

A Brief History of the Firm in Economic Theory

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Introduction

Microeconomic theory has in its history seen no shortage of theoretical controversy, variation, and synthesis. Much of this has revolved around the nature of the modern business enterprise—its behavior, the motives and methods behind this behavior, and in turn the organizational processes involved therein. The following is an attempt to trace out the concept of the firm throughout the development of that body of economic theory that owes its form seminally to the marginalist revolution of the late 19th century and the tradition it began. The account begins with the development of the neoclassical theory of the firm in the intellectual and social context of the 18th and early 20th centuries. It leads then into the criticisms of marginalist theory in the mid-20th century that culminated most saliently in the marginalist controversy. This is followed by a discussion of the so-called revisionist theories of the firm that survived and evolved after the controversy, leading ultimately to the transaction costs approach to the firm.

It is well to preface this narrative with a few notes on two key concepts: the nature and role of knowledge/technology in these theories, as well as the manner in which costs to the firm are conceptualized. As will be shown the neoclassical theory of the firm, in which an exogenously established technology defines the firm's transformation costs according to the productive contributions from factor inputs offered under free exchange, gave way to explorations of firm organization itself. This would eventually lead to the supposition of a new class of costs: those incurred in the process of exchange itself. In turn, another class of costs would be posited: those arising specifically from what Foss (2007) has termed 'knowledge processes'. Because of the recency of this latter 'knowledge governance approach' the paper will conclude with a discussion of this approach and an attempt to draw certain insights from the doctrinal history of the theory of the firm and where future research might take us.

The Neoclassical Theory of the Firm

Instances of the Neoclassical Theory of the Firm are not difficult to find: its construction can be found in fairly uniform manner in almost any standard

microeconomics textbook of today and into the not-so-recent past. As Hunt (1992, p. 376) writes, neoclassical economics, broadly speaking, is the “culmination of the tradition of Say, Senior, and Bastiat” At its heart, this view holds that “economics is exchange.” It thus comes as no surprise that the structure envisioned is dominated by a system of markets, populated by agents engaged in voluntary exchange. Commonly characterized as households in contemporary texts, these agents are the sole possessors of the capacity to contribute to the production of goods and services. Likewise, and in symmetry, it is their satisfaction in consumption of these goods and services that constitutes the final term to which production is directed. This much was present in the early utilitarian theories from which modern neoclassical theory evolved.

As Bharadwaj (1994) and Hunt (1992) have explained, the mid-19th century saw a number of sweeping social and economic shifts including expanding industrialization, increasing concentration of wealth and power, and the rise of the corporation. With these developments the antagonistic relationship between capitalist and worker was becoming more prominent, and the legitimacy of the former’s claim to the fruits of production was being questioned. For these reasons, Bharadwaj (1994, p. 21) notes, initial works in the marginal utility theory of value, specifically those of Jevons, Menger, and Walras in the early 1870s, were primarily aimed at a “radical alteration of the view concerning distribution.”

As Hunt explains, these authors, in works almost simultaneously published, continued the utilitarian individualism of Say, Senior, and Bastiat, but formulated the concept of marginal utility,¹ and its diminishing nature, to elucidate the beneficent nature of free exchange. In these theories, individuals are conceptualized as utility maximizers in possession of one or another commodity. The price mechanism of the markets for these commodities then facilitate their trade up to the point that no individual can be made better of without making another worse off in a story too common to detail here.

¹ Bharadwaj (1994, p. 19) notes that the marginal utility concept had in fact already been presented in the works of Cournot, Dupuit, and Gossen, lending further credence to the argument that the social, economic, and intellectual circumstances of the time played a role in the theoretical developments of the 1870s.

Of central importance in the present analysis is the minimal importance attached to production in these early formulations of neoclassical theory. As Henderson (1976, pp. 135-136) has written,

the utility theory of value initially was postulated for the determination of prices when production already had been completed, and ‘bygones were bygones.’ In Carl Menger’s world, two farmers meet in the forest to exchange their surpluses of grain and wine, to their mutual satisfaction, each employing the incremental principle of maximization.²

That production occurred by application of various inputs was not, of course, wholly spurned; it was, however, relegated to the more critical matter of, in Jevons’ (1907, p. 49) words, “the natural laws according to which...distribution takes place.”

In this view, all agents were in possession of some productive service in various kinds—specifically, land, labor, and capital—and (Menger, 1976 [1871]) degrees. These would be sold to the entrepreneur in exchange for a money income in the form of rent, wages, and interest, according to kind, and to a degree reflecting the productive contribution of the service (Bharadwaj, 1994). As Henderson (1976) explains, the neoclassical doctrine under development at this time held that all value is ultimately derived from the consumer’s utility. Moreover, because “at the margin all resources are equally necessary to the fulfillment of his utility,” the “consumer plays no favorites” as to the *types* of inputs employed in production (Henderson, 1976, p. 137). Thus, because the value of goods rests ultimately on the homogeneous utility conferred to the consumer—and, it should be added, because utility from consumption is processually separated from production by means of market interstice—all productive services are accorded an homogeneity of value in terms of kind, becoming, in equally homogeneous terms, merely transformations costs to the firm. In this manner, production was conceptualized as “merely a species of exchange,” (Hunt, 1992, p. 345) in which the incomes of laborers, landlords, and capitalists alike were justified in the value of their productive services (see for instance Menger (1976 [1871], p. 167 n.)).

² Henderson is, ostensibly, referring to the exposition given in (Menger, 1976 [1871], Ch. IV).

Thus, the processes and location of the creation of goods and services is only of secondary concern to the matters of distribution and consumption. Indeed, this remains manifest in more recent expositions of neoclassical microeconomics. Clower, et al. (1988, p. 17) in particular note that the common distinction between households and firms is not, in the final analysis, a necessary theoretical distinction at all. Firms, rather, function only as intermediaries between household production and household consumption and are separately considered only to show the distinct decision-making processes between the two (viz., utility and profit maximization). It would appear then that this neoclassical firm developed, not from an inquiry into the incidence of actual organizations, a task which ought to have been quite urgent as corporations rose to prominence in the late 19th century, but as a structural projection from the theory of individual behavior.

In short order, the neoclassical theory of the firm followed in form from the existing approach to household maximization and functioned to explain remuneration to the various factors of production in accordance to their contribution to said production. The development of this theory involved both the supposition of an even footing for the agents of production, as discussed above, as well as the formulation of algebraic production functions—derived from an exogenously given state of technology—that would come to be the eminent representation of the firm in neoclassical theory. These production functions would then enter into a firm's cost-minimization/profit-maximization problem which in turn constituted both the motive and method behind firm behavior. As Humphrey (1997) has argued, this much had been completed, at least in implicit terms, by Johann Heinrich von Thünen by the mid-19th century. It was not, however, until the late-19th century that the key elements of the theory were reintroduced into economic doctrine by, among others, Hermann Amstein, Francis Edgeworth, Philip Wicksteed, and finally Alfred Marshall, who explicitly acknowledged his debt to von Thünen (Humphrey, 1997).

Of this group, Amstein was the earliest (1877) to formulate, at the request of his colleague, Walras, the marginal productivity theory of distribution by way of firm cost-minimization against its production function in algebraic terms. Edgeworth subsequently

(Edgeworth) specified the entrepreneur's method of maximizing net revenues by hiring factors of production up to the point at which the cost of the additional input just equaled the added revenue. Arthur Berry and William Ernest Johnson would, in 1891, extend Edgeworth's work. Finally, by the first years of the 20th century, Wicksell would define the conditions under which this method of choosing the optimal combination of inputs would just exhaust total output—and in the process would formulate the Cobb-Douglas function that was to be reattributed some 30 years later (Humphrey, 1997).

These developments aside, however, Marshall remains the most influential of the second generation marginalists. First published in 1890, Marshall's *Principles of Economics* (1898) delineated the essential aspects of the firm's decision process in its neoclassical conception and, therefore, the distribution mechanism by which factor inputs are paid according to their contribution to output in a competitive exchange economy. Marshall's theory is, additionally, widely recognized for utilizing the concept of a 'representative producer' or 'representative firm' which would evolve into the more contemporary neoclassical take on the firm and, in the process, spark a number of far-reaching debates and diverging research agendas in the field.

Marshall took a dynamic, historical view of individual firms, making particular note of their life-cycles, from fledgling companies making scant profits, to the established company of considerable competitive advantage, and finally to the aged company withering with the declining competitive fortitude of successive generations of management. His theoretical framework for analyzing industries however was static, equilibrium-based. In order to reconcile his view of individual firms with the static analysis of industries then, Marshall introduced the representative firm, "composed of the salient characteristics of all firms in the industry," (Moss, 1984, p. 308). In this manner Marshall could maintain the concept of a firm without leaving the static sand-box of his industry analysis. Thus, while it was recognized that the particular interstices within an industry shifted with the waxing and waning of enterprises, the dynamics of the matter were, for the sake of finding a static market equilibrium, left to another time.

It became clear, however, that the marginalist model of the firm broke down where firms enjoyed internal economies of scale—that is, where firms saw increasing returns (decreasing costs) as their output rose, and thus had an incentive to expand output

indefinitely at a fixed, market-given price. To remedy this theoretical problem Pigou developed in 1928 his concept of the 'equilibrium firm', declaring it essentially the same as Marshall's notion.³ In this article Pigou laid out the conditions of equilibrium which, again, demanded that all internal economies of scale were exhausted such that the equilibrium firm's output occurred at the intersection of the marginal and average cost curves. It is of note that Moss (1984, p. 312) finds that it is this formulation,

that has become the exclusive subject of analysis in the conventional theory of the firm. Indeed, as far as I know, the very first appearance of the U-shaped average cost curve and its corresponding marginal cost curve is in Pigou's..."An Analysis of Supply."

Moss furthermore makes notes of place of exogenous technology in Pigou's consideration of firm costs curves as determined independent of the firm's activities. This, of course, follows from what was by then a substantial tradition of conceiving the firm in terms of algebraic production functions (as discussed above).

One further step was required in the development of the modern treatment of the firm in proper neoclassical theory. This, simply put, was to assume industries to be comprised entirely of equilibrium firms with identical cost structures, a task the proved necessary in the works of Robinson (1933) and Chamberlin (1933). By making these assumptions, the authors,

stood Pigou's construction of the equilibrium firm on its head. Where Pigou argued that an equilibrium firm could be derived from the laws of returns obeyed by any particular industry, Robinson and Chamberlin defined the industry on the basis of a population of equilibrium firms. (Moss, 1984, p. 314)

Thus, by the 1930s the neoclassical approach to the firm had developed, not so much out of careful observations of how firms and industries actually formed and operated, why they did so, or how this had changed historically; but, decidedly, from a

³ Robbins (1928, p. 387 n.) would, in the next issue, remark that the equilibrium and representative firms were "almost identical" though the former was an "interesting and important variation" to which Robbins hoped his critique of the latter would apply. Moss (1984), however, finds this untenable, noting that whatever dynamic properties the representative firm retained in Marshall's analysis was stripped off in the Pigovian equilibrium firm.

series of intellectual expediciencies developed to resolve various obstacles in the path toward an internally coherent body of theory. These obstacles included, for instance, the socio-political matter of justifying remuneration to the owners of the means of production, as well as the technical matters of showing that the marginal productivity theory of distribution exhausted all output and the firm cost structure conditions required for industry equilibrium to attain.

In the process, the early neoclassical economists had defined the structure and directing forces⁴ of the economy in terms of purely individualized agents, interacting at all points in markets under free exchange which itself drives the system's processes. As regards motives and methods, the theory retained from the earlier Utilitarians the central role of an homogeneous utility located in the individual who satisfies himself to the best of his ability through exchange. With the patent separation of productive and consumptive activities in the day-to-day affairs of people, the theoretical structure was ultimately split as if by mitosis, and the profit-maximizing/cost-minimizing firm was generated to create the circular system familiar to any undergraduate economics student today. Subsequent issues then led these firms and the industries in which they operate to be defined in terms of their input cost structures given to them by a state of technology defined outside of the system.

However, in this same process, neoclassical theory's bearing on the facts of the modern economic system had become increasingly dubious. The empirical work laying doubt on the marginalist approach to industry, the consequent crescendo of criticism of this school, and subsequent reactions in the middle third of the 20th century are the subject of the next section.

Mid-Twentieth Century Controversies and Developments in Theories of the Firm

If Robinson's and Chamberlin's works—which Boulding (1942) would term the "Cambridge Theory"—were considered a substantial refinement of economic theory marking "the explicit recognition of the theory of the firm as an integral division of

⁴ Recall the discussion at the beginning of this chapter in which the key theoretical components of interest were listed as structure, driving forces, motives, methods, and effects. The latter of these need not detain us here as there are far more eminent, deft, and comprehensive critiques of neoclassical theory *qua* consensus theory than could be given here.

economic analysis upon which rests the whole fabric of equilibrium theory,” (Boulding, 1942, p. 791), these contributions certainly did not comprise the final word as regards the firm. Indeed, the 1930s saw an explosion of work on this particular area of economic research. A combination of reasons are here given for this trend.

With the development of imperfect competition theory, whereby Pigou’s equilibrium firms were assumed to pervade industries, the actual actions, and the motivations underlying these actions, became subject to empirical test (Moss, 1984). This and the exigencies of the Great Depression gave impetus to numerous empirical surveys of businesses, both from government entities and individual researchers (Lee, 1984, pp. 1109-1110; Mongin, 1997, p. 1). The implications of these works were significant. It was evident, for instance, that firms did not, as portrayed in neoclassical doctrine, use marginalist tools in practice, did not react to changes in demand, taxes, &c., and did not maximize short-run profits.

Among the empirical work produced in this period, one of the most influential pieces was surely Berle and Means’ *The Modern Corporation and Private Property* (2009 [1932]), notable chiefly for the recognition that the modern firm was marked by a separation of ownership and control⁵. This in combination with the introduction of monopolistic elements in the Cambridge Theory opened economic theory up to the possibility of managerial discretion in the direction of firm behavior. Thus, whereas the competitive firm could have previously been theorized to aim for little more than the minimization of its costs in the course of maximizing profits, the aims and motives of the controlling individuals *within* the firm—i.e. of top management—were now open to speculation.

The earliest theoretical responses to these developments fall under what Nordquist (1965) has called the “utility-index hypothesis.” These expositions, beginning formally with Higgins (1939)⁶ and continuing to be the commonest revisions of the theory of the firm into at least the mid-1960s (Nordquist, 1965), appended an entrepreneurial or managerial utility function to the output decisions of firms—connecting firm output to

⁵ See also, e.g., Berle (Kogut & Zander, 1996) and references given in Nordquist (1931)

⁶ Hicks (1935, p. 8) made reference to the necessity of including the entrepreneurs subjective preferences in the case of monopoly; however, Higgins (1939) appears to be the earliest paper devoted to the exposition of this line of thought.

income and other amenities conferred to the controlling interest of the organization. Managers would direct the firm in accordance with their own utility maximization which would be unlikely to square with maximum profits. In Higgins' original exposition, the absence of perfect competition gave the 'entrepreneur' the leeway to pursue other ends, notably prestige and leisure, as well as allowing a role for habit, custom, and uncertainty that could not exist under perfect competition. In response, Lynch (1940) noted that the preferences of management were relevant even under perfect competition as, even in these conditions, the so-called 'transfer cost of entrepreneurship' that makes up 'normal profits' is defined by the subjective concerns—for prestige and so on—of the entrepreneur. Higgins (1940) agreed.

Several implications follow from these early lines of argument. As Nordquist noted, these revisions had,

the advantage of putting the theory of the firm on an equal footing with the theory of consumer choice....In the revised theory the business decision-maker, like the consumer, merely makes a choice from among the set of all feasible alternatives which will put him on the highest indifference locus. (1965, p. 43)

This is to say that the particular methods and aims—viz. utility maximization—on the production and consumption sides had been reconciled. It meant more generally that the organization of the firm was open to scrutiny at least so far as the 'entrepreneur' or controlling interest of the firm was concerned, and that marginalist tools could be applied to this line of inquiry.

Scitovszky (1943) would make an interesting contribution in this regard. In this short paper, the author posited an indifference map for the entrepreneur relating money income and 'entrepreneurial inactivity'—taken, for present purposes, to mean essentially 'leisure'. Scitovszky then showed that, in order for utility maximization in these terms to result in profit maximization, the entrepreneur's efforts would have to be independent of his level of income. This was argued to be plausible in cases where a businessman is "so keen on making money that his ambition cannot be damped by a rising income," where "he makes money, not in order to have more to spend, but for its own sake, because it is an index and token of his success," (p. 59). It was thus concluded that the profit

maximization assumption may still be a valid approximation in general as ‘this assumption is patently untrue only about people who regard work as plain drudgery: a necessary evil, with which they have to put up in order to earn their living and the comforts of life,’ (p. 60).

In addition to the dubious footing on which the utility-index hypothesis put the assumption of profit maximization, these arguments posed difficulties for the determinacy of equilibrium solutions in production and cost theory. Higgins’ 1939 paper had this as its central topic. As it regards the utility-index hypothesis, the necessity of including managerial utility functions meant that output decisions are only determinate *if* managerial preferences are known, which, Higgins argued, they generally are not. Moreover, the possibility of habit, an ‘unwillingness to take chances’, and so on negates the determinacy of output levels even where preferences are known.

To this we might add a number of arguments in the development of a ‘resources effect’, the production-side correlate of the income effect in standard consumption theory (developed in Graaff (1950-1951), Makower and Baumol (1950), and Clower (1952-1953)). Here again the reconciliation of production and consumption theory⁷, while appearing to constitute a fortuitous “generalization of the theory of consumer behaviour just as much as of the theory of the firm,” (Graaff, 1950-1951, p. 83) came at a cost. Here this cost was the introduction of the possibility of the Giffen paradox with regard to factors, and, more substantial, an ambiguity in the predicted effect of a change in prices on supply and demand (see esp. Graaff (1950-1951) and Clower’s (1952-1953) correction for further explanation).

Thus, during the 1930s and 40s a number of lines of inquiry, of varying degrees of theoretical and empirical nature, were raising serious doubts as to the applicability of marginal analysis to modern business. These critiques of, and alternatives to, the neoclassical theory of production and cost appear to have been borne of 1) the recognition of controlling interests in the direction of production following from the separation of ownership and control and from the introduction of theories of ‘non-perfect’ competition; and 2) the resulting interest in the particular and possible aims and methods

⁷ Clower’s (1965, p. 37 n. 11) term was “producer-consumer theory of economic behavior.”

of these controlling interests. The resulting controversy came quickly after the close of the war.

While the marginalist controversy may be conceived broadly as occurring between Hall and Hitch's "Price Theory and Economic Behavior" of 1939 and Heflebower's NBER paper published in 1955 (though presented at the Conference on Business Concentration and Price policy three years prior (Lee, 1984)), Mongin (1997) restricts the controversy proper to the AER from 1946 to 53. Machlup had similarly defined the controversy as within the AER, between Lester, Machlup, and Stigler, and from 1946 to 47. As it pertains to the present narrative, however, it might be best to bear in mind that the exchanges constituting the marginalist controversy proper resulted from a substantial period of growing doubt over the neoclassical approach and that, despite authoritative declaration of the controversy's resolution, these doubts continued to push more than a few economists to diverge from the accepted approach.

Lester's initial attack in March 1946 reflected the author's doubts concerning the marginal productivity theory of wages in particular and marginalism more generally. The article was grounded in a survey of Southern manufacturing firms, giving Lester the 'empiricist' label (Oliver, 1947, p. 375)⁸ in contrast to the marginalists. The conclusions drawn from this piece (cf. Lee, 1984, pp. 1114-1115; Mongin, 1997, p. 3), as well as others were as follows. First, demand was considered by the decision makers of firms to be much more important in determining employment as compared to wages or other costs—this in contrast to the emphasis placed by marginalism on wages and profits.

Second, unit variable costs tend to be stable or decreasing with increased output over a normal range. These conclusions were similarly drawn by Joel Dean and Theodore Yntema in the early 1940s (Lester, 1946, p. 67). Moreover, this was the point on which Eiteman would attack conventional economic analysis nine months after Lester (cf. Lee, 1984). The important result of this was the conclusion that "business men do not determine their scale of operations by reference to marginal cost and marginal revenues at all: they simply produce all that they can sell," (Eiteman, 1947, p. 914)—viz., the methods by which firms pursued their aims posited in neoclassical theory did not hold up

⁸ The term is used here and below to reflect the empirical roots of the so-called antimarginalist group, and not to suggest that this side was anti-theoretical.

to observation. Lester had in fact found this to be the case in his survey: “unlike economists, business executives tend to think of costs and profits as dependent upon the rate of output, rather than the reverse (the rate of output as dependent upon the level of costs),” (Lester, 1946, p. 81). Thus, importantly, Lester concluded that curtailment of output is relatively unimportant in responding to increased wages, contrary to marginalist predictions. Finally, Lester found that firms do not in practice adjust capital-labor ratios to changes in relative costs.

Knowing before hand that Lester’s article was to go to print, Machlup responded in September of the same year by refining his pre-War redefinition of marginalism’s purpose (Lee, 1984, p. 1115). The argument began with a broad definition of marginalism, “the logical process of ‘finding a maximum’,” as a derivative of “the so-called *economic principle*—striving to achieve with given means a maximum of ends,” (Machlup, 1946, p. 519). Machlup similarly broadened the definitions of marginal revenue and cost to “any additional income [or outgo, respectively] expected to result either directly or indirectly from the action in question,” (Machlup, 1946, p. 524; see also Oliver, 1947). In light of these more liberal definitions, Machlup made specific the scope and depth of marginalist analysis and in the process significantly narrowed its applicability (in word, if not in practice).

To point, Machlup argued that marginalism was intended to explain and predict *changes* in prices given changes in conditions, not in any way to predict the actual behavior of firms or any particular level of price, output, &c. This contention aside, however, managers may be ‘implicitly’ considering marginal costs and revenues, the price elasticity of demand, and so on (Lee, 1984, pp. 1115-1116) by looking to the effects of price changes on any given number of expected future conditions (Machlup, 1946, pp. 522-525). Similarly, adjustments in the ratio of utilized capital to labor can be hidden in, e.g., adjustments in machine maintenance and the frequency of replacement (Machlup, 1946, p. 531 n. 14). Empiricist evidence could thus generally, and with sufficient creativity, be interpreted in marginalist terms (Lee, 1984, pp. 1115-1116).

In redefining marginalism, Machlup gave his classic automobile driver analogy in response to arguments that managers did not actually make the calculations made in marginalist analysis. In sketch, a driver passing a truck when an oncoming car is present

does not literally calculate the speeds and distances that would be involved in a scientific explanation of the event; he has, rather, developed through experience the ability to unconsciously know if there is time to pass. Moreover, the driver may not even be capable of making the ‘scientific’ calculations. Thus, Machlup argued, a hypothetical scientist’s ‘naïve questionnaire’ regarding the process would only produce “the most hopeless assortment of answers;” but “to call, on these grounds, the theory ‘invalid’, ‘unrealistic’, or ‘inapplicable’ is to reveal failure to understand the basic methodological constitution of most social sciences,” (Machlup, 1946, pp. 523-535).⁹

Lester’s 1947 reply both to Machlup and to Stigler’s 1946 marginalist analysis of the minimum wage issue, and the latter two authors’ rejoinders, took on a markedly antagonistic tone. Among many arguments, Lester assured Machlup that even a marginalist of infinite genius could not tease out a manager’s explanation of employment adjustments in terms of marginal cost and revenue. Turning to Stigler, the criticism fell on the “questionable conclusions that are likely to follow from strict application of pecuniary marginalism to wage-employment problems,” (Lester, 1946, p. 142). From this line the ‘antimarginalist’ concluded that,

At the heart of economic theory should be an adequate analysis and understanding of the psychology, policies, and practices of business management in modern industry. Contrary to the assumptions of marginalists, the quality of business management may not vary according to its compensation, nor is such management all cut to the same pattern, motivated by a single pecuniary purpose and making decisions by one method. (Lester, 1946, p. 146)

It may be worth noting that there is a great deal of similarity in these demands as compared to those in the early developments of the utility-index hypothesis discussed above, particularly as regards the importance of the psychology, as well as the multiplicity of motives and methods, of management.

⁹ Machlup would clarify that this argument only applies over many cases, not the individual, and with regards to changes in conditions (e.g. of driving conditions). His 1955 supplement argued further that even auxiliary assumptions (such as competitive type of firm) are a matter of theoretical specification, not empirical justification (1967, pp. 6-7).

Sparing the details, Machlup and Stigler's rejoinders would provide little additional argument not made in Machlup (1946), and even less toward Lester's 1947 communication. These would conclude, primarily by fairly patent misrepresentation, 1) that Lester's key conclusions were both compatible with, and generally dealt with explicitly by, marginalists' work; 2) that Lester's conclusions were not supported by evidence—e.g., that decreasing wages did not lead to increased employment (Stigler, 1947); and, finally, 3) that Lester had presented no alternative theory—Machlup going further in attacking the 'full-cost pricing' doctrine (Machlup, 1946, pp. 152-153).

Mongin (1990-91) has noted that Machlup's automobile driver analogy did not play a major role in the marginalists' defense; however, it has been my own reading that, while the analogy was not the direct focus of subsequent arguments on the antimarginalist side, it remained an implicit impasse in the controversy. While the above-quoted passage from Lester (1947) does not directly address Machlup's tautological reasoning, it suggests a place for economic theory that is at cross-purposes with Machlup's placing. That is, Lester's vision of economics was wider than Machlup's, being able to address and explain the actual economic behavior of firms and markets, whereas Machlup expressly denied the discipline the better part of this capacity. The general thrust of Machlup's argument may, furthermore, be understood as laying the groundwork for future developments in mainstream theories of the firm after the controversy. Specifically, the broadening of marginalist concepts and the dismissal of a need to build microfoundations—e.g. of decision-making processes—may have guided inquiry to some degree in the ensuing decades (more below).

Moreover, while it was noted above that Machlup himself restricted the 'Marginalist Controversy' proper to the 1946-47 articles already discussed, the AER continued to publish responses to these initial arguments in the course of the following two years. Among these, the most insightful and critical of Machlup's meta-theoretical redefinition were Oliver (1947) and Gordon (1948). Both of these articles summarily refuted the efficacy of expanding marginalist concepts to the point of saying nothing, and emphasized the need for theory to be grounded in actual processes. Oliver (1947, p. 381), for instance, argued that marginalism should explain not only price movements, but also why prices don't change when they don't, *and* why often all of this can be accounted

for by simple ‘rules of thumb’. Gordon (1948, p. 269), furthermore, found that Machlup’s broadened definitions of marginal cost and revenue simply allowed for the rationalization of any and all behavior. Between this extreme and the extreme of profit maximization and perfect knowledge, Gordon thus hoped for a middle-ground that could explain actual behavior with subjective approximations of objective magnitudes (Gordon, 1948, p. 269). To this end Gordon found traditional marginalist tools lacking:

Marginal theory can carry us only a limited distance in explaining the business decisions that are made under these conditions. Refuge in subjective interpretations of the cost and revenue functions is certainly no answer. It leaves theory saying that business men do what they do because they do it. (Gordon, 1948, p. 287)

While the arguments set forth in the AER from 1946 to 49 appear to have, in some degree, favored the critique of marginalism—with only Machlup’s 1946 article constituting a full piece on the defending side—it would be widely held by 1952 that the antimarginalists’ positions could simply be brought into marginalism without substantially altering the latter. E. A. G. Robinson, Machlup, Cartwright, Clark, and Hawkins had each said that, if average direct cost is constant with respect to different levels of output, it would coincide with marginal cost; and, if the markup on which full cost pricing focused was based at all on demand considerations, and was flexible, it could be a proxy for price elasticity of demand. (Coase, in fact, defined “ordinary marginal analysis” as “taking account of demand” in his response to Heflebower (1955, p. 394)) Firms could therefore be conceived as indirectly equating marginal cost and revenue. “Thus,” Lee (1984, p. 1118) concludes, “by 1952, there existed a widespread belief that full cost pricing was marginalism in a different language.”

While Professors Lee (1984) and Mongin (1997) both see Heflebower’s (1955) article as the final word in the controversy, it would appear just the same that Heflebower made no definite conclusions regarding the controversy. He likely did perceive his own work as showing the commensurability of full cost pricing and marginalism *via* management consideration of demand—the manner in which empirical work in support of the former was denigrated, while noting work supporting the latter, is enough to make

the point. However, Heflebower's theoretical analysis was restricted to dressing an essay on the inadequacy of the state of knowledge on the subject in the rather threadbare garb of a persuasive argument toward co-opting the antimarginalist side. Consideration of the market elasticity of demand was restricted to little more than a qualitative judgment of its existence in the first place (see Lee, 1990-91). Mongin furthermore, notes that the *ad hoc* manner in which the defenders of marginalism interpreted their own doctrine was largely responsible for preventing detailed empirical comparisons of the two sides; the formal model, in which the profit markup was explained in terms of the elasticity of demand, was never tested empirically (Lee, 1990-91).

Rather than a definitive theoretical statement or a reconciliation of arguments, the 1952 article's primary function was as a gilded medal of self-proclaimed victory for the marginalists. Coase made just this point immediately following Heflebower's work:

I have implied that Heflebower rejected the full-cost principle. Perhaps this is too strong. But I had the impression, at the end of reading his paper, that if the full-cost principle was still standing, it was only because it was supported by two old gentlemen, one of whom was certainly Demand and the other of whom looked uncommonly like Marginal Analysis. (Coase in comment to Heflebower (1955, p. 393))

That Coase's reading left him only with the 'impression' of victory for marginalism only reinforces Lee and Irving-Lessman's (1992) analysis of the three approaches to the contradicting evidence presented by the antimarginalists. In the first, it is clear that Heflebower's was the ultimate instance of several arguments of co-optation by reinterpreting marginalism and full-cost pricing so that the latter appears to conform to the former.

In addition to this strategy of theoretical co-optation by declaration, however, the even more unseemly strategies of political, ideological, and institutional suppression appear to have been well at work. In the US, for instance, only articles in opposition to Eiteman's 1947 article were printed in the AER (Lee, 1984, p. 1123). In the UK, where P. W. S. Andrew's normal-cost pricing had similarly been co-opted (Lee & Irving-Lessman, 1992, pp. 300-301; Mongin, 1990-91, p. 239), attempts were made to take

Andrews' fellowship, advancement was denied to Elizabeth Brunner (Andrews' collaborator), and graduate students were told they would suffer low career prospects for their association with Andrews (Lee & Irving-Lessman, 1992, p. 298).

Thus, by the early- to mid-1950s the marginalist dominion over mainstream theory was effectively secure. The firm would remain essentially a black box designed to maximize profits, in the long run if not the short, and effectually if not actually. From this then, profit maximization, as an empirically *unverifiable* tenet, became part of the neoclassical 'hardcore', establishing that the study of "decision-making processes was no task for a theoretician," (Lee & Irving-Lessman, 1992, pp. 300-301).

However, while it appears the marginalist controversy put to rest the more significant departures from orthodoxy as perceived threats, a significant body of research continued to be developed that diverged from the neoclassical theory of the firm proper while keeping several of the core components of that theory (see, e.g., Cyert & Hendrick, 1972). Generally speaking, the varied approaches during and after the marginalist controversy were in line with the utility-index hypothesis in modeling firm behavior as the outcome of a utility maximizing process of management. These would come to be referred to as managerial-discretion theory or managerial economics, reflecting the various goals of management central to the controlling objective function (see Williamson in Cyert & March, 1963; Cyert & Pottinger, 1979, p. 206).¹⁰ Because they maintained the marginalist 'tool' of optimization they came also to be called 'extended marginalism' (see, for instance, the closing paragraph of Baumol, 1962; Lee, 1984; Machlup, 1967). A number of select articles will be discussed presently in order 1) to see the basic makeup and evolution of these research efforts, and 2) to draw out a few basic conceptual developments expected to be of importance in subsequent chapters. (See Lee (1984, pp. 1120-1121) regarding Gordon's 1948 contribution and insights into the relation of these theories to the marginalist controversy, and (p. 1122) for a few additional references.)

Two works in 1947, Rothschild and Reder, maintained a prominent role for profit maximization in their considerations, but with qualifications. For Rothschild, this was

¹⁰ Williamson (1972, p. 1149 n.) more coherently organized the various potential goals of a management, given a purported general consensus between organization theorists and knowledgeable economists. These are salary, security, dominance (status, power, prestige), and professional excellence.

the condition that the firm's survival had been ensured. On the other hand, among the alternatives considered by Reder was that management might attempt to maximize profits on the condition that its control over the firm was not in jeopardy. This observation was then used to consider the diverging interests of the firm's owners (profit maximization) and its management (broadly, utility maximization)¹¹ where control is at issue. It is worth noting here that in Reder (1947), as in articles to be discussed subsequently, the divergence from profit maximization is taken as possible only where perfect competition—Reder used a slightly more general term: 'keen competition'—does not hold.¹²

Of the works that continued the managerial tradition after the marginalist controversy, Papandreou (1952) is a commonly cited figure, though Williamson's dissertation (1964) is likely a more refined exposition. In the years between these two works several contributions from William Baumol may elucidate key developments in this approach. Baumol's (1958) *Economica* article modeled the firm as maximizing long-run total revenue, seeking a level of retained earnings sufficient to allow for such maximization. In 1962 the author would posit an alternative model, arguing for its superior applicability to large firms. In this model the firm maximizes the rate of growth of output. Here profits were no longer treated as a constraint but as a means to expansion. Moreover, the relevant costs were divided into standard production costs and expansion costs—the latter deriving from strained entrepreneurial resources and increased risks. According to John Williamson (1966, p. 1) the expansion cost concept was first proposed by Penrose (1959) followed by Marris (1964) and thereafter Baumol as here discussed.

Expansion cost is worthy of note as it is an early example of a multiplicity of developments in theoretical costs. Baumol and Quandt (1964) would discuss another important cost-type in their formulation of 'rules of thumb' as potentially optimal

¹¹ While Reder's statements, as others, did not explicitly discuss an entrepreneurial utility function, it appears to have been generally acceptable that the arguments for alternative maximanda can be translated into such an objective function (see, for instance, Baumol & Quandt, 1964, p. 24 n. 4; cf. Nordquist, 1965, p. 43)

¹² See Winter (1971, p. 238 n. 7) who argued that "this is a bit oversimplified—unless the case considered is that of a lonely nonmaximizer in an industry full of maximizers."

mechanisms for decision-making—namely, information costs. Winter (1971, p. 242) later summarized the argument:

Once it is recognized that decision making, treated as free in conventional theory, is actually costly, reliance upon simple rules is seen as an aspect of cost minimization. Such rules yield economies in information gathering, computation, and intrafirm communication.

As Nordquist (Nordquist) wrote, from the mid-50s to the mid-60s, work on the theory of the firm followed the same battle lines as in the marginalist controversy. Specifically, the revisionists were met with essentially the same arguments, though perhaps with some new additions, designed to dismiss any need to change the traditional neoclassical framework or the profit maximization assumption. Two approaches are discussed below, the first involving the influence of operations research and managerial science, the second amounting to essentially the same methodological defense given during the marginalist controversy.

The growing skepticism with regard to the neoclassical theory of production prior to the marginalist controversy developed in tandem with a growing role for economists as business consultants. As Simon (1979) wrote, prior to WWII, industrial engineers, public administrators, and other specialists formed ‘operations research’ to look directly at how decisions are made and how these decisions could be aided by the research. This was brought into the social sciences with the establishment of ‘management science’, where the common concern was with “the *ways* in which decisions are made, and not just with the decision outcomes,” as well as “*how* to decide rather than...*what* to decide,” (Simon, 1979, p. 498). Thus, contra Lazear (2000, p. 126), there was, from a very early date in the modern history of economics, a good deal of normative work in the areas of microeconomics and industrial organization (Farrar & Meyer, 1970; Shubik, 1961; Simon, 1959, 1979).¹³

It would appear from a cursory review of the literature that the developments of normative microeconomics also offered bulwarks for the defense of the traditional theory

¹³ See also the session entitled “Managerial Economics: A New Frontier” printed in the May 1961 issue of the *American Economic Review*.

of the firm. Earley (1956) submitted survey evidence of purportedly “excellently managed” firms, suggesting that pricing behavior was consistent with marginal analysis—at least for the firms under consideration. Earley explained that his sample was intentionally restricted to “leading firms...presumably in the vanguard in the use of new management techniques.” Earley continued, “through diffusion, direct imitation, and the competitive pressures they create, they are likely to set the dominant patterns of *future* business practice,” (1956, pp. 44-45). By implication, profit maximization, or marginalist pricing, either is or, failing that, *should be* how firms behave.

In his 1963 *Journal of Business* response to revisionist theories of the firm Cohan made this argument explicit. There he argued that these theories would likely offer no important insights into positive or normative economics. On the normative side, Cohan boldly stated “it is palpably absurd...to argue that firms *should pursue* ‘satisfactory’ profits,” (Cohan, 1963, p. 316, emphasis mine). Interestingly, the argument was taken even further, suggesting that neoclassical analysis does not necessarily explain what firms do, but rather is directed toward explaining what they ought to do.

These arguments aside, however, the primary defense remained unchanged since the marginalist controversy roughly ten to twenty years prior. Bodenhorn (1959) and Cohan (1963), for instance, both conjured Friedman’s classic methodological treatise to argue that attacks on the motivational assumptions constituting the traditional neoclassical theory of the firm were irrelevant (cf. Cyert & March, 1963, p. 13; Lee, 1984, p. 1111). And again it was Machlup (1967) who explicated the primary statement of defense in his 1966 AEA Presidential address. In this, Machlup argued that the revisionist theories operated on lower levels of analysis than the traditional theory and thus were not rivals (cf. Foss & Klein, 2005, p. 13). More specifically, Machlup argued that there were numerous conceptions of the firm, depending on the area of analysis. Thus, it is,

ludicrous...to attempt *one* definition of *the* firm as used in economic analysis, or to make statements supposedly true of ‘the’ firm, or of ‘its’ behavior... The concept of the firm in organization theory, for example, need not at all be suitable for accounting theory or legal theory; and I know it is not suitable for either

competitive price theory or for oligopoly theory. (Machlup, 1967, p. 28)

On the whole, Machlup left space for alternative lines of inquiry into the theory of the firm, but maintained the traditional, profit maximization approach as, ostensibly, the most applicable to the most common matters in economics—though managerial economics may be suited in certain cases where the traditional theory would not suffice (Machlup, 1967, pp. 30-31). The implication was clear that profit maximization would remain the default model, though economists could ‘specialize’ in more peripheral topics as they saw fit. Nordquist had observed essentially the same consensus within the discipline in the prior year:

Despite the scores of assaults on it over a period of more than 20 years, the battered and bruised neoclassical theory somehow manages to stand as the principal model of the firm’s output, cost, and price behavior. (Nordquist, 1965, p. 44)¹⁴

These general trends may shed some light on the changing landscape of economics in the 1950s and 60s. Nordquist’s 1965 apprehension that managerial economics may prove “so general and so elastic that it becomes incapable of producing meaningful and refutable hypotheses,” and furthermore, that the complexity of modern firms may make well ordered preference sets inappropriate to analysis (p. 43) begs the question as to how these theoretical developments evolved into the 1970s and 80s. A review of the literature suggests that the movement was toward 1) a standardization of the interstitial framework to be considered—primarily relationships *between* firms and between owners and managers *of* firms; 2) the constraints relevant to self-interested behavior involved therein; and 3) a reformulation of the pertinent questions from the what and how of firm behavior toward the why of the firm’s existence. This last matter was indeed first explicated much earlier in the history of thought.

Theories of the Firm in the Coasian Tradition

¹⁴ More recently, Mongin (1997) has agreed that revisionist lines of inquiry were not representative of the profession.

Coase's 1937 article on "The Nature of the Firm" contained the seeds of a substantial shift in the pursuit of a theory of the firm. In this relatively short and uncomplicated piece, Coase analyzed the firm from a marginalist perspective, but not in terms of how it behaves or why it does so; rather Coase attempted to explain why firms exist at all and what determines their size. For this the starting point was to assume a society of only market transactions, but wherein all transactions had some costs associated with carrying them out. From there the firm is organized and, indeed, is defined by the profitability of circumventing the market by organizing exchanges within the firm. The size of the firm is then limited by bureaucratic rigidities (or, 'diminishing returns to management')—that is, the firm will continue to grow until it is no more profitable to organize exchanges within the firm than it is to buy on the market (see also Bowles & Gintis, 2000; Coase, 1988a; Foss & Klein, 2005). Thus, Coase reflected,

like galaxies forming out of primordial matter, we can imagine the institutional structure of production coming into being under the influence of the forces determining the interrelationships between the costs of transacting and the costs of organization. (Coase, 1988a, p. 47)

The article was, however, cited only occasionally in the 1940s and, owing to Stigler's decision to reprint it in the AEA's *Readings in Price Theory*, more in the 50s. However, it was not until the 70s and 80s that it was both cited and discussed (Coase, 1988b, 1988c; Kitch, 1983, p. 202). Arguments that the analysis was without precedent or company until the 1970s (see Coase, 1988a) are, nonetheless, not well founded. Several scholars have noted that Simon's 1951 article in *Econometrica* was essentially a formalization of Coase's approach (Bowles & Gintis, 2000; Hart & Moore, 1990) though Simon had made no mention of the 1937 article in this work. Similarly, it is clear that work by Baumol and others made 'expansion costs'—deriving also, in part, from limited 'managerial resources' and acting as the principal limit to a firm's size—a central part of their analyses of the growth of firms, as discussed above.

In truth, and as Benjamin Klein has pointed out (in Kitch, 1983, p. 202), "The Nature of the Firm" went largely unrecognized until Coase's much more influential article, "The Problem of Social Cost," (1960) wherein the argument was essentially restated. This

contribution was indeed so popular that citations of Coase's 1937 article grew exponentially from the late 1960s through the 70s (Cheung, 1983),¹⁵ and probably long after (cf. Coase, 1988a; O. E. Williamson, 1988). Coase's work, and in particular the concepts of transaction costs and the firm versus market, or make versus buy, decision, may however retain a level of distinction in its role in consolidating the many *ad hoc* alternatives to profit maximization of the time.

Beginning in the early 1970s, many economists began dealing with business practices in terms of responses to transaction costs, and this approach (appropriately coming to fall under the heading 'transaction costs economics') brought the Coasian theory of the firm—or, as Foss and Klein (2005, p. 11) have termed it, the 'modern theory of economic organization'—into the purview of orthodox analysis (Coase, 1988a, p. 35).

Work in this line was substantially underway during the 1960s and 70s, falling under headings such as the 'firm-as-nexus-of-contracts' view, principal-agent theory, and 'property-rights approach'. These arguments retained utility maximizing individuals constrained by organization structure, and emphasized transaction costs and the effects of property rights systems on behavior. Noting Boulding's (1960) concern for the ability to specify management's utility function (see similar comments from Nordquist (1965) and Higgins (1939) above) Furubotn and Pejovich (1972) claimed that such specification could be made with a very general framework emphasizing "the fundamental interplay between institutional structure and economic incentives," (Furubotn & Pejovich, 1972, p. 1149). Therein, the economic incentives at issue were those of the owners in maximizing the profits of the firm and those of the management in maximizing their utility. The prominent aspects of the institutional structure revolved around constraints imposed by the organizational structure of the firm and the structure of property rights over scarce resources. Several notable cost constructs were advanced. These included the "exchange, policing and enforcement costs of contractual activities," (Furubotn & Pejovich, 1972, p. 1141) in general. More particularly, the approach concerned itself with "the costs to the owners of detecting and policing managerial decisions and of

¹⁵ See Cheung (1983, p. 2 n.) for an extensive list of articles discussing "The Nature of the Firm," from Malmgren in 1961 to Barzel in 1982.

enforcing wealth maximizing behavior,” (p. 1149), where maximization of share-holder wealth became the proxy for the profit maximization benchmark.

Continuing this work of integration, Yarrow, noting the “plethora of *ad hoc* and relatively untested models,” (1976, p. 267) of managerial utility functions and constraints, utilized the property rights approach to compare a few of the more common managerial theories of the time. Notably, Yarrow argued that the disjointed approaches within managerialism could be substantially standardized if focus was given to the constraints on management’s discretion. For Yarrow these included not only attempts by the share-holders to maximize share value, but also the threat of involuntary take-over by other firms.

By the 1980s, Oliver Williamson—whose own dissertation had been a clear example of the managerial approach—was writing of a unified transaction costs approach in which economic institutions were functionally conceived in terms of economizing on transaction costs. In Williamson’s (1981) exposition, transactions costs stemmed ultimately from the bounded rationality of all individuals as well as the opportunism of at least some. The non-market organizations are thus seen as “devices by which to *economize* on bounded rationality,” (p. 571). The character of transactions, moreover, needed to be dimensionalized in terms of, among other things, asset specificity—the argument being that where assets, including human assets, are specialized to particular transactions or parties to a transaction we would expect costs associated with carrying the exchange out through the market.

It follows then that while managerial economics may have sprung from commonly held doubts regarding the traditional neoclassical conception of the firm—doubts that were presumably largely laid to rest following the marginalist controversy—, this approach did not simply dissipate as orthodox economics settled into its reign over the discipline. Rather, managerial economics, alongside the Chicago school theories of Coase, Becker, and the like, fed into a more general sub-discipline in which marginalist tools could be applied to topics traditionally outside the scope of economics.

Nor is this particularly surprising. Machlup himself had already in 1967 suggested a place for these alternative theories, ostensibly so long as the profit maximizing approach remained the standard in the usual areas of economic inquiry (e.g. market behavior):

proponents of managerial theories...have never claimed to be anything but marginalists, and the behavior goals they have selected as worthy for incorporation into behavior equations, along with the goal of making profits, were given a differentiable form so that they could become part of marginal analysis. Thus, instead of a heated contest between marginalism and managerialism in the theory of the firm, a marriage between the two has come about. (Machlup, 1967, p. 29)

Moreover, a common historical root can be found in that all of these various branches developing out of the 1970s and 80s can be seen as responses to Berle and Means' observation that the modern corporation is marked by a separation of ownership and control (Foss & Klein, 2005, p. 27; Kitch, 1983, p. 174). The response in each case was to retain the optimization principles of marginalism, but to apply these principles to the organizations—in particular, firms—themselves, thus recognizing the intra-organizational interstices of modern firms (see O. E. Williamson, 1981); the controlling actors operating at these points; their relevant motives; and, importantly, in terms of constraints, methods. These lines of inquiry effectively diverted some of the interest in the theory of the firm from pricing behavior and the like toward the firm's organization as an interesting construct in itself (Foss & Klein, 2005, p. 2; see also O. E. Williamson, 1985, pp. 23-29 for further discussion of the variety of approaches to contract in industrial organization).

Conclusion – The Knowledge Governance Approach

While there remains a great deal more work that could be discussed, the above narrative is sufficient for understanding an important development in recent research on the theory of the firm—namely, the Knowledge Governance Approach (KGA). As proposed by Foss (2007),¹⁶ KGA represents a convergence of transaction costs economics and the “broad interest in the management of knowledge that has characterized many fields in business administration during the last decade,” (Foss 2007, p. 30). As in TCE this approach seeks efficiency explanations of inter- and intrafirm organization, adding the key dimension of costs and capabilities in terms of knowledge

¹⁶ Foss and Mahoney (2010) cite Grandori (1997) as the originator of the term ‘knowledge governance’.

processes—i.e. the transfer, creation, and sharing of knowledge. The definition of a knowledge transaction thus implies a new set of costs in terms of the explicitness, ‘teachability’, complexity, &c. of these transactions. Indeed, Foss and Mahnke (2003) argue that the explicit definitions of costs involved in the knowledge processes of organizations is an important, and otherwise neglected, concept in the knowledge-management literature, and possibly the knowledge movement in general (Foss, 2007, p. 37).

The Knowledge Governance approach is, furthermore, explicitly tied to the resource-based view of the firm in the fields of strategic management, organizational economics, and industrial organization (see, e.g., Mahoney & Pandian, 1992; Wernerfelt, 1984). This view focuses on firm heterogeneity in terms of differential advantages derived from unique resources and the capabilities garnered therefrom.

While it appears that implications of the KGA have been confined primarily to management research thus far, some insights might be drawn from its central concepts in light of the broader history laid out above. First among these is that the unit of analysis has changed as the notion of the firm has evolved. Interestingly, the marginalist revolution took, at least implicitly, the factors of production (coming ultimately to be located in house holds) as the units of analysis in the theory of production and distribution. The firm as an entity in its own right was however eschewed in favor of a simple principle of motive and method (profit maximization) and a cost structure defined by an exogenously given state of technology.

In the marginalist controversy the firm as a black box was defended as an adequate unit from which to derive outcomes of market behavior—with the factors of production theory behind it maintained as essentially beyond refute. Subsequently however there has been inquiry into these inter- and intra-organizational processes of modern firms and the unit of analysis has moved to the transaction (more recently, the knowledge transaction or the problem).

This change in the unit of analysis is important because it is from the unit of analysis that costs are derived. Thus the factors of production are the source of transformation costs, transactions the source of transaction costs, and knowledge processes the source of knowledge costs. Subsequent research in the TCE tradition has

dealt with dimensionalizing these costs which should prove a ripe area for empirical verification of actual costs incurred. Indeed, the application of the TCE framework to management research may be beneficial in focusing this research on the individual level (Foss and Mahoney (2010) argue this point explicitly). This in turns offers the potential for an integration of management and economic theory with contemporary research in psychology (see, e.g., Cabrera, Collins, & Salgado (2006) on motivation psychology and knowledge sharing).

A final question remains, however; and it is an important one: how is knowledge in this framework to be considered at the aggregate-, social-, or community-level, and where does the firm stand in relation to this concept of knowledge? To explain, the firm was initially conceptualized as a locus of productive contributions defined by an exogenous state of the industrial arts. Under the KGA knowledge itself has been incorporated into the workings of the firm; but the question remains, is this incorporation of knowledge limited to the knowledge in hand and of use to the firm or firms under analysis, or is there still a conceptual space for knowledge at a social level—incorporating the broader concept of a community’s on-going capability of reproducing itself? This, it would appear, is the central problem that future research will face in applying the findings of management research, organizational and industrial economics, &c. to economics in general.

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