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The Austrian Theory of the Firm: Retrospect and Prospect

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The ideas presented in this research are the author's and do not represent official positions of the Mercatus Center at George Mason University.

Introduction.

Over the years, I have many times inflicted the following writing assignment on both an undergraduate Honors Seminar and my graduate course in the Economics of Organization.

One of the central concerns of economics is the nature and functioning of both markets and non-market institutions like business firms or governments in allocating resources. In an important and influential article, the Nobel Laureate F. A. Hayek (1945) painted the virtues of the market as a mechanism of coordination in a vivid way. Writing in the context of a long-running debate about the efficacy of socialism, he argued that the market is superior to central economic planning because of the way it economizes on information and takes advantage of the localized knowledge of market participants. In an equally important article, another Nobel Laureate, Ronald Coase (1937), considered a related question: in a market economy, why are there non-market institutions like business firms? Why aren't all aspects of production carried out through market exchanges among independent workers? In constructing his argument, Coase asserts (a) that the firm consists in the suppression of the price mechanism by administrative control and (b) that such suppression is often efficient because "there is a cost to using the price system."

Your assignment is to summarize the argument of the Hayek and Coase papers, and to consider the following question. Is there a conflict or contradiction between Hayek's argument and Coase's argument? If you think there is a contradiction, explain what it is. If you think there is no contradiction, explain how the two arguments can be reconciled.

Most students choose the easy way to reconcile the two articles: Hayek and Coase are operating at two different levels. Hayek is talking about the differences between a market order and political central planning, whereas Coase is looking at the details of how a market order works. From Hayek's point of view, Coase's firms are one kind of "individual" that makes use of the knowledge of the particular circumstances of time and place. Needless to say, however, this is a bit too facile, for a number of reasons.

In important respects, Coase and Hayek really are addressing the same problem: what are the limits of the market and of the firm? At first glance, and as a significant number of students have insisted, Coase has the better story. Whereas Hayek abstracts away from costs of using markets in order to make his case against central planning, Coase seems to have a unified theory of both firm and market. The number of transactions internalized – the size of the firm – is determined at the margin between the costs of using the price system and the costs of internal management. On closer inspection, however, Coase's account is

arguably as one-sided as Hayek's. Coase has a well-developed (and, I would add, often misunderstood and generally underappreciated) theory of the costs of using the price system. (More on which presently.) But his "theory" of the costs of internal administration amounts to little more than a claim that there are inevitably decreasing returns to the managerial function (for reasons largely unspecified) and perhaps to other factors of production as well. By contrast, Hayek has a subtle theory of the costs of centralized administration; and, although he doesn't apply it to the cost side of markets or to coordination within firms, his approach via the knowledge problem is actually quite relevant to those Coasean issues.

Let's begin with Coase. What did he see as the source of those "costs of using the price system"? At first, they seem to be simple search costs. The "most obvious cost of 'organizing' production through the price mechanism," he says, "is that of discovering what the relevant prices are" (Coase 1937, p. 390). 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. Notice, however, that costs of these two sorts really exist only under circumstances of novelty and change. If nothing changes in my pattern of transacting, I won't need to keep searching, and I can continue to trade with the same partners over time. Moreover, if I'm sure nothing unexpected will happen, I can further reduce the frictional costs of contact-writing by arranging a single long-term contract with each partner. "It may be desired to make a long-term contract for the supply of some article or service," Coase writes.

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

The essence of the firm, and its source of advantage over product markets, lies in its flexibility in circumstances of change and uncertainty.

Why is a firm more flexible? By substituting an employment contract for a spot contract in output, "the buyer" can manage economic activity in real time. As Herbert Simon (1951) explains, under an employment relation, "the buyer" pays

a wage for the right to choose which action $x \in \Omega$ the worker will perform, where Ω is the "job description" or set of allowable actions for which the worker contracts. The worker thus agrees ahead of time to the abstract contours of what he or she may be asked to do; the worker also agrees that, within those limits, the wage-payer has *authority* – the right to dictate a decision in any circumstances not spelled out explicitly in the original contract (Tirole 1988, p. 464). To Coase, the firm really is an instance of (some kind of) central planning. Note also for future reference that the kind of uncertainty that gives rise to the Coasean firm does not stray far from the neoclassical understanding of that concept: the uncertainty is about which task will be needed at a particular moment, not about the set of possible tasks or the precise nature of those tasks.[1]

Coase's article helped inspire the revival of interest in the economics of organization beginning in the 1970s with the work of Alchian and Demsetz (1972), Williamson (1975) and others.[2] Much of that revival, including the early Williamson, also stressed coordination advantages as a reason for the existence of firms. But much of it began to focus on quite different "costs of using the price system": moral hazard, principal-agent problems, information (not knowledge) asymmetry, and what Williamson took to calling "opportunism." Within the mainstream economics literature, this concern with incentives quickly came to dominate and largely crowd out explanations from coordination[3] (Langlois and Foss 1999).

Needless to say, one cannot ignore issues of incentives and information asymmetry. From an Austrian point of view, however, the rise to near-exclusive prominence of these issues was a development to be lamented. The point of my student assignment is to get people to move in the opposite direction – to think about how to enrich Coase's Marshallian story with a thicker account of coordination in the face of uncertainty and to extend that knowledge-and-coordination approach symmetrically from the price system into the internal structure of the firm. The other side of the coin, of course, is that this lacuna in mainstream theorizing also constitutes an intellectual opportunity to bring Austrian ideas to bear on the Coasean question. In their 1985 synthesis of the

Austrian program, O'Driscoll and Rizzo famously noted that "there is no subjectivist or Austrian theory of the firm" (O'Driscoll and Rizzo 1985, p. 123). By the time O'Driscoll and Rizzo penned these words, however, an Austrian answer to the Coasean question was already beginning to emerge[4] (Langlois 1984, 1988; Silver 1984); and by the 1990s, this once empty ground had become a lively bazaar of Austrian theories of the firm (Dulbecco and Garrouste 1999; Foss 1994; Langlois 1992; Lewin and Phelan 2000; Sautet 2000; Yu 1999). At the same time, ideas were emerging from other fringes of the economics profession (Nelson and Winter 1982; Teece 1980) and from business schools (Wernerfelt

1984) that would arguably dovetail with some of these Austrian approaches. Indeed, at this point the ground is so overrun with footprints that forensics would be a rather tedious and perhaps fruitless exercise; so in what follows I will stick largely to my own ideas without too much worry about differences with other contributions.

Using Hayek to rewrite Coase.

Recall my thesis so far. Although Coase had a nice symmetrical theory of firm and market, and despite the fact that Coase's account of the costs of using markets (properly understood) has some Austrian flavor to, Hayek actually provides richer material for a general theory of economic organization. "The Use of Knowledge in Society" makes the following points.

> 1. Both production and exchange depend on idiosyncratic local knowledge – "the knowledge of the particular circumstances of time and place" (p. 522). This is in contrast to the notion that, especially in production, the relevant kind of knowledge is explicit ("scientific") and thus easily transmitted and used.
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> 2. In view of this, a large part of the problem of coordination – again, in both production and exchange – involves making the best use of dispersed knowledge, which "depends on whether we are more likely to succeed in putting at the disposal of a single central authority all the knowledge which ought to be used but which is initially dispersed among many different individuals, or in conveying to the individuals such additional knowledge as they need in order to enable them to fit their plans in with those of others" (p. 521).
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> 3. But solving this problem of the efficient use of knowledge (and, more generally, of the efficient use of resources) is ultimately a dynamic problem not a comparative-static one: "economic problems arise always and only in consequence of change" (p. 523).

Roughly speaking, these considerations map into two sets of ideas that, in my view, are the essential components of an Austrian theory of the boundaries of the firm: economic *capabilities* and *dynamic transaction costs*.[5]

The notion of capabilities arises in the work of Edith Penrose (1959) and George Richardson (1972), but was largely reinvented in the work of Nelson and Winter (1982), Teece (1980), and others. If knowledge is local, sticky, and perhaps largely tacit in the sense of Michael Polanyi (1958), then firms as well as individuals are likely to have different sets of "knowledge, experience, and skills" (Richardson 1972, p. 888). Such capabilities are what enable production in the first place; but their limits also bound what, and how much, individuals and firms are able to

do. Managerial capabilities are prominent among the *resources* that figure into Penrose's theory of the growth of firms, which provides a deeper and more subtle account of the limits to firm growth than simply invoking diminishing returns.

The question then becomes: why are capabilities sometimes organized within firms, sometimes decentralized into markets, and sometimes coordinated by a myriad overlapping contractual and ownership arrangements like joint ventures, franchises, and networks? Explicitly echoing Hayek, Jensen and Meckling (1992, p. 251) point out that economic organization must solve two different kinds of problems: "the rights assignment problem (determining who should exercise a decision right), and the control or agency problem (how to ensure that self-interested decision agents exercise their rights in a way that contributes to the organizational objective)." There are basically two ways to ensure such a "collocation" of knowledge and decision-making: "One is by moving the knowledge to those with the decision rights; the other is by moving the decision rights to those with the knowledge" (Jensen and Meckling 1992, p. 253). Markets (in the widest sense of the term) take the latter approach. The Coase theorem suggests that, so long as rights are well defined and alienable, decision rights will tend to end up in the possession of those whose specialized knowledge can make the most of them. This also solves the agency problem, since the alienability of a right means that market prices can measure its value, which in turn creates an incentive for the owner to maximize value by using the right appropriately. But we know from Coase that there are also potential costs to such extreme decentralization. These might include the familiar sorts of transaction costs arising from moral hazard and asset specificity. More interestingly, however, transaction costs may arise from the need to bring otherwise decentralized knowledge together and to coordinate it, especially in circumstances involving learning and the generation of new productive knowledge.

Even in some kind of equilibrium, of course, organization would still have to solve the collocation problem, balancing the costs of mislocating knowledge against the costs of moral hazard (etc.). But Austrians like to point out that economics is in fact a process and that much economic activity takes place outside of equilibrium. This has general implications for the study of organization (Langlois 1984). In the context of the collocation problem, it suggests another type of transaction cost, something that would never appear in equilibrium: what I call *dynamic* transaction costs (Langlois 1992).

Williamson (1985, p. 20) is fond of assuming that "in the beginning there were markets." He means this as a heuristic dictum not a historical claim: let's assume that markets and firms are both equally capable – that both (and other forms, too, perhaps) exist and have at their disposal the same productive capabilities. This

makes it easy to conduct a (static) comparative-institutional analysis. We can compare firms and markets as discrete institutional choices and then explain observed forms strictly on the basis of differences in transaction costs (and perhaps also production costs as understood in neoclassical terms). In reality, of course, there is no level playing field between firms and markets. At any historical instant, relevant capabilities may be located predominantly in markets or predominantly in firms. On such a tilted field, one form may prove superior to another partly or mostly because it can create or redeploy capabilities more rapidly and (perhaps therefore) more cheaply. For example, if seizing an entrepreneurial opportunity requires creating capabilities that do not yet exist, it may prove cheaper to do so using the structures of ownership and authority that we call a firm than by somehow transferring the relevant knowledge to contractual partners. Moreover, even if the both markets and firms are equally capable at the level of production, there may still be costs of adapting or redeploying capabilities in the face of change. For example, it may be costly to persuade otherwise capable outside suppliers of the profitability of one's vision, and thus cheaper to do it oneself (Silver 1984). It can work the other way, as well: it may be cheaper to use flexible markets when existing capabilities are contained within inflexible hierarchies. In all cases, what I call dynamic transaction costs are these costs of informing, teaching, and persuading others in order to create and redeploy capabilities in the face of change.

With all this in mind, Paul Robertson and I (Langlois and Robertson 1995) have proposed a way to think about organizational change and development. Three factors are important:

> 1. *The pattern of existing capabilities in firm and market*. Are existing capabilities distributed widely among many distinct organizations or are they contained importantly within the boundaries of large firms?
> 2. *The extent of the market and the level of development of market-supporting institutions*. To what extent can the needed capabilities be tapped through existing arrangements and to what extent must they be created from scratch? To what extent are there relevant standards and other market-supporting institutions?
> 3. *The nature the economic change called for*. When technological change or changes in relative prices generate a profit opportunity, does seizing that opportunity require a systemic reorganization of capabilities (including the learning of new capabilities) or can change proceed in autonomous fashion along the lines of an existing division of labor?

One scenario in which the firm has an advantage over markets is when (1) existing capabilities are dispersed into decentralized markets; (2) markets in general are thin and market-supporting institutions are weak; and (3) an

entrepreneurial opportunity arises that demands a systemic rearrangement of capabilities, possibly including the development of wholly new capabilities. In this context, the dynamic transaction costs of informing, teaching, and persuading suppliers – if suppliers can even be found – are high. It is cheaper for the entrepreneur to integrate the necessary capabilities vertically in order to directly direct and design the effort of others. In another, scenario, however, it markets that yield lower dynamic transaction costs. If existing capabilities are contained within large vertically integrated firms, and if the economic change involved is less systemic in structure – as, for example, when relevant markets are thick or when technological standards and modularity (Langlois 2002) reduce the need for systemic coordination – then dynamic transaction costs can lead to the creative destruction of firms by markets. The first scenario is Alfred Chandler's *Visible Hand* (1977); the latter is what I call the Vanishing Hand (Langlois 2003).

Capital and its structure.

This approach to the Coasean question is clearly Hayekian, augmented by cognate streams like the evolutionary economics of Nelson and Winter (1982). But it is also "Austrian" from a couple of other perspectives as well. One of these is the Austrian concern with entrepreneurship (Kirzner 1973). I will not expand on that point here, as I have recently expatiated elsewhere on the topic of entrepreneurship and the nature of the firm (Langlois 2007). The other perspective — perhaps surprising at first — is the Austrian theory of capital. A number of writers on the Austrian theory of the firm have mentioned capital theory (Dulbecco and Garrouste 1999; Foss, Foss, Klein and Klein 2002, 2007; Lewin 2005; Yu 1999), but only recently have I come to understand the relationship to my own work.

The basic idea of Austrian capital theory, going back to Menger and (especially) Böhm-Bawerk, is that capital is not a homogeneous factor of production but a complex structure of relationships among specialized assets. In the original story, the issue was the "roundaboutness" of production: assets could be lined up neatly according to how distant from final consumption were the goods they served to produce. (You know the story.) I am something of a deliberate outsider to the macroeconomic aspects of this, but my understanding is that present-day Austrians consider Böhm-Bawerk's account as oversimplified and in the end a bit lame, especially his attempt to come up with a scalar measure of roundaboutness. In his early work (which is what actually won him the Nobel Prize), Hayek worked in this tradition, trying to associate the structure of production with roundaboutness. But, consistent with his later emphasis on idiosyncratic knowledge, he also stressed the heterogeneity of capital and the importance of coordination when capital is heterogeneous. Ludwig Lachmann (1978) picked up this strand.

All capital resources are heterogeneous. The heterogeneity which matters is here, of course, not physical heterogeneity, but heterogeneity in use. Even if, at some future date, some miraculous substance were invented, a very light metal perhaps, which it was found profitable to substitute for all steel, wood, copper, etc., so that all capital equipment were to be made from it, this would in no way affect our problem. The real economic significance of the heterogeneity of capital lies in the fact that each capital good can only be used for a limited number of purposes. (Lachmann 1978, p. 2.)

A correlative of such specialization is that capital becomes increasingly complementary and increasingly less substitutable. Production requires the cooperation of (increasingly) many pieces of capital, the unavailability of any one of which can bring the system to a crashing halt. When unexpected change occurs, including change brought about by the entrepreneur's own desire to take advantage of envisaged profit opportunities, the complementary structure of capital is upset, and complements have to become make-shift (and thus often second-best) substitutes in new uses.

What are the implications of this for organization? We could easily take the lesson to be the one preached by Williamson (1985) or Benjamin Klein (Klein, Crawford and Alchian 1978). Heterogeneous capital in *Austriansprake* translates into highly specific assets in the lingo of the economics of organization. It seems to me, however, that what Lachmann is suggesting is a lot more like the theory of dynamic transaction costs. Lachmann defines two types of capital complementarity: *plan complementarity*, the complementarity of capital goods within the framework of one plan, and *structural complementarity*, the over-all complementarity of capital goods within the economic system. The first type of complementarity is brought about *directly* by entrepreneurial action. The making and revision of such plans is the typical function of the entrepreneur. Our second type of complementarity is, if at all, brought about *indirectly* by the market, viz**.** by the interplay of mostly inconsistent entrepreneurial plans. (Lachmann 1978, p. 54, emphasis original.)

We can imagine in this context that, in a situation of change, the internal plan of the entrepreneur may have advantages in coordination over the impersonal forces of the market. For, as Lachmann insists, the function of the entrepreneur is "to specify and make decisions on the concrete form the capital resources shall have. He specifies and modifies the shape and layout of his plant, which is something he cannot do to his typists, desirable though that may seem to him. As long as we disregard the heterogeneity of capital, the true function of the entrepreneur must also remain hidden. In a homogeneous world there is no scope for the activity of specifying" (Lachmann 1978, p. 16).

In many respects, of course, the point is that the present-day literature of the economics of organization, notably the "Austrian" parts I have been describing, have actually gone well beyond Austrian capital theory in putting some analytical structure on the idea of capital structure. As I argued above, whether the firm or the market is in a better position to overcome the dynamic transaction costs of change will depend on the existing structure of capabilities in the economy and on the nature of the economic change itself. When the change requires *systemic* innovation, internal coordination may be cheaper; but when change requires *autonomous* innovation, market coordination may prove cheaper (Langlois 1992; Teece 1986). And whether systemic innovation is required will depend on the modular structure of the technologies and organizations involved (Langlois 2002; Langlois and Robertson 1992). As Lewin (2005) suggests, the theory of modular systems may even be one promising way to recast the entire Austrian theory of capital itself.

In Coase, recall, the firm arose because of a certain kind of flexibility in response to uncertainty. This kind of flexibility can be even more important in the case of the kind of radical uncertainty of which Lachmann was fond. Management is a way of *buffering* uncertainty — of attempting to control and limit the effect of change and uncertainty on a structure of specialized complementary assets[6] (Langlois 2003). But markets (and contractual arrangements broadly understood) also have their ways of buffering uncertainty. When markets are thick, and when standards have created clean interfaces within the complementary structure of production, entrepreneurs can reconfigure production without having to own the assets involved. In effect, modularity can turn assets that are highly specified technologically into assets that are economically unspecialized. For example, a firm that specializes in providing Internet backbone services has assets that are highly specific to that business; but the firm actually benefits from *not* holding assets or engaging in activities complementary to those services, since it can spread risk by accepting work from a wide variety of owners of complementary assets whose fortunes are poorly correlated with one another. In the limit — and the Internet is indeed an example — assets can become *general-purpose technologies* whose specialization can benefit wide sectors of the economy (Helpman 1998; Lipsey, Carlaw and Bekar 2005; Stigler 1951). In this sense, and contra Lachmann, it is sometimes true that even specialized pieces of heterogeneous capital can in fact be used for a wide variety of economic purposes.

In his discussion of economic capabilities, George Richardson (1972) also talked about complementarities. But he focused not on assets but on *activities* complementary in the chain of production.[7] His point was that the capabilities needed to undertake successive complementary activities might be quite dissimilar from one another. Dissimilarity is the source of the knowledge

diseconomies to internal organization we talked about earlier. But if activities — not necessarily complementary ones — require *similar* capabilities, then there can be spillover economies when the activities are undertaken under the same organizational roof. Thus firms will tend to integrate not into complementary activities (unless they are also similar or unless they have to) but into activities that require similar capabilities.

Such capabilities can in fact be rather non-specialized. As Penrose (1959) had already proposed, firms create managerial *resources* in the course of carrying out their activities. These resources are a kind of asset; and, because of lumpiness in the production of such resources, they can spill over cheaply into related activities. For example, as Chandler (1990, p. 168) tells us, American meat packers like Armour and Swift integrated early on into the byproducts of the slaughterhouse: leather, fertilizer, glue, abrasives. But by the beginning of the twentieth century, they had begun to use their more generic capabilities in refrigerated logistics to distribute products like eggs, butter, poultry, and fruit. Perhaps Penrosian managerial resources are an example of Lachmann's *reserve assets* (Lachmann 1978, p. 90).

Whither the theory of the firm?

In a number of respects, many Austrian ideas today are being extended by legions of academics elsewhere in the academy, albeit not those in the mainstream of the economics profession. With its focus on the search for entrepreneurial opportunities and its attention to the heterogeneity of capital resources, Penrose's account arguably qualifies as an "Austrian" theory of the The so-called Resource Based View (RBV) of the firm (Mahoney and Pandian 1992; Wernerfelt 1984, 1995) grows explicitly out of Penrose, and the so-called dynamic-capabilities approach (Teece, Pisano and Shuen 1997) is closely related. These literatures are burgeoning, and anyone interested in advancing an Austrian theory of the firm needs to pay attention to these literatures. As I've already suggested, the same can be said for the large literature on modularity.firm.[8 9] Aside from capabilities (a.k.a. dispersed knowledge) and modularity (a.k.a the structure of capital), the other important dimension of an Austrian theory of the firm (I've suggested) is the importance of coordination, especially in the face of radical uncertainty and of tacit and localized knowledge. Here the landscape is more variegated. At the fringes of the profession not far from where Austrians stroll, there is some interest in these issues. Some work in this literature is close in spirit to my own, in some cases extremely close (Jacobides and Winter 2005). I would also call attention to attempts to think about a *cognitive* theory of the firm (Langlois 1998; Noteboom 2003; Witt 1998).

Nearer to the main roads, however, the situation is not dramatically different from what Nicolai Foss and I (Langlois and Foss 1999) reported nearly a decade

ago. The formal literature on incomplete contracts (Hart 1989; Hart and Moore 1990; Pagano 2000) does perhaps capture some of the spirit of Coase's account, as described earlier, even if it tends, unsurprisingly, to be guided more by the imperatives of modeling than by the real-world phenomena of coordination (Foss and Foss 2001; Pagano 2000). Within that tradition, some work by Steven Tadelis (2002) comes perhaps the closest to considering the issues of knowledge coordination I have highlighted here. And there was even a session on organizational capabilities at the most recent (2007) meeting of the American Economic Association. But this is nothing like a major move in the direction of Austrian ideas. The bad news is that these important ideas are still far from having been absorbed by the mainstream. The good news is that there is still much for Austrians to do, and to claim already to have done, in the theory of the firm.

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Footnotes

1 Elsewhere (Langlois 2006) I have branded this phenomenon *repertoire* uncertainty, a manifestation of what I long ago called *parametric* (as against structural) uncertainty (Langlois 1984).
2 As Nicolai Foss (1996) points out, Harald Malmgren (1961) was a precursor of this revival, whose approach had in addition many "Austrian" aspects to it.
3 In his recent categorization of classes of "formalizable" theories, Gibbons (2005) includes one (of four) based on the idea of coordination. His examples? Some work by Williamson and Benjamin Klein – but not the likes of Coase or Knight.
4 And let us not forget Loasby (1976).
5 For a more fully elaborated discussion of what such a theory would look like, see Langlois (2007).
6 Another way to buffer uncertainty in the context of the firm is to hold *reserve assets* (Lachmann 1978, p. 90).
7 In another assignment, I have sometimes asked students to write about the implications of thinking in terms of complementary assets (Teece 1986) versus thinking in terms of complementary activities (Richardson 1972).
8 Even if Sautet (2000, p. 94) thinks that, in the end, her notion of entrepreneurship is really "Robbinsian" rather than Kirznerian. From my point of view, the problem is not that Penrose isn't Austrian but that she isn't *Coasean*. Penrose assumes the existence of the firm, and analyzes learning within the firm; but she never asks about firm boundaries, and never considers whether entrepreneurs might be better off taking advantage of resources outside the firm rather than surplus ones within. As Loasby (2002, p. 52) points out, all that is missing in Penrose is "a significant treatment of external organisation and of the continuous restructuring of industries which was emphasised by Allyn Young, and these omissions may be attributed to a deliberate focus on the individual firm, and in particular on the relationship between its internal organisation and the process of internal learning, which may be regarded as one of the two most significant novel elements in her work."
9 Garud, Kumaraswamy, and Langlois (2002) collects many of the important papers in this literature.