect. For example, one may compare Nash equilibria that result from different distributions of bargaining power (for example, as given by ownership patterns) (Hart 1995). 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. Alternatively, it is established by claiming because agents are supposed to be so clever that they can always calculate and choose optimal economic organization.[20]

Shared Characteristics

[20] 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".

The above normal form game representation has been chosen as an illustrative device because it brings out a number of the crucial underlying assumptions in the modern theory of the firm. These are summarized in the following.

Cognition. Particularly in its formal versions, the theory of the firm follows standard economics in making strong assumptions about the cognitive powers of agents. This reflects the dependence of most of the modern theory of the firm on mainstream information economics and game theory. While bounded rationality is occasionally invoked as a necessary part of the theory of the firm (particularly by Williamson 1985, 1996a), virtually all of the contracting problems that are studied in the modern theory of the firm can be approached making use of the more tractable notion of asymmetric information (Hart 1990). Relatedly, because of the Bayesian underpinning of game theoretical contract theory, "Knightian," "deep," "radical," etc. uncertainty has no role to play. In the above representation, players can thus never be surprised.

Everything is given. Because of the strong assumptions that are made with respect to agents' cognitive powers, decision situations are always unambiguous and "given." The choice of efficient economic organization is portrayed as a standard maximization problem in the case of contract design or as a choice between given "discrete, structural alternatives" (Williamson 1996a) in the case of the choice of governance structures. There is no learning, no need for entrepreneurial discovery and no explicit room is made for the innovation of new contractual or organizational forms. In the above representation, strategies are thus given.

Motivation. Motivation is assumed to be wholly extrinsic (Bruno Frey 1997) and self-directed (i.e., there are no other-regarding preferences) (Fehr and Gächter 2000). Hence, stronger monetary incentives always call forth more effort (in a least one dimension). To the extent that low powered incentives are called for, this is solely explained in terms of the multi-tasking agency problem (Holmström and Milgrom 1991).

Explaining economic organization. Problems of economic organization may in generic terms be represented as games where the Nash equilibrium is not Pareto-optimal. While this formally includes, for example, coordination games of the stag-hunt variety (Camerer and Knez 1996), the modern theory of the firm generally disregards coordination type problems. The problem is to aligning incentives rather than to coordinate actions. The function of contracts, governance structures and mechanisms such as reputation is to influence incentives in such a way that agents choose those strategies that result in the choice of an equilibrium that is Pareto-superior relative to the Nash equilibrium. Ultimately, the causes of inefficiency as well impediments to reaching first best outcomes are transaction costs. Production costs play no direct role in the explanation.

Methodological individualism. Aggregates play no independent role in explanation in the sense of being causal agents. The aim is to explain contractual and organizational forms in terms of individual actions. Thus, aggregate level constructs such as "trust," "embeddedness," "organizational cognition," "capabilities," etc. are not part of the *explanans* of the modern theory of the firm, and are only rarely treated as *explanandum* phenomena (but see, e.g., Kreps 1990 on culture).

Mode of explanation. As a first approximation, efficient economic organization is supposed to be consciously chosen by well-informed, rational agents. If pressed on the issue, economists of organization may also invoke evolutionary processes that are assumed to perform a sorting between organizational forms in favor of the efficient ones (Williamson 1985). Thus, explanation is either fully "intentional" or "functional-evolutionary" (Elster 1983; Dow 1987).

Different Research Streams

Even within the set of theories of the firm that shares the above principles, there are rather marked differences.[21] This is the case with respect to even something so fundamental as how transaction costs should be conceptualized and explained. As noted earlier, the difficulties of understanding the nature and sources of these costs have been among the major problems in the evolution of the firm. In fact, many formal contributions prefer in general not to use the concept at all (or only in a verbal introduction) and to model not the transaction costs *per se*, but rather the manifestations of transaction costs. For example, 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 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 center stage 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 1998).

As a starting point, one may interpret this diversion in the literature as stemming from 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 2 illustrates this by providing a conspectus of assumptions about contracting and their implications for economic organization.

[21] In fact, most of the discussion in the mainstream journals takes place between proponents of theories within this set.

[Figure 2 here]

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.[22] 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 costlessly write contracts covering 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 or another reason costly to draft complex contracts, and that there is therefore a need for *ex post* governance. In particular, Williamson has for a long time put much emphasis on contractual incompleteness, and Grossman and Hart (1986) made the incomplete contracting methodology fashionable among formal economists of organization.

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").

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 (particularly Williamson 1991, 1996a). 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 Holmström and Milgrom (1994).

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

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 (busines 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 (Foss 1993). 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.

The following sections discuss in greater detail 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, and incomplete contracts: the asset specificy/property rights 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 specificy/property rights branch), not the least with respect to how rationality should be modelled, 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, there are reasons to believe that 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.

[Table 1 here]

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 suppress incentive conflicts in order to focus on coordination problems relating to information transmission. Juxtaposing these two dimensions, we obtain the following table:

[Table 2 here]

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 Jensen and Meckling (1976):

> 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 (1972), in Fama (1980), and, perhaps most forcefully, in Cheung (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. First, 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. Second, 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). Third, we seem to observe more firms in the real world that can be explained by team-production (e.g., conglomerates). Forth, while firms indeed consist of collections of contracts, intra-firm contracts may be qualitatively different from inter-firm contracts; for example, courts will rarely intervene in intra-firm disputes, leaving the firm's managers as the ultimate authorities for resolving disputes (Williamson, 1996a) (see more on this below). Fifth, there is an important teleological distinction between the set of contracts constituting a given firm and an arbitrary set of contracts. Firms are organized by entrepreneurs to server particular purposes beyond the purposes served by each individual contract [cites].

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, particularly in theoretical and empirical corporate finance. For example, Jensen and Meckling (1976) 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 define optimal capital structure as the combination of debt and equity that minimizes agency costs. Fama (1980) and Fama and Jensen (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 Holmström (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.[23] 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 not have to balance its budget.

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 (1997: chapter 5) suggests, the nexus of contracts tradition is far from dead. Thus, Barzel launches what is essentially a new theory of the boundaries of the firm. In his view, interest should center on the guaranteeing function of equity 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). Unfortunately, Barzel's approach remains relatively unknown.

Jensen and Meckling (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

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

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).

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 (see Hart and Holmström 1987). Indeed, in the 1980s, principal-agent models 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 ("hidden actions") or who he is ("hidden characteristics"). 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 disthinguishes between *adverse selection* models (where the uninformed party is imperfectly informed of the characteristics of the informed party); *signalling* models, which have the same informational structure but in which 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 Ross (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 (1979) 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 inquiries 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 (1991). 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 multi-dimensional tasks or agents working on multiple tasks. In this situation, incentive pay not only influences efforts and allocates risk; it also direct 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. Holmström and Milgrom (1994) 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. hen 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 (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 (1997) point out. In their story *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 somewhat akin to the analysis in Jensen and Meckling (1992).

Incomplete Contracts: The Coordination Perspective

This stream of research may be put in perspective by highlighting an otherwise neglected aspect of Coase's (1937) analysis. 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: 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 1999). Of course, this view is closely tied to the view of the employment contract as the defining characteristic of the firm.

As Simon (1951) points out 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 Loasby (1994) suggests. 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 Kreps (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 Wernerfelt (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.

We think the coordination perspective offers considerable insight into aspects of the firm that have received little attention from economists. However, the notion of "coordination" is subtle and

complex, and the economics literature includes several, often incompatible, concepts of coordination (Klein 1997).

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, 1996a) 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 (1978), in which the importance of asset specifity 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 (1971). As he explains internal organization may realize certain advantages over market contracting

> ... when conflicts develop, the firm possesses a comparitively 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, Williamson (1991) 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.[24] 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 (1986) and Hart and Moore (1990). As in Williamson's work, a central assumption is that real-world contracts must necessarily be incomplete in the sense that the allocation of control rights cannot 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.

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

TCE and the property rights view. Grossman and Hart (1986) and Hart and Moore (1990) were recognized immediately as pathbreaking contributions to the study of incomplete contracting. Williamson (1996a: 372-73) uses the incomplete contracting literature as his third example in describing TCE's progression from "pre-formal" (i.e., Coase) to "semi-formal" (i.e., Williamson) and then "fully formal" stages. However, Williamson devotes several pages of his 2000 summary of TCE to an analysis of the Grossman-Hart-Moore model, finding it substantially different from his own framework in several key respects. For instance, formal incomplete-contracting models assume that levels of relationship-specific investments are completely unobservable and noncontractible, yet ex post bargaining over the division of the surplus is costless. ("GHM vaporize ex post maladaptation by their assumptions of common knowledge and costless ex post bargaining" [Williamson 2000: 605].) Moreover, the Grossman-Hart-Moore approach emphasizes the direction of integration; even under integration, the firm's central managers cannot observe or verify subordinates' ex ante relationship-specific investments, so it matters whether integration results from Party A acquiring Party B or vice versa. Williamson argues that integration should be modelled as a hierarchy in which the allocation of decision rights is independent of the process by which integration occurred.

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 behavioural assumptions that underlie the two theories.[25] Incomplete contract theorists explicitly deny the need for a notion of bounded rationality (cf. Hart 1990). In contrast to Williamson where contractual incompleteness is clearly seen as something that is derived from bounded rationality, 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

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

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 (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 Kreps (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 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 (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.

Looking Ahead

Having surveyed the prehistory to and current of streams of research in the modern theory of the firm, it is time to end this chapter by providing a few pointers to the rest of this book.

Although one may feel justified in hailing the modern theory of the firm as a major scientific step forward, the theory (i.e., set of theories) has certainly received a fair dose of criticism, some of which, for example, from sociologists, marxists, heterodox economists, business administration scholars, etc. is *external* in nature, being based on often completely different underlying perspectives.

Many of the characteristics (surveyed above in section ...) that the critics focus in on are not really particular to the theory of the firm. They are generally made in game-theoretical microeconomics. Thus, critics of the theory of the firm may appear to be really criticizing modern microeconomic. However, while this may indeed be the case for some critics, a different interpretation is possible: What the critics protest is the use of analytical tools that may well be appropriate for the analysis of *market exchange* to analyze firm organization. While some economists maintain that there is no difference in kind between firms and markets (Alchian and Demsetz 1972; Cheung 1983), and most economists would agree that the same analytical tools are applicable to firms as well as to markets, it is a strong underlying theme among the critics that firms are essentially different from markets and many of the critics (particularly sociologists) argue that they need to be approached using different tools (Freeland 2002).

Thus, while some critics may balk at methodological individualism and assumptions of full, instrumental rationality in general, they are likely to find such assumptions *particularly* objectionable

when they are applied to the theory of the firm. Thus, in the literature that is critical of the modern theory of the firm, firms are often portrayed in rosy terms as "mini-societies" (Freeland 2002) that provide "identity" (Kogut and Zander 1996), "higher-order organizing principles" (Kogut and Zander 1992), trust relations (Ghoshal and Moran 1996), and collective learning (Hodgson 1998) that, purportedly, "atomistic" markets cannot provide. Firms exist because and to the extent that they can supply "identity," "collective learning," etc.

While maintaining a certain skepticism towards such arguments, we acknowledge that they may point to unresolved issues and weak spots in the modern theory of the firm. For example, one can deny methodological collectivism and still hold that there are firm-specific cultures and capabilities, the understanding of which is inadequate in the modern theory of the firm (in spite of the efforts of, e.g., Kreps 1990). Or, one can argue that there is too little room for bounded rationality in this body of theory.

Traditionally, economists have given short shrift to these kinds of critique, and theorists of the firm do not seem to be much an exception (in spite of Williamson's relative eclecticism). 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 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 (17 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 1999);
- 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).

Appendix: Some Earlier Contributions

As far as we know, no monograph-length study exists on the historical aspects of the theory of the firm that we address in this paper. The two larger contributions that come closest are, in chronological order, Philip Williams' study on *The Emergence of the Theory of the Firm: From Adam Smith to Alfred Marshall* from 1978, and David Schrader's study on *The Corporation as Anomaly* from 1993. Since these two, very different, books deal with issues that are closely related to the issues under consideration here, they warrant some comments.

Williams' book is an account of the analysis of firms' selling and production decisions, as it can be found in, primarily, Adam Smith, J.S. Mill, and Alfred Marshall. Williams' primary interest seems to lie in the role of the firm as an important part of the production of *market* level phenomena[26]; his interest in the firm per se is completely subordinate to this overall interest. Hence, the concentration on selling and production decisions of firms rather than on, for example, their internal organization. This means that Williams' contribution is concerned with thin rather than thick theories of the firm. To illustrate, there are only two references to Coase (Williams 1978: 171, 174), and none of these directly turns on his theory of the firm. Moreover, the narrative is conducted from a perspective of historical, rather than rational reconstruction.

In contrast to Williams' book, Schrader's volume is much more explicitly about thick theories of the firm, and specifically about the corporate form of the firm. Schrader's basic thesis is that the corporate form for long constituted an anomaly for economics, and that "... economic theory has changed in response to the development of the modern business corporation" (1993: 11). It had to change, because the firm in economics until approximately World War II was essentially the anonomous, undifferentiated entity that can perhaps best today be seen in textbooks on intermediate microeconomics - and the corporation had been in existence for several decades then. The invention of managerial, principal-agent, transaction cost, etc. theories of the firm should be seen as a continuous process of problem-solving *á la* Laudan (1977).

In addition to the two monographies that we have discussed above, several writers have touched on the issue of the history of the theory of economic organization, mostly in the context of providing the background for their own work[27]. However, only relatively few of these have been *directly* concerned with historical aspects. Among the more noteworthy is Paul McNulty's 1984 article, "On the Nature and Theory of Economic Organization: The Role of the Firm Reconsidered", and Dennis P. O'Brien's essay

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[26] Specifically, Williams is primarily interested in the "... successive elaborations on the equilibrium and stability model presented in *The Wealth of Nations*" (1978: 166) undertaken until, roughly, Marshall"s death. This interest is reflected in all the chapters of the book.

[27] For example, Coase (1937, 1991), Boulding (1942), Alchian and Demsetz (1972), Moss (1984), Putterman (1986), Milgrom and Roberts (1988), Boudreaux and Holcombe (1989), Hart (1989), Demsetz (1988), Loasby (1989), Langlois (1988, 1992), and Knudsen (1995).

on "The Evolution of the Theory of the Firm", also from 1984. Whereas O'Brien in what is a true model of doctrinal scholarship mostly details the story about the fate of Marshall's industrial analysis that I have briefly summarized in the above, McNulty casts his net much wider: he wants to account for the lack of interest on the part of economists in the firm, to critically discuss previous contributions (such as Alchian and Demsetz (1972) and Williamson (1975)), and to construct a rationale for the existence of the firm that differs from these previous explanations[28]

[28] Specifically, McNulty tries to rationalize the existence of the firm in terms of its role as provider of differentiated products. Consumers alone cannot, according to McNulty, define, produce and market new products.

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Figure 1

Game 1

		B	
		left	right
A	up	2,2	0,0
	down	0,0	4,1

Game 2

		B	
		left	right
A	up	2,2	0,0
	down	0,0	4-u,1+u

Figure 2

Contracting and Governance

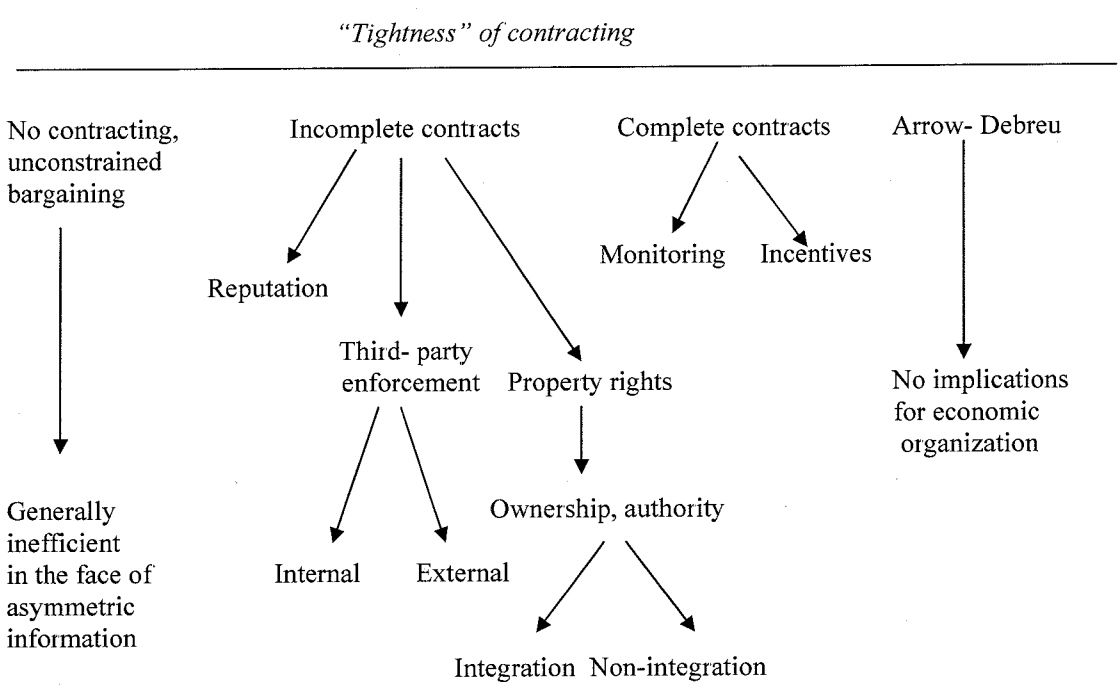

Table 1: Streams of research in the theory of the firm

	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

Table 2: Contracting and Coordination Problems

	Incentive conflicts crucial	**No incentive coordination problems**
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.

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