

THE METHODOLOGY OF PROFIT MAXIMIZATION: AN AUSTRIAN ALTERNATIVE

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For nearly a century, the assumption that the firm maximizes profits has been front and center in neoclassical economic theory. Tollison (2003) writes:

Recall the extensive debate about whether firms maximize profits in the 1940s and 1950s. This was a useful interlude in economics, but it mostly served the purpose of forcing scholars to be more careful in framing maximization hypotheses, and as a consequence, the profit-maximization hypothesis is basically a non-issue today.

Indeed, there has been a rich literature on the subject—based mostly around the behavioral view of the firm—that for the most part has remained on the periphery of mainstream economic thought.¹ That economists would question the methodology of the dominant paradigm is understandable, given that the standard “theory of the firm” is based upon rigid assumptions that do not seem to be particularly realistic. Cyert and Hedrick (1972) note:

The unmodified neoclassical approach is characterized by an ideal market with firms for which profit maximization is the single determinant of behavior. Thus predictions can readily be made by combining the description of the market with the results of maximization of the relevant Lagrangian. (p. 400)

Perhaps the most important of the assumptions that make up the theory of the firm is the assumption that firms maximize profits (and minimize costs) by setting output where marginal costs equal marginal revenue. Hirshleifer (1980) writes, “According to the classical formulation, the aim of the firm as a decision-making agent is to maximize (economic) profit” (p. 265).

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¹Cyert and Hedrick (1976) outline many of the alternative or revisionist discussions on the firm that will be presented in the literature review here.

Of course, the firm to which this assumption holds is what Hirshleifer calls “an artificial entity created in response to economic incentives,” but nonetheless, it is the subject of much study and speculation.

This is hardly to say the issue truly is settled, at least within some quarters of the economics profession. For example, the recent very public split in the economics department at Notre Dame University, one of the nation’s elite institutions of higher learning, demonstrates that there is dissatisfaction with the standard approach to the theory of the firm, and, indeed, with the standard neoclassical approach to economic science, not to mention the hypothesis that individuals act rationally within economic settings.

Austrian dissatisfaction—for that matter, neoclassical dissatisfaction—with the theory of the firm has been well known for a long time. Coase (1937), in his well-known paper, described the firm as a nexus of contracts. As Klein (1999) points out, a rich literature has arisen from the neoclassical front that attempts to enable economists to peer into the “black box” of the neoclassical firm. Authors include Williamson (1975, 1985, 1981) who has emphasized the “bounded rationality” of players within a firm, Klein, Crawford, and Alchian (1978), Grossman and Hart (1986), and Hart and Moore (1990), all of whom approach the firm from a “transactions cost” viewpoint.

While we welcome this literature as part of the larger discussion on the merits of the mainstream theory of the firm, this paper has a much more narrow focus. We attempt here to challenge the assumption that the firm automatically “maximizes profits” *through the mechanism of setting marginal costs equal to marginal revenue*, and examine, instead, alternative views that place firm decision makers in a real-world situation. (We do not attack the “rational decision maker” approach, however.) This is *not* to say that a firm owner does not set out to “maximize profits,” but rather that the constraints of time and uncertainty do not make the standard neoclassical explanation of how the firm accomplishes that goal particularly plausible. At best, we argue, the decision makers within the firm must pick other mechanisms for determining the success of the firm—in both the long *and* the short run—in order to accomplish long-run goals of maximum profitability.

Furthermore, we believe that the long-ignored points made by Rothbard (1993) and (to a much lesser extent) Baumol (1967) offer a wealth of alternative explanations that not only challenge the existing theory but also present plausible courses of action that firm decision makers will take in the absence of the kind of information needed for the neoclassical theory to be realistic. Using the works of the two authors, along with Menger (1976), we will present another view that includes time, uncertainty, and other factors that real decision makers within the setting of the firm face on a daily basis.

ANOTHER LOOK AT THE NEOCLASSICAL METHODOLOGY OF PROFIT MAXIMIZATION

The assumption of profit maximization naturally raises some questions as to what it really means. For example, profit maximization relative to what? Is it relative to the maximum return that anyone is receiving in any market at any time? Is it maximum relative to others in a particular industry or even country? Is there any way to “objectify” a term that by its very nature would seem to be subjective? These are not idle questions, and while they will not be discussed at length in this paper, they still are germane to the issue at hand.

Furthermore, the “duality” to profit maximization being cost minimization, we are left with another problem: the subjectivity of costs. How does one effectively “minimize” an entity that will meet the standards of all principles involved with the firm, since minimization truly is “in the eye of the beholder”? Again, while we do not try to answer that question (Is there really an effective answer here?), the question is worth asking if for no other reason than that it does point out the difficulty of depending upon an assumption like “profit maximization” that can be “solved” in the classroom using differential calculus, yet in the “real world” has no obvious solution.

However, the assumption persists in large part because it seems to be self-explanatory; the “economic problem” to be solved in neoclassical economics is for a firm or individual to maximize an objective function in the face of constraints, cost and otherwise. The firm faces constraints both with the physical nature of production (the production function) and costs (due to the production function and input prices), all of which are a “given” in the neoclassical theory of the firm.²

Ultimately, then, according to the theory, the firm has a profit function of total revenues minus total costs. To maximize this profit (objective) function, one sets the first derivative of this function to zero, with the solution ultimately being that in order to maximize profit, the firm sets output where marginal costs equal to marginal revenue.³ Thus, the problem for the firm to solve

²Rothbard (1993, p. 529) strongly criticizes this neoclassical paradigm, writing: “One of the aspects of this superficiality [of the artificiality of cost curves] is the assumption that prices of productive services are given, without any attempt to explain them.”

³The mathematical proof is given as follows, where π = profit, TR = total revenues, TC = total costs, MR = marginal revenue, and MC = marginal cost. We say $\pi(Q) = TR(Q) - TC(Q)$, and $d\pi/dQ = dTR/dQ - dTC/dQ = 0$, so $dTR/dQ = dTC/dQ$. Since dTR/dQ = marginal revenue and dTC/dQ = marginal cost, therefore profit is maximized where marginal revenue = marginal cost or $MR = MC$. When a firm is in perfect competition, since price equals MR, the profit-maximizing firm sets output where price equals marginal cost. However, when a firm is in imperfect competition, price > MR, which means that the price where output is set where $MR = MC$ will be greater than the price if output is set where $MR = \text{demand}$.

is to determine where to locate output, given costs and demand for the product to be sold.⁴

Hayek (1945) examines the same line of argument in the opening statements of his well-known paper:

What is the problem we wish to solve when we try to construct a rational economic order? On certain familiar assumptions the answer is simple enough. *If* we possess all the relevant information, *if* we can start out from a given system of preferences, and *if* we command complete knowledge of available means, the problem which remains is purely one of logic. That is, the answer to the question of what is the best use of the available means is implicit in our assumptions. The conditions which the solution of this optimum problem must satisfy have been fully worked out and can be stated best in mathematical form: put at their briefest, they are that the marginal rates of substitution between any two commodities or factors must be the same in all their different uses. (p. 519; emphasis in original)

However, Hayek adds, the real questions that face individuals veer from the established mainstream economic thought:

This, however, is emphatically *not* the economic problem which society faces. And the economic calculus which we have developed to solve this logical problem, though an important step toward the solution of the economic problem of society, does not yet provide an answer to it. (p. 519; emphasis in original)

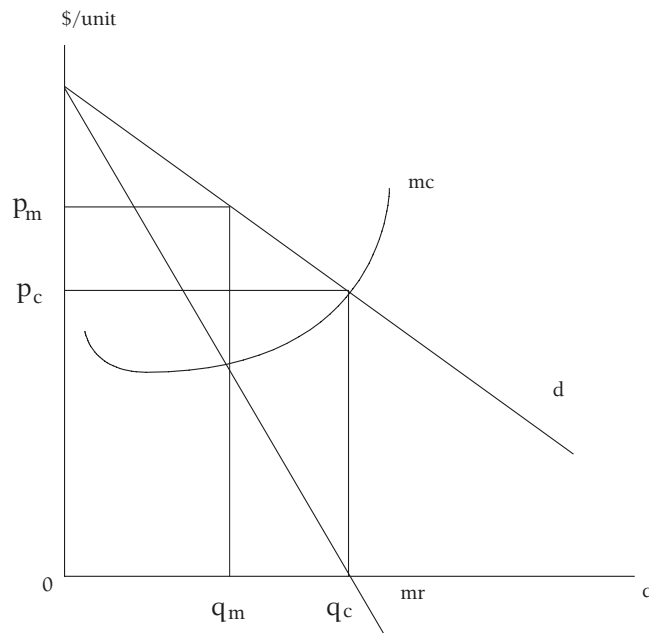
There are other parallel assumptions here, such as the state of information that is held by both buyer and firm owner/management. In perfect competition, everyone has command of all necessary information, while in imperfect competition, the situation becomes somewhat more murky, as we assume that all parties have access to all necessary information, but that the firm's "market power" enables it to face a downward-sloping demand curve, a situation that permits the firm to set output at a level where the price charged is a "monopoly price," as opposed to a "competitive price" that occurs when output is set where marginal cost equals price. Figure 1 illustrates the standard neoclassical approach, including both the monopoly and "competitive" prices and outputs of the firm.

Within the highly-stylized world of neoclassical economics, all of this is axiomatic and needs no further explanation. Whether or not it reflects a real-world view of things is seen as irrelevant, given that the economics profession generally accepts the Friedman (1953) thesis that realistic assumptions are

⁴This certainly is true when one assumes a firm to be in a state of perfect competition, since the firm does not have "market power" that can influence either the price of the product or the prices of the inputs it uses. The situation does become somewhat more complicated when the firm is in imperfect competition, since it may or may not have some "market power" over input prices and its actions (such as aggressive marketing) also can influence demand.

irrelevant to economic modeling as long as a theory effectively predicts events. Thus, even if a business owner does not cognitively try to set marginal costs equal to marginal revenue (or is even aware of what those figures might be), it can be assumed that he or she is doing it anyway, since the theory holds it to be true. To quote Tollison again, for most economists this certainly is a “nonissue.”

Figure 1



At this point, let us say that *if* all market participants were privy to all of the relevant information, *if* time did not factor into business decisions, *if* business decision makers were always aware of their particular demand curves, *if* business owners were fully aware of all of their costs at all times, and *if* they were in the minute control of their operations that would permit them to consistently set output where $MR = MC$, then, indeed, this would be a nonissue. However, we also know from experience that *none* of the provisions we have listed are true, yet neoclassical theory operates as though they were. Therefore, one asks if a better explanation of business behavior exists than what is offered in the standard neoclassical models, an explanation that takes time and uncertainty—a staple of business operations—into consideration. That is what we attempt to provide here.

The neoclassical model is unsatisfactory, we believe, not only because its assumptions are unrealistic, but also because it misinterprets human action

within the setting of the firm, and it operates upon the outdated and inaccurate assumption that prices of the final product are determined by the costs of the factors of production, which certainly goes directly against the insights provided first by Menger (1976) and others within the tradition of Austrian economics. If one is going to interpret the workings of the firm through the Austrian paradigm, then the standard neoclassical model needs to be rejected—and replaced with something that is more complete in its ability to explain firm decision making.

ROTHBARD'S MODEL

The model developed by Murray Rothbard realistically places *time* front and center in its analysis. In the neoclassical system costs, production, and sales occur concurrently, or at least one can assume that no more than a nanosecond passes from when costs are incurred during production to the sale of the final good. In such a state, the decision-making process is quite easy, as the producer always has the latest information for the setting of output in order to be able to maximize profits.

Yet, such assumptions leave out the reality of how firms make decisions regarding output and sales. As Rothbard (1993) points out, production costs occur before sales, something that has important implications for the firm. Hoppe (1999) writes:

Production, explained Rothbard, *precedes* the sale of the final products, and production costs must be incurred *before* consumers can demonstrate their preference for one's products. Hence, it is nonsense . . . to define a monopoly price as a price above marginal cost (or of marginal revenue higher than marginal cost) because the cost curves on the one hand and the demand and revenue curves on the other do not exist simultaneously. (p. 235; emphasis in original)

The action of the producer/entrepreneur, then, is governed by what he *perceives* future business conditions to be, or at least what business conditions are expected to be when he anticipates the goods to be sold. Notes Rothbard (1993):

Every entrepreneur . . . invests in a process because he expects to make a profit, i.e., *because he believes that the market has underpriced and undercapitalized the factors* in relation to their future rents. If his belief is justified, he makes a profit. If his belief is unjustified, and the market, for example, has really *overpriced* the factors, he will suffer losses. (p. 466; emphasis in original)

In Rothbard's view, the firm's decision makers must predict both the prices at which they can sell the final goods and the prices they will pay for the factors of production. These decisions must be made upon the basis of imperfect information that only will be revealed throughout the production

and sales process. In what would be called the “immediate run,” the entrepreneur/producer must be able to predict what will occur over the “long run” in order to find out if the firm’s operation is profitable, or experiences losses.

It is important to note here that in the “immediate run,” the entrepreneur/producer can only anticipate what marginal cost and marginal revenue might be; in the “long run,” as we already have pointed out, the standard *must* be maximization of revenue, given that costs already have been paid. To put it another way, the $MR = MC$ paradigm cannot effectively hold either in the “immediate run” or “long run.”

For a real-world example, let us examine the market for snow blowers during a recent winter where we live in western Maryland. The average winter snowfall in this area is about 30 inches, and many people own gasoline-powered snow blowers. In November, December, and January, the local Lowes had a number of \$600 snow blowers lined up in front of the store, along with an array of snow shovels. The last few winters had been relatively mild, however, and blower sales have been somewhat slow.

The winters of 2002-03 and 2003-04, however, were much colder with more snow than previous winters, and by early December in both years, the area already had experienced two large snowfalls. In mid-February 2003 a huge storm dumped more than two feet of snow in the area overnight, and within a few days neither a snow blower nor snow shovel could be found in the area. In the neoclassical model, the quick shift in demand would result in (1) higher money prices at the retail level, (2) more profits for the *producers* of the snow blowers and snow shovels, and (3) the producers would quickly make more snow blowers and snow shovels, and the stores in western Maryland would quickly purchase more of each. Unfortunately for the neoclassical model, none of these things occurred.

While the snowstorm quickly increased demand for the blowers and shovels, it did not result in higher prices, since Lowes already had priced them before the winter season began. (One can expect that prices for such goods in their *secondary* markets rose, however.) The producers of snow shovels and blowers had to decide how many goods they would produce when the weather was still warm, depending upon projections of what they believed would be the severity of the coming winter, and what they believed they could profitably sell.

Lowes, which purchased the goods from the manufacturers, had a number of decisions, the most important being how many to buy. Whether the purchasing agents were depending upon the *Farmers’ Almanac* or an “authoritative” source on the weather, they had to decide long before winter just what they might hope to sell, given an average winter. Assuming the agents knew that the area would receive more than 50 inches and two feet in one storm, they certainly would have ordered more than they actually did.

The last set of shovels and blowers sold in mid-February, but those who produced them already had received payment for them. Furthermore, the employees who made the blowers and snow shovels were paid at about the

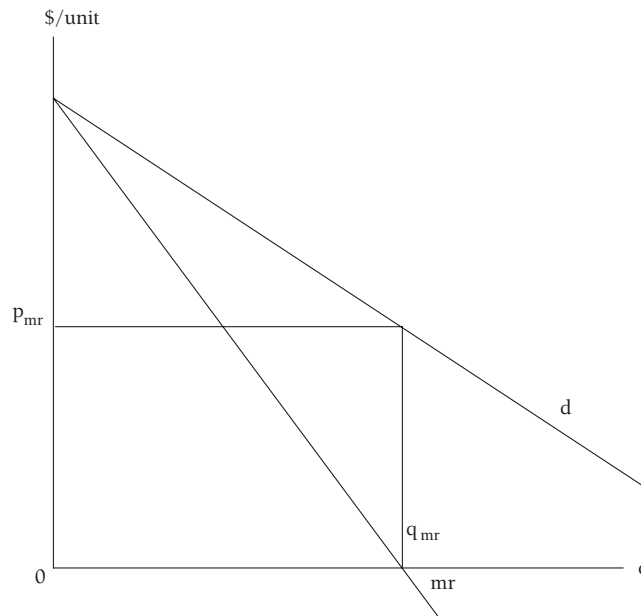
time the goods were produced—and long before they ever were sold at Lowes or at any other retail outlet. To even infer that the payments to owners of the factors of production and sale of the final goods occurred simultaneously, which is the case with the neoclassical models, is silly.

Defenders of the model, of course, have an answer for such examples. The model, they say, is not supposed to *mirror* reality, but rather *predict* it. The model, as they would rightly point out, shows that if demand increases for goods like snow blowers and snow shovels, that firms will look to meet the new demand.

What the defenders fail to see, we believe, is that a legitimate model should be able to do more than just predict events; it should also be able to *explain* them in the Mengerian sense of identifying their essential causes. (As Menger writes in his opening chapter, “All things are subject to the law of cause and effect” [p. 51].) The standard model fails to do just that, and that is why we hold that it needs to be replaced by something that works better.

The Rothbard view that firms would seek to maximize revenues (as is seen in Figure 2) reflects the reality that when it is time to sell the final product, all previously-incurred costs *must be regarded as sunk costs*. By their very nature, they cannot influence the price of the final good. Instead, the price that the final good can retrieve within the current market setting will influence *future costs*, as production decisions for goods to be manufactured and sold later are made with current and anticipated prices in mind.

Figure 2



If producers could be certain about the future, then they would be able to produce within the bounds of the neoclassical model, since they would have all the necessary information. Given that the very presence of time means that uncertainty abounds, however, any model that fails to capture the existence of uncertainty is incomplete at best and useless at worst.

Using the snow example again, had the producers of blowers and shovels (along with the retailers of these goods) known what was in store for East Coast residents, no doubt different production and pricing decisions would have been made during the warmer months when plans were being made for winter sales. In the end, however, the manufacturers and retailers had to adjust to the new realities caused by the harsh and unexpected weather.

BAUMOL'S MODEL: PRESENTATION AND CRITIQUE

We include Baumol's revisionist model (1967) even though it is substantially weaker than what Rothbard presents and is more easily subject to criticism. He notes that his own observance of firm behavior demonstrated that firm management often would seem most interested in total revenue or sales. He writes:

Though businessmen are interested in the scale of their operations partly because they see some connection between scale and profits, I think management's concern with the level of sales goes considerably further. In my dealings with them I have been struck with the importance the oligopolistic enterprises attach to the value of their sales. A small reversal in an upward sales trend that can quite reasonably be dismissed as a random movement sometimes leads to a major review of the concern's selling and production methods, its product lines, and even its internal organizational structure. (p. 45)

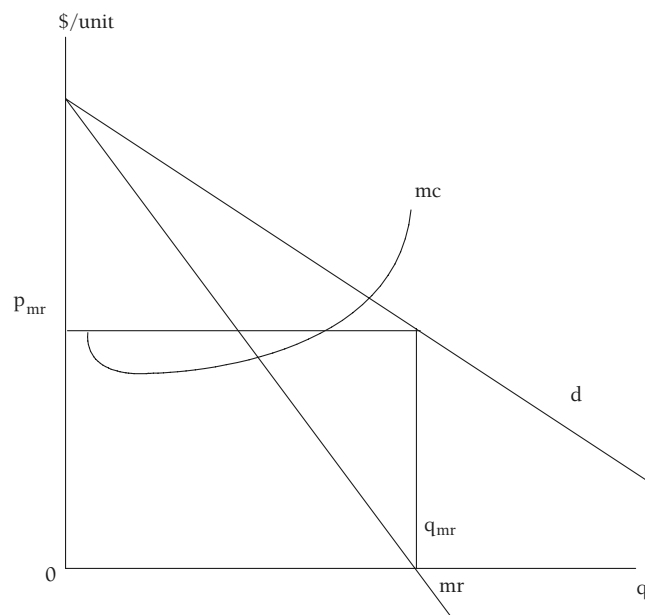
Nicholson (1995) adds:

Most important, when firms are uncertain about the demand curve they actually face or when they have no reliable notion of the marginal costs of their output (as may be especially true in multiproduct firms), the decision to try to maximize sales may be a reasonable rule of thumb for assuring their long-term survival. Indeed, a number of management consulting firms stress to their clients the importance of maximizing their "market share" as a way of protecting themselves against the vagaries of the market. (pp. 415-16)

Nicholson then uses Figure 3 to demonstrate through use of a graph how such a price and output scenario would look. As one can see, in this graph, the output and price are set at a level that maximizes revenues ($MR = 0$), but it also depicts a situation that is a logical absurdity. The producer in this case is *deliberately* setting price below marginal cost, something that makes no sense in the neoclassical framework.

What Nicholson does not point out—yet it is the heart of the issue—is that if a producer constantly were cognizant of both marginal cost and marginal revenue, then there would be no reason for the Figure 3 price and output scheme, yet that is the assumption built into that particular model. The point here is that a producer will attempt to maximize revenues *in the face of uncertainty*, which means that the placement of a marginal cost curve into that model simply is nonsensical, since no one would know where it should be placed. In fact, given the uncertainty that is assumed into such a model, it would be no less instructive to place the marginal cost curve at a place where $P > MC$.

Figure 3



One can argue that if the placement of a marginal cost curve into the figure is arbitrary, so then is the attempt to set price and output where $MR = 0$, since uncertainty exists and the producer is not likely to know at which point that revenues actually are maximized. That is true, as far as it goes, but the larger point being made is that the setting of price and output where $MR = 0$ is an approximation of *real action* taken by the seller. To put it another way, in models such as depicted in Figures 1 and 3, marginal cost is a given, while the setting of price and output represents actual choices and actions that the seller undertakes.

Furthermore, the producer in imperfect competition (where the demand curve is downward sloping) does have some control over price and output, although those choices obviously are constrained by its demand curve. The

question at hand, then, is how does the seller, given the information that he possesses, decide to price the product in order to maximize sales revenues?

Baumol, while raising the point of uncertainty and the inability of the producer to operate according to the profit-maximizing assumption, does bring a challenge to neoclassical theory, albeit a weak one. However, because he fails to place time within the model, his options for explaining firm behavior are severely limited. Rothbard, on the other hand, presents a more complete picture of how firm decision making works in the presence of uncertainty precisely because time is at the center of the model.

THE SCENARIO OF “SUNK” REVENUES

While the Rothbard model easily applies to “sunk” costs, one can also apply it to the situation that is common within the business world, that being the future sale of goods that have not yet been produced. Using the snow blowers example again, we look at the situation in which Lowes might contract with a manufacturer to deliver a large number of snow blowers to its “snow belt” stores.

Under the terms of such an agreement, Lowes will contract to purchase the blowers at a certain price long before the blowers are manufactured. Thus, the manufacturer is faced with a different set of circumstances from the firm which produces the goods first, then tries to sell them. In this case, the goods are sold beforehand, so the producers know what revenues to expect.

Given that set of circumstances, the managers most assuredly will look to *minimize* the costs of producing the snow blowers. Now, within the paradigm of profit maximization, its duality is cost minimization, so at first glance it would seem that the neoclassical theory might hold. However, time and uncertainty still play a crucial role in analyzing this situation.

There is no criticism of the view that firm owners wish to maximize their profits; the issue is how the owners actually engage in such behavior, and the sets of dynamics behind their actions. As we have noted before, if one does away with the assumption of perfect knowledge and foresight, then profit maximization via marginal cost equals marginal revenue simply cannot stand up to economic analysis.

Going back to the firm that has pre-sold its snow blowers, one remembers that the firm’s managers negotiated the contract with the retailer *in anticipation* of a certain set of costs. The actual costs to the firm might very well be different over the course of when the goods are manufactured, but once the revenues have been negotiated, they become “sunk” in the sense that the firm’s subsequent actions are not going to be revenue driven, but rather cost driven.

For example, in the late spring of 2000, gasoline prices spiked very quickly after the implementation of new federal clean air policies that resulted in a number of supply bottlenecks around the country. However,

United Parcel Service was able to enjoy a cost savings over its competitors because the company had negotiated long-term contracts with gasoline suppliers to provide gas at a price that was significantly lower than the market price of gasoline that spring.

At the time the contract was struck, it is most likely that neither party could foresee the wild price swings that characterized the oil and gasoline markets in May and June of 2000. Indeed, many firms were to experience unanticipated cost increases in fuel that damaged their prospects for profitability. Instead, they had to live with the decisions that created production and distribution plans which did not take into account the huge price hikes in fuels during that period.

Indeed, the problems facing producers that lock down negotiated prices for goods not yet produced are not unlike the pitfalls that producers who sell their goods *after* incurring their costs. In the first case, the producers will have to deal with the uncertainty of prices to be paid for the factors of production (Menger's *higher order* goods), while the latter must successfully anticipate the prices for the "final" products (Menger's *lowest order* goods). While the former has the advantage of knowing the coming revenue stream, such knowledge will be useless if the business cost climate turns for the worse.

The $MR = MC$ paradigm cannot hold for either case. In the first scenario, although costs are incurred *after* the negotiated sale of future goods, there can be no guarantees that the anticipated cost structures will hold. The incentive in this case is for the firm owner/manager to negotiate the highest revenues possible given what output the owner/manager reasonably believes the firm can produce. What does *not* occur here is the owner/manager attempting to negotiate a "monopoly" output as opposed to a "competitive" one, nor does such a scenario even contain the possibility of such action.

Mund (1933) explains why this is the case:

Many economists, in plotting supply and demand "curves," fail to consider that a curve of buyers' *valuations* cannot logically be plotted against a curve of sellers' *monetary costs*. The two are in an entirely different plane. The process of market exchange is a subjective one in which buyers and sellers match and adjust their *respective* valuations. In this process monetary costs are one of several factors which influence a seller's valuations; but, as such, they are distinctly an objective factor and logically lie outside of the subjective valuation. (p. 129, n. 11)

Salerno (2004) further emphasizes the role of time in the managerial decision-making process:

For the Mengerian price theorist, all economic phenomena emerge out of causal adjustment processes that have both a beginning and an end, so he is vitally interested in both the immediate and long-run factors that shape market outcomes. . . . More generally, at every moment on all markets actual prices are determined, on the one hand by the total existing stock of the good which has resulted from past production decisions, and, on

the other hand, by the total demand for the good based on the momentary valuations of the buyers (and sellers, if we take into account their speculative reservation demand for units of their own good). In this “immediate run” of the real-world market economy, all production plans have already been consummated and the quantity of the product is fixed and at hand, so that money costs are now irrelevant and the marginal apparatus is inapplicable. (pp. 79-80)

This explanation of the behavior of the firm differs greatly from what has become standard in neoclassical analysis in short-run and long-run analysis. Salerno (2004) explains that the textbook long-run view “is an analytical construct characterized by optimal resource allocation that never materializes in reality because of ceaseless exogenous change and the resulting milieu of all-pervasive uncertainty in which entrepreneurs plan and undertake production decisions” (p. 81). Firm owners and managers engage in *planning* for the long run, but must deal with business conditions *as they occur* once they have set forth their plans. Such occurrences always happen *in the short run* when we see plans either come to fruition or are in need of being reworked precisely because reality has demonstrated that such plans are incorrect—or failed to adequately predict the future.

CONCLUSION

While the $MR = MC$ profit-maximizing model that is used almost religiously by the economics profession has been challenged over the years, it still remains the dominant model to explain firm behavior. However, its popularity does not mean that the model accurately describes what actually occurs in firm decision making. Given that modern mainstream neoclassical economists have failed (through omission or commission) to examine their models through the lens of time, they have lost that component that presents accuracy and enrichment to their arguments.

This paper has incorporated challenges to the dominant neoclassical model that were fashioned by Rothbard and, to a much lesser extent, Baumol. In examining the work of both economists, we conclude that the Rothbard model is more complete, as it factors time into the model, where Baumol’s does not, which renders it fatally incomplete. Both authors, however, make a solid point that if one is to analyze the workings of the firm *in the real world*, other models such as revenue maximization must be taken into account if we are to assume that firms attempt to maximize profits.

To be sure, there is much work to be done in the creation of alternative theories of the firm. Klein and others have attempted to build upon the work of Mises and Rothbard to construct a theory of the firm that can stand up to intellectual scrutiny *and* explain the various aspects of the decision making process within the firm. We attempt through this paper to add to this alternative theoretical construct.

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