FROM MARSHALLIAN PARTIAL EQUILIBRIUM TO AUSTRIAN GENERAL EQUILIBRIUM: THE EVOLUTION OF ROTHBARD’S PRODUCTION THEORY

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ABSTRACT: This paper analyzes a recently reconstructed proto-chapter of Rothbard’s Man, Economy, and State (2009 [1962]) tentatively titled “Chapter 5: Producer’s Activity” (Rothbard, 2015 [1953]). In it, Rothbard used many concepts of standard neoclassical microeconomic analysis that he would later criticize, such as perfectly competitive markets and the isolated firm. This paper juxtaposes the proto-chapter with Rothbard’s finished work and argues that after grappling with the problems of Marshallian partial equilibrium production theory, Rothbard substituted it with an Austrian general equilibrium analysis. This distinctive approach did not construct production theory from the vantage point of an isolated price taking firm, but rather viewed the overall economy as a temporal and dynamic production structure with the capitalist-entrepreneur occupying the central role. This Austrian production theory has important consequences for understanding the efficiency of markets, the formation of output and input prices, and the profit-maximizing output level of an isolated firm.

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Concentration on a single firm and the reaction of its owner is not the appropriate route to the theory of production; on the contrary, it is likely to be misleading. In the current literature, this preoccupation with the single firm rather than with the interrelatedness of firms in the economy has led to the erection of a vastly complicated and largely valueless edifice of production theory (Rothbard, 2009 [1962], p. 455).

I: INTRODUCTION

Murray Rothbard’s *Man, Economy, and State* (2009 [1962]) is a landmark book in Austrian economics. Following earlier writers, especially Ludwig von Mises (2008 [1949]), it is written in the form of a treatise that derives the general body of economic theorems from the ground up, starting with isolated individual action, moving on to various forms of interpersonal exchange, and ending with government intervention. When developing this economic organon Rothbard synthesized the works of many economists working in the Austrian tradition, including Carl Menger, Eugen von Böhm-Bawerk, Frank Fetter, Phillip H. Wicksteed, Ludwig von Mises, and F.A Hayek. The Austrian approach concentrates on issues such as real world price formation, entrepreneurship and the market process, and the relationship between time and the production structure. It uses the praxeological method—deduction grounded on the axiom that humans act purposively along with other realistic assumptions, such as that there exists a variety of natural resources and that humans value leisure as a consumer good (Salerno, 2009, pp. xxxii–xxxiii).

One of Rothbard’s monumental contributions was the construction of a systematic production theory that integrated various strands of thought developed by earlier writers working in this tradition, which included capital and interest, the structure of production, rent and factor pricing, and entrepreneurship theory (Salerno, 2009, p. xxvi). For example, one achievement was his integration of the Mises-Fetter pure time preference theory of...
interest with the Hayek-Knut Wicksell structure of production analysis (Salerno, 2009, p. xxvii; Rothbard, 2009 [1962], p. lvii). In general, his production theory integrated all of the interrelations of the production structure and set out to actually explain the formation of output and input prices throughout the economy. This synthesized Austrian production theory is different from the more well-known Marshallian partial equilibrium approach. The latter approach is best represented in modern economics by Chicago production theory, which was mainly developed by George Stigler and Milton Friedman, who built off the works of Alfred Marshall and Frank Knight (Salerno, 2011, pp. 1–2). This theory analyzes equilibrium production decisions from the viewpoint of an isolated firm with given input and output prices.¹

In contrast, Austrian production theory is the halfway house, or middle ground, between excessive microeconomic analysis, which is the Marshallian partial equilibrium approach that concentrates on a single firm facing fixed prices, and excessive macroeconomic analysis, which is the contrasting Keynesian aggregative approach that hermetically seals off sectors of the economy from each other. It shows that a change in any sector of the economy must always impart its influence through repercussions in the structure of prices and production in other sectors. This Austrian general equilibrium is starkly different than Walrasian general equilibrium for three important reasons. The first is that it is dynamic and not static because it shows the equilibrating processes between equilibrium states that are driven by profit seeking capitalist-entrepreneurs and emphasizes the importance of uncertainty and change. The second is that it recognizes the temporal heterogeneous capital structure. The third is that it expresses its theorems using verbal logic rather than non-causal mutually determined mathematical equations (Rothbard, 2009 [1962], p. 361; 2008 [1963], pp. 65–66).

At the beginning of his treatise, Rothbard laid out this distinction:

¹ In this paper the Chicago “theory of the firm” refers to the “black box” production function view where the firm is given a set of underlying data and chooses its output level through mathematical optimization (Klein, 2010a [1996], pp. 3–4; Foss and Klein, 2012, pp. 136–137). It does not refer to the Coasean theories that analyze the reasons for the existence, organization, and limits of the firm. With regards to the latter, Rothbard was heavily influenced by Coase and was one of the first economists to incorporate the Coasean framework (Klein, 1996, pp. 13–18).
One “radical” feature of our analysis of production is a complete break with the currently fashionable “short-run” theory of the firm, substituting for this a general theory of marginal value productivity and capitalization. It is a “general equilibrium” analysis in the dynamic Austrian sense, and not in the static, currently popular Walrasian sense [author’s emphasis] (Rothbard, 2009 [1962], p. lvii).

What is unknown is that the original drafts of Rothbard’s treatise contained a production theory grounded in Marshallian partial equilibrium theory, and that it was only after writing large parts that Rothbard realized much of it was untenable. Only in a 1990 interview did Rothbard briefly mention the lost chapter, stating that “I took Chapter 5 out of Man, Economy, and State, which included the usual cost-curve analysis. I wrote the whole chapter before I realized that the approach I was taking was nonsense. So I started over” (Rothbard, 1990). Tentatively titled “Chapter 5: Producer’s Activity” (2015 [1953]), the chapter was recently reconstructed by the present author from the Rothbard archives at the Ludwig von Mises Institute. Among other things, what is particularly interesting is that Rothbard constructed the chapter from the point of view of an individual firm and based on four concepts he later changed his mind about: the distinction between a free market competitive and monopoly price; the model of perfect competition and the price taker assumption for output prices; using the price taker assumption for input prices and the isoquant-isocost framework to derive factor demand curves; and using the isolated firm as a unit of analysis to understand optimal production and investment decisions.

This paper traces the evolution of Rothbard’s thinking on these issues. It is important to realize that this is not merely an arcane exercise in the history of economic thought, as juxtaposing Rothbard’s divergent production theories highlights important differences and shows the weaknesses of modern Marshallian partial equilibrium production theory using Austrian general equilibrium theory. This reinforces the view of Klein (2010b [2008], p. 149) that the “mundane economics” of the Austrian school is distinct from the neoclassical paradigm.

Mark Blaug has similarly contrasted what he calls Austrian “total equilibrium analysis” with both Marshallian partial equilibrium and Walrasian general equilibrium analysis (Blaug, 1990, pp. 185–186).
The competitive-monopoly price distinction is inappropriate for analyzing free market situations because it arbitrarily assumes that a certain price is competitive and a higher price that increases revenue is monopolistic. Both prices still are market prices that are consonant with consumer wants, especially when one realizes the restriction of output that increases revenue releases factors of production that can be used elsewhere. The price taker assumption in perfect competition is unrealistic because every firm contributes to the total market supply and commands some influence on its output price. As a result, all firms are price searchers and engage in so-called “imperfect” competition, and the traditional efficiency benchmark of perfect competition is a poor standard because it is impossible to attain. The factor demand curve derived from the isoquant-isocost framework does not actually explain the formation of the input price it sets out to explain, nor does it show the causal influence of the output price on the input price. Lastly, the correct unit of analysis for understanding optimal production and investment in a firm is not that of the manager of a firm, but rather that of the capitalist-entrepreneurs who invest in the firm. This is because unlike the manager of a firm, the capitalist-entrepreneurs can invest in multiple firms. The most important implication of this is that, as opposed to a static general equilibrium where all investment returns are equal, in a dynamic world of multiple investment opportunities for capitalist-entrepreneurs with varying degrees of profitability, profit may not be maximized in a given firm where its marginal revenue equals marginal cost (MR = MC).

The rest of the paper is outlined as follows: Section II goes through a brief history of Rothbard (2015 [1953]) and his changing ideas on production theory; Section III juxtaposes Rothbard’s analyses of monopoly prices and perfect competition; and Section IV compares Rothbard’s analyses of the derivation of factor demand curves. Section V discusses the profit maximizing output level of a firm in a dynamic world, and Section VI concludes.

II: A HISTORICAL OVERVIEW OF ROTHBARD’S PRODUCTION THEORY

In the fall of 1949, the Volker Fund asked Rothbard to write a “college-style” economics textbook modeled after Mises’s Human
Action (1949). After Mises reviewed and approved a sample chapter on money, Rothbard began working on the project. What was originally supposed to be a principles level textbook developed into an advanced economic treatise that would occupy a large part of Rothbard’s intellectual efforts in the 1950s and would eventually be transformed into Man, Economy, and State.\(^3\) The order in which he initially wrote the textbook mirrored the structure of his later treatise. By April 1953 he had written rough drafts of what can be considered Chapters 1-4 of Man, Economy, and State (Stromberg, 2004, pp. xxvi–xli).

Following this order, Rothbard then moved on to writing a large chapter on production theory, tentatively titled “Chapter 5: Producer’s Activity” (2015 [1953]). Its main focus was the production decisions of an individual firm and an analysis of input and output pricing. It also contained a competitive versus monopoly price framework which included perfect competition. When discussing the production decision of a firm he derived constant outlay (isocost) and constant product (isoquant) schedules as well as rates of constant outlay and constant product substitution in order to show that the cost-minimizing level of output is where these two rates are equal. Rothbard also developed a theory of the optimal investment decision of the producer.

One important feature of the chapter is that it lacks a Misesian or Austrian “feel.” As the original plan was for Rothbard to write a textbook version of Mises (1949), this is surprising and puts a unique perspective on the chapter. His earlier chapters had followed Mises and earlier Austrians more closely as they directly dealt with topics those writers concentrated on. His first chapter had tried to clarify Mises’s analysis of the fundamental laws of praxeology, i.e., the means end relationship and the laws of marginal utility, time preference, and returns (Stromberg, 2004, p. xxxii). His other chapters, particularly those on exchange and pricing, built significantly on writers other than Mises, not because they were different, but because Mises had assumed his audience already knew the material, and as a result had not covered supply and demand analytics in depth (Stromberg, 2004, p. xxxv). For

\(^3\) Throughout this period Mises asked Rothbard to present some of the chapters at his New York University seminar (Hülsmann, 2007, pp. 936, 939).
example, when it came to basic price analytics, Mises simply assumed his readers understood the “marginal pairs” framework, and briefly cited Böhm-Bawerk (1959 [1889], pp. 207–256) for those who wanted more information (Mises, 1949, pp. 202, 324). Aside from citing Fetter on time preference, which Rothbard planned to elaborate upon in a later chapter, and citing Mises and others on monopoly price theory, for the bulk of the chapter Rothbard mainly utilizes the standard tools of price theory, in particular relying on Stigler (1947 [1946]) and Weiler (1952). This is interesting because Rothbard (2009 [1962]) would use these works as models for criticism of contemporary production theory. Rothbard’s initial use of these writers and not Mises most likely stems from the fact that Mises did not talk about what Rothbard wanted to discuss, namely the optimal production decisions of an individual firm.

Ultimately, Rothbard decided that this approach was totally in error for reasons to be described in later sections, and as a result proceeded to completely rewrite his production theory. In particular, he realized he would have to forge a new path into areas that Mises did not explicitly develop, and in some cases—such as the competitive versus monopoly price distinction—correct his views. This decision was mainly responsible for his proposal in February 1954 to switch from writing a textbook of Mises (1949) to a full blown economics treatise. Writes Rothbard:

The original concept of this project… was as a step-by-step, spelled-out version of Mises’s *Human Action*. However, as I have been proceeding, the necessary elaborations on the sometimes sparse framework of Mises has led inevitably to new and original presentations. Now that I have been proceeding to the theory of production where the whole cost-curve situation has to be faced, Mises is not much of a guide in this area. It is an area which encompasses a large part of present-day textbooks, and therefore must be met, in one way or another. Mises, in his treatise, deals only tangentially with the problem⁴ and really with good reason, but a more detailed treatise, or one that attempts to be a textbook, must tackle this issue. After much thought about the problem, and many false writing starts, I have come to the conclusion that the whole complex of cost curves… and the whole emphasis on the size of firm, cost curves to plant, etc., …is all erroneous speculation on technological irrelevancies. [T]his whole line of approach [is] now glorified in the texts as the “theory

⁴Rothbard is most likely referring to Mises (1949, pp. 336–347).
of the firm”. … [T]he first draft of Chapter 5... is now being completely rewritten to omit “the theory of the firm”…. [It] has become evident from my work on the book, that the result cannot be a textbook of general principles in the traditional sense” (Rothbard, 1954, pp. 1–2; Stromberg, 2004, pp. xli–xlv).

By July 1955, Rothbard decided to split his work on production into multiple chapters, what are now Chapters 5–10 of Rothbard (2009 [1962]) (Stromberg, 2004, p. liv). Major work on the book apparently stopped around 1956, but by 1959 Rothbard had completed it (Stromberg, 2004, p. lxiii). As explained below, Rothbard’s revised production theory did not suffer from the pitfalls of the partial equilibrium firm analysis of his early work. It is now time to turn to a discussion of Rothbard’s evolution on some of these critical matters.

III: THE COMPETITIVE-MONOPOLY PRICE AND PERFECT-IMPERFECT COMPETITION

The original marginalist framework used to analyze the pricing decisions of firms was the competitive-monopoly price distinction. If a firm was able to restrict output and raise price above the competitive market price such that it increased revenue (i.e., the demand curve is inelastic above the competitive price), it was said to attain a monopoly price. This old competitive-monopoly price distinction was not exclusively neoclassical but also included prominent Austrian economists such as Mises, Menger, Fetter, and Wieser (Rothbard, 2009 [1962], p. 672). Kirzner (2013 [1973], pp. 15–18, 70–107) provides the most recent defense and elaboration of Mises’s views. During the Monopolistic Competition Revolution in the 1930s, this approach was superseded by the familiar perfect-imperfect competition framework (Salerno, 2004; Rothbard, 2009 [1962], p. 720). Modern economics now analyzes markets as situations where firms engage in either perfect or imperfect competition. Under perfect competition, the individual firm is so small relative to the total market that it has no influence on the price of its product and takes the market price as “given,” i.e., it can increase or decrease its output without changing the price. There are no barriers to entry, all firms in the given market produce a homogenous product, and all firms in the market have perfect
knowledge (Stigler, 1946, p. 21). Under imperfect competition, the firm has an influence on the price of its product, because when it increases or decreases its output, the price has to change. The important assumption for Rothbard (2015 [1953]) was the inability of the producer to influence the output price.

Rothbard’s earlier production theory employed both frameworks in a hybrid fashion. In the first two sections of Chapter 5, titled “Section 1: The Demand for a Firm’s Product” and “Section 2: Competitive Price and Monopoly Price” he discusses the various production possibilities that a firm can use to make Good A, and explains the scenario under different pricing situations. Rothbard presents possible combinations of inputs X and Y that can make varying amounts of Good A at a constant cost by assuming the prices of X and Y are fixed (Rothbard, 2015 [1953], pp. 494–95). Rothbard then analyzes the firm’s output decision in various pricing scenarios (a), (b), and (c) for Good A. In (a), the firm’s individual demand curve is horizontal, or perfectly elastic, as opposed to sloping downward as in (b) and (c). In (b) and (c), the demand curves the firm faces are downward sloping, but in (b) the point of maximum output from a given amount of money invested in the factors is the point of maximum revenue, while in (c) the point of maximum revenue is no longer at maximum output, i.e., the demand curve is inelastic above the point of maximum output, and it pays for the firm to restrict output relative to what it could have produced (Rothbard, 2015 [1953], pp. 495–501). Rothbard considers both case (a), which is traditionally described as perfect competition, and case (b) as where a competitive price would result, and case (c) as one where a monopoly price would result (Rothbard, 2015 [1953], pp. 501–02).

Rothbard grudgingly uses these terms, noting that their use in economics is unfortunate and misleading, but that they “must be used for traditional reasons” (Rothbard, 2015 [1953], pp. 503–04, 510). Much of his analysis in Section 2 on monopoly prices and monopoly are whole paragraphs later reproduced in Rothbard (2009 [1962]) in “Chapter 10: Monopoly and Competition.” For example, Rothbard here notes that a monopoly was originally defined as a

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5 The price assumption also applies to input prices, which are treated in the next section.

6 Imperfect competition can still occur with no barriers to entry and perfect knowledge.
grant of state privilege to produce a good or service, that defining a monopolist as the producer of a single good is a poor definition, and that there is a built in tendency for cartels to break down. Rothbard even notes that a monopoly price is not in defiance of the consumers and is not immune from competition since all goods compete for the consumer’s money. The exchanges are still voluntary because the consumers still voluntarily form their demand curves (Rothbard, 2015 [1953], pp. 510–12). Interestingly, Rothbard pins the unfortunate monopoly-competitive price distinction on Marshallian partial equilibrium theory, as he writes that “the terminology is the result of an old Neoclassical preoccupation with single “industries” (Rothbard, 2015 [1953], p. 510).

Rothbard later, quite famously, scrapped the entire competitive-monopoly price distinction and trenchantly critiqued it (Rothbard, 2009 [1962], pp. 672–704). Rothbard wrote that the entire distinction on the free market is spurious because it is impossible to define a competitive price. There is no way to look at the demand curve a firm faces and decide what is a competitive price and what is a monopoly price (Rothbard, 2009 [1962], p. 689). In order to show that a firm achieves a monopoly price by restricting output along an inelastic demand curve to increase revenue, one has to assume the original price was a competitive price. But this is completely arbitrary because a competitive price cannot be identified since in both cases the firm is trying to produce at the most profitable level of output. Rothbard notes that there is no way to distinguish the monopoly price situation from a situation in which the capitalist-entrepreneur has overestimated the demand for a given stock of a good and realizes he can earn more by producing less. Moreover, this analysis of a “restriction of production” is spurious in general once it is realized that the decreased production releases factors of production that can be used elsewhere in the economy. Those factors will go to more profitable uses that better satisfy consumer wants (Rothbard, 2009 [1962], pp. 638, 690). Even the requirement that the demand curve be inelastic above the competitive price is arbitrary, because as Méra (2010, pp. 51–55; 2015) points out, the demand curve could be elastic above the competitive price yet net revenue still increases because costs of production fall by even more. The competitive-monopoly price distinction that tries to show a violation of consumer sovereignty is a misleading partial
equilibrium framework that narrowly concentrates on one market instead of looking at the entire economy.\(^7\)

What of case (a), a situation of perfect competition where there is a perfectly elastic demand curve? Rothbard initially also seemed to grudgingly use it and contradicted himself at times when he defended its applicability. Rothbard describes the perfectly competitive case (a) as a situation where regardless of how much the firm produces, “the market-supply curve will not be affected sufficiently to lower the price” (Rothbard, 2015 [1953], pp. 495, 499–500, 502). One could extend Rothbard’s logic to the traditional neoclassical juxtaposition of the firm’s perfectly elastic demand curve and the industry downward sloping demand curve (Stigler, 1946, p. 91). Figure 1 depicts the distinction:

**Figure 1**

![Diagram of Market Demand Curve and Individual Firm's Demand Curve](image)

Such a comparison is done to highlight the fact that the firm’s marginal contribution to output is “so” small it cannot affect the price. Only large enough increases in supply can accomplish that. Rothbard writes that even in case (a) with a change in output there had to be “some effect” on the supply curve that would “tend to affect the price,” but that the overall change was “too small to alter the point of intersection” (Rothbard, 2015 [1953], p. 496). When later Rothbard reiterated that the market supply is always affected, he stated that “It

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\(^7\) This is not to deny, as Rothbard emphasized, that the distinction is unimportant when a government intervention allows the firm to restrict output and attain a monopoly price. Here the element of coercion has tampered with the voluntary actions of consumers, and now the restriction is in defiance of their choices. For the consequences of factor pricing under such situations, see Méra (2010).
may well be, of course, that, within the relevant range, the action of
the firm is not large enough in relation to the product as a whole, to
change the market-price” (Rothbard, 2015 [1953], p. 539).

Rothbard’s defense of the model is confusing. How is it possible
that every change in supply must tend to affect the price, but in
some scenarios when the change is small enough price does not
change? Either every change must influence price, including those
extremely small, or some marginal amounts of supply have no
impact. Basic economic analysis shows that Rothbard’s original
logic is correct: every nonzero change in supply must change the
market price. Total market supply is the sum of the individual
supplies produced by the firms; an increase in the output of one
must increase the supply and lower the price.

The error comes in approximating a very small number as zero.
For example, Stigler compares a market with 10,000 sellers where
each produces an equal quantity. If one firm increases its sales by 100
percent, then the total quantity increases by 0.0001 percent, which
is so imperceptible that it can be treated as zero (Stigler, 1946, pp.
91–92). But 0.0001 percent is not equal to 0 percent. Stigler (1957, p.
8) recognizes this and writes that only when there are an infinitely
large number of firms does every firm have zero influence on price
and a perfectly elastic demand curve. Otherwise, every firm has
an (albeit extremely small) nonzero influence on price and faces
a downward sloping demand curve. However, he maintains that
as the number of firms increase, the market approximates perfect
competition.\(^8\) But infinity is not a real number and can never
be “reached,” so it is impossible for a firm to have no influence
on price. And approximating a very small number as zero has
enormous implications that drastically changes how the market is
analyzed. Every firm, no matter how small, must have an influence
on supply: the perfectly elastic demand curve is impossible.\(^9\)

The constant price assumption does seem plausible when taken
from the real world perspective of an individual firm with many

\(^8\) See also Hirschleifer et al. (2007, p. 165) argues along similar lines: “While [perfect
competition is] never literally true, this may approximate reality if the firm
produces only a small fraction of the output in its industry.”

\(^9\) For more, see Keen (2011, pp. 76–77, 85–90, 95), who presents a critique very similar
to Rothbard (2009 [1962]), although from a more mathematical perspective.
competitors. The firm, when entering the market, “looks around” at the going market price for a given homogenous product. It certainly uses this as an estimate and appraisal for the future selling price of its product. It may in fact sell all its stock at the ruling price. But this does not mean that the demand curve is horizontal; all it means is that the demand curve shifted slightly outward to accommodate the increased supply, or that some producers now have a surplus of unsold goods (which means that not all of the supply was sold at the market price). If all else could be held equal in the real world when the producer sells his additional supply, then the price would have to fall (Armentano, 1999 [1982], p. 23). The isolated firm approach is completely unhelpful and misleading when analyzing the formation of the output price. Only when one understands this and abstracts from the firm to look at the market as a whole is the fallaciousness of the approach revealed. Even though the output price is determined by the industry supply and demand curves, each individual firm within the industry confronts a downward-sloping demand curve that gives it some influence over price. Rothbard (2009 [1962], pp. 721–722) later realized this insight and as a result concluded that the perfectly elastic demand curve was a deceptive illusion and “utterly fallacious.”

In addition to his critique of the competitive-monopoly price distinction, Rothbard’s argument that the perfectly competitive framework is invalid because it is impossible for a firm not to have any influence on its output price is a unique criticism in the Austrian tradition. The most well-known Austrian work in this field is Hayek (2009 [1946]), which does not attack the price taker assumption but instead the assumption of perfect knowledge. Hayek emphasized that competition is not an end state but rather a dynamic process involving entrepreneurship and uncertainty. The capitalist-entrepreneur is not given the relevant knowledge, such as the demand curve, but instead must estimate and discover it in the market. Similar Austrian criticisms include Ludwig Lachmann (1977 [1954]) and Israel Kirzner (2011 [1963], pp. 312–315; 1973, pp. 71–74, 90–95). Real world competition is not an optimization problem with given demand and cost curves, but rather requires

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10 Kirzner notes that Mises thought the model was confusing and unrealistic, and intentionally avoided discussing it (Kirzner, 2001, pp. 100–101).
uncertainty bearing capitalist-entrepreneurs trying to estimate consumer wants and allocate resources using economic calculation, i.e., profit and loss accounting (Mises, 1949, pp. 349–354). This is not to say that Rothbard disagreed with their argument. In fact, he embraced it and emphasized it in his analysis.\textsuperscript{11} Rothbard just added additional arguments regarding competitive prices and perfect competition.

Once it is realized that every firm’s demand curve slopes downward, no matter how slightly, all firms engage in imperfect competition, and the differences between them are only of degree and not of kind. The degree refers to the relative slope of the demand curve, while the kind is the difference between a downward sloping demand curve and an impossible horizontally sloping one. There is no longer a difference in the kind of demand curve for the small wheat farm and the Hershey Chocolate Company, as both face a demand curve that slopes downward (Rothbard, 2009 [1962], pp. 721–22). This has important implications for some neoclassical efficiency analyses of competition. It is held that imperfect competition is less efficient than perfection competition because the former’s most profitable level of output is only where MR = MC and not where P = MC. However, firms with downward sloping demand curves are not necessarily “inefficient,” nor do they “restrict output” or necessarily “misallocate resources,” because the efficiency benchmark of perfect competition to which they are compared is an impossible standard that cannot obtain in the real world. All firms face a downward sloping demand curve of some kind and are imperfect and therefore do not produce where P = MC (Armentano, 1982, pp. 22–25).

The contrast between Rothbard (2015 [1953]) and Rothbard (2009 [1962]) on competitive and monopoly prices and perfect competition is stark. In the former, the concepts were used to analyze actual markets in the unhampered economy. In the latter, in addition to emphasizing the older Mises-Hayek position that competition is a rivalrous process that involves efficient entrepreneurs earning

\textsuperscript{11} While agreeing with Kirzner’s dynamic critique of the model, Rothbard did criticize his use of the perfectly elastic demand curve (Kirzner, 1963 [2011], pp. 98–99; Rothbard, 2011b [1961], pp. 14–15). See Mises (1949, pp. 356–357) for his limited remarks on perfect and imperfect competition.
profits and inefficient entrepreneurs sustaining losses, Rothbard emphasized that there are no differences in kind between various firms and their output prices. Every price is a market price that is based on entrepreneurs’ estimations of the wants of consumers. Every firm exercises some influence on its output price and cannot take it as given.

**IV: THE FACTOR DEMAND CURVE AND THE CAUSAL INFLUENCE OF OUTPUT PRICES**

Like fixed output prices, fixed input prices are a tool used in much of neoclassical production theory. For example, they are prevalent in isocosts, cost curves, and perfect competition in factor markets. Rothbard (2015 [1953]) frequently employed this assumption, but later realized it was highly misleading and discarded it for a framework that explained the formation of input prices without taking them as given. This section surveys Rothbard’s analysis of isoquants and isocosts in preparation for tracing out factor demand curves, and compares it with his later derivation of the factor demand curve, as well as his remarks on the causal influence of output prices on input prices.

After finishing Section 2 with a discussion on the competitive versus monopoly price distinction and possible definitions of monopoly, Rothbard returns to the individual production decisions of a firm in “Section 3: The Product and Outlay Schedules of the Firm.” Aside from unique terminology, which will not be used in this paper for ease of exposition, it provides a fairly familiar exercise in production theory. Rothbard derives isoquants and isocosts, and shows that the slope of the isosquant is the marginal rate of technical substitution, and the slope of the isocost is the ratio of the fixed prices, and that the cost minimizing combination of factor inputs for a given level of output is where the slopes of the isoquant and isocost are equal (Rothbard, 2015 [1953], p. 521). Later, in a subsection, Rothbard engages in a mathematical and graphical formulation of the above exposition, and concludes with the following figure:
Figure 2

P1, P2… P7 are the firm’s isoquants for given levels of production, while O1, O2… O7 are the firm’s isocosts for given levels of expenditure based on the fixed input prices for X and Y. A, B… G represent the cost minimizing combinations of factor inputs for each level of output.

Aside from illustrating a firm’s optimal production decisions, Rothbard seemed to have undertaken this analysis in order to draw out a firm’s demand curve for a factor, which apparently was supposed to take place in another chapter that appears not to have been written. He initially writes that the isoquant-isocost apparatus is “essential to an analysis of the prices of factors of production” and then describes it as one that “will be handy in later analyses of the pricing of factors of production” (Rothbard, 2015 [1953], pp. 522, 530). The demand curve Rothbard appears to have wanted to derive would have been taken from Weiler (1952, pp. 154–161). The modern analysis based on this approach described

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12 Weiler (1952, pp. 147ff) was cited by Rothbard (2015 [1953]) when he discussed factor ratios and production coefficients, and Weiler (1952, pp. 141–161) was later cited in Rothbard (2009 [1962], pp. 589–590) when he critiqued cost curves. The
incorporates both scale and substitution effects, which are similar to the familiar income and substitution effects in consumer demand curves, and is shown in Figure 3:

Figure 3

At prices \( P_x \) and \( P_y \) the firm originally demands \( Q_1 \) of \( X \). To show the downward sloping nature of a factor demand curve with the isoquant/isocost approach, let the price of factor \( X \) rise relative to the price of factor \( Y \) from \( P_x \) to \( P_x^* \). This pivots the isocost inward to reflect the higher price of factor \( X \), which is then shifted rightwards until it is tangent with the original isoquant at a new cost minimizing combination \( B \) and as a result the firm demands only \( Q_2 \) of \( X \) now. The difference between \( Q_2 \) and \( Q_1 \) is the substitution effect. There is also the scale effect which occurs because the increase in the relative price of \( X \) increases the firm’s marginal costs, which causes it to produce at a lower level of output and raises its price. Thus the firm’s new isocost shifts leftward from where it was tangent with the original isoquant to where it is tangent to the new profit-maximizing isoquant. The cost minimizing combination is

above citation is to a chapter devoted entirely to the analysis of the demand for the factors of production. Although Rothbard also cited Stigler (1946) in both places, his demand curve is derived differently and is discussed below. For an explanation similar to Weiler, see Hicks (1979 [1946], pp. 89–98). Kirzner (1963 [2011], pp. 194, 215–216) also describes this approach.

See also McGraw (2002) for another exposition of this factor demand curve.
now at A and the firm demands only Q3 of X now. The difference between Q3 and Q2 is the scale effect. Overall, at the higher price, the firm demands less of factor X and more of factor Y, and so the firm’s demand curve for factor X slopes downwards (Benjamin, Gunderson, and Riddell, 2002, pp. 147–153).

It is important to realize that this process takes place from the perspective of an individual firm facing given input prices. Nowhere is it explained how this given input price was originally determined, or why it changed. Furthermore, there is no recognition of the fact that input prices are imputed from output prices. In fact, in this framework, the analysis implies the reverse. A rise in the price (for some reason) of input X leads to a decrease in the production of the output and a rise in its price. Rothbard (2009 [1962], pp. 454–455) realized the weaknesses of this approach and argued that “the chief error is that of basing a causal explanation of factor pricing on the assumption of given factor prices [emphasis Rothbard].”

For Rothbard, the correct method of deriving a demand curve for a factor of production was through marginal productivity analysis that did not assume the price of the factor was already given. Moreover, this procedure does not start from the perspective of a firm but rather from the general demand for the factor and its interrelations. In the Austrian static general equilibrium known as the Evenly Rotating Economy (ERE), the price of any given factor is its discounted marginal revenue product (DMRP). It must be noted that there is an important yet neglected difference between Austrian “Böhm-Bawerkian” input price theory and the neoclassical “Knightian” input price theory. This refers to the fact that the factor price is equal to the DMRP and not just the MRP. This is because the capitalist-entrepreneur, due to time preference, receives an interest return on his investment from supplying present goods in return for future goods.

To be fair, the MRP in both approaches refer to different things. The neoclassical view argues that the factors get paid their MRP if the MRP is taken to be the revenue from selling the immediate semi-finished product. However, this semi-finished product does not mean anything to the capitalist-entrepreneur; what he cares about is selling the future product for expected future money. And since future money is discounted due to time preference, he will only supply to factors in the present a smaller amount of
present money. This difference is interest (Block, 1990; Rothbard, 2009 [1962], pp. 504–507; 2011a [1987], pp. 265–266). The Austrian approach emphasizes the importance of time and futurity in production, as opposed to the Knightian view. The Knightian view is present in the works of Stigler and contemporary price theorists, and is traceable to the works of Clark, Marshall, and Walras. It neglects the temporal structure of production analysis involving heterogeneous capital goods, and as a result its capital theory is seriously deficient (Huerta de Soto, 2009 [1998], pp. 512–522).

This DMRP is the marginal physical product (MPP) of a factor times the marginal revenue earned from its employment discounted by the pure rate of interest. The DMRP of a factor in its general uses (among different production processes and in a single production process) as its supply increases is decreasing because both the MPP and the output price fall as output increases. The DMRP of a factor in a particular process is where the total stock of the factor intersects the general DMRP curve, and through the entrepreneurial process the price of the factor is brought into alignment with its marginal use (Rothbard, 2009 [1962], pp. 456–476). If the prices of a given factor are unequal, then entrepreneurs will shift factors from lower priced lines of production into higher priced ones to try and earn profits, thereby bidding up the price of the factor in the former and lowering it in the latter until the uniform DMRP is established.

The price of the factor of production is ultimately determined by the output prices of the goods they produce. The causal formation of prices is that anticipated future output prices determine present input prices, or the costs of production, not the reverse. This is Böhm-Bawerk’s (1889 [1959], pp. 248–256; 1962 [1894]) “Law of Costs” that Rothbard emphasized in his analysis of the firm (Rothbard, 2009 [1962], pp. 361, 588–589). The fixed input prices a firm sees are not costs determined beyond its control. They are the prevailing prices of factors based on other capitalist-entrepreneurs’ estimations of their marginal use elsewhere as determined by consumer demand. In short, these prices reflect the opportunity cost of using the factors in other lines of production. By entering into this factor market, the firm is directly influencing the formation of the new prices by bidding them up, which tends to increase them, which would result if other intervening processes did not occur
during the interim. This is like the firm’s influence on its output price—the output price appears given, but in reality, by producing for the market the firm is directly contributing to the formation of the price and does exert an influence. As opposed to the original factor pricing theory that Rothbard planned to write, his revised theory of factor pricing was one that explained the formation of the factor price without assuming it was given and showed the causal influence of output prices on input prices (Rothbard, 2009 [1962], p. 476).

The above factor demand curve derivation is similar to the derivation of the short run demand curve for a factor where marginal productivity analysis is also used (Stigler, 1946, pp. 175–178). This is opposed to the long run demand curve for a factor, which was the isoquant-isocost method critiqued above. The short run refers to a period where some factors are fixed are unable to be changed, while in the long run all factors are variable. While Rothbard and Stigler’s approaches are largely similar compared to the long run demand curve, there are important differences. Aside from the fact that the factor in Rothbard’s analysis earns its DMRP while in Stigler’s it earns its MRP, the main one is that the analysis begins from the vantage point of a firm facing a given input price (as determined in the general market). The firm then hires the factor along its diminishing MRP schedule until the MRP is equal to the price of the input, because that is the point where its MR = MC. It is true that in the ERE the firm will produce where MR = MC as any other output level will lead to negative profits (as opposed to where MR = MC, where the firm will earn zero). However, as will be explained below, in the dynamic world the profit-maximizing level of output for the capitalist-entrepreneurs investing in the firm is generally where the firm’s MR is greater than its MC. When applied to a non-general equilibrium world, this factor demand curve derivation is incorrect, as the firm’s MR and MC convergence does not always occur.

V: THE CAPITALIST-ENTREPRENEUR AND THE OPTIMAL LEVEL OF INVESTMENT IN A FIRM

This section is framed differently from the prior two because it presents an important critique of the Marshallian partial equilibrium
firm theorizing that Rothbard (2015 [1953]) described but did not fully emphasize in Rothbard (2009 [1962]) and only briefly mentioned in other writings.

In the final elongated section that was pieced together by the present author\(^\text{14}\) and titled “Section 4: The Output and Investment Decision of the Producer,” Rothbard strove to develop an optimal theory of investment of the capitalist-entrepreneur. The implication of this analysis is that in the dynamic world where there is a mélange of firms with varying degrees of profitability for the capitalist-entrepreneurs that invest in them, there can be no theory of optimal investment formulated for a single firm in isolation, which implies that a given firm’s optimal production may not be where its MR = MC. This momentous realization undoubtedly contributed to Rothbard’s later decision to discard the isolated firm analysis and completely rewrite his production theory.

Although in many ways Rothbard (2015 [1953]) was very similar to traditional neoclassical production theory, one major difference between the two is that the “producer” Rothbard concentrates on is a capitalist-entrepreneur investing his own money, while the neoclassical producer is a propertyless manager who can borrow an unlimited amount of money at a given interest rate and only invest in the given firm. When analyzing the firm, in Rothbard’s framework the capitalist-entrepreneur is the controlling factor that earns an interest rate of return on his money invested, while the manager is a hired factor of production whose income is a money cost. The capitalist-entrepreneur can also earn a profit when his total rate of return is greater than the interest return (Rothbard, 2009 [1962], p. 510). In the latter framework, the propertyless manager is considered to be the entrepreneur and the controlling factor in the firm who pays an interest return on his borrowed money from capitalists that is counted as a cost of production. The manager still earns a management wage, which is also counted as a cost of production, but also can earn a profit, which is the difference between his total revenue and the principal and interest payments on his borrowed money. The former has been explicitly called the “Austro-Wicksellian” theory of the firm that views interest as an earning as opposed to the neoclassical theory that views it as a

\(^{14}\) See the editor’s foreword of Rothbard (2015 [1953], p. 489).

This difference is present even in the beginning of the chapter. In Section 1, before discussing the various production decisions and possible demand situations a single-product firm might face, Rothbard briefly looks at the optimal investment decision of a representative capitalist-entrepreneur who can invest in multiple lines of production. The capitalist-entrepreneur has a given stock of money that he can spend on consumption, investment, or keep in his cash balances. He will only invest if the rate of return is greater than or equal to his rate of time preference, or his specific premium on present money over future money that represents the minimum return the capitalist-entrepreneur requires in order to invest. For a given amount of money invested, the capitalist-entrepreneur will choose the line of production that maximizes his expected monetary return (Rothbard, 2015 [1953], pp. 490–94). Rothbard then postponed further analysis of the investment theory and for the rest of Section 1 through Section 3 turned to analyzing competitive prices, monopoly prices, perfect competition, and the isoquant-isocost apparatus that showed the cost minimizing level of output. This is what was described above in Sections III and IV of the present paper. After all of this was done, Rothbard then returned to investigating investment decisions in the final section of the chapter.

In Section 4, Rothbard considered a capitalist-entrepreneur who has chosen to invest in a given firm that produces Product P. Rothbard describes various amounts of expenditure, or total costs, which lead to various total revenues the capitalist-entrepreneur can earn by investing in the given firm. For ease of exposition, Figure 4 depicts Rothbard’s (2015 [1953], p. 540) results with the familiar continuous and nicely shaped curves instead of jagged lines and discrete points without loss of importance:
Rothbard calls the difference between total revenue and total cost “net income,” and calculates the rate of return as net income divided by total cost.

Now Rothbard asks, what level of output will be chosen? How much will the capitalist-entrepreneur invest in the given firm, and consequently how much Product P output will the firm produce? What is the optimal level of output? The traditional answer is that the optimal level of investment and output is where net money income is maximized, i.e., the greatest distance between total revenue and total cost. In familiar terminology, using continuous curves, this is the point where MR = MC. As explained above, the usual perspective taken is that of the propertyless manager, with a fixed interest return to the investing capitalist included in the cost curve. The manager of the firm should borrow from the capitalist-entrepreneurs at a given interest rate and invest until MR = MC to maximize his profit amount.

However, the crucial problem in this analysis is that it neglects whether or not the capitalist-entrepreneurs can invest their money in other firms that earn higher than the rate of return earnable in this firm. The output level that maximizes the firm’s profit amount may not be the output level where the capitalist-entrepreneurs who invest in the firm maximize their profit. This is because the capitalist-entrepreneurs
are not restricted solely to investing in the given firm but can also invest in other firms where they could potentially earn a more profitable rate of return on their marginal money invested. The rate of return that can be earned always varies, because in the real world there is uncertainty, and consequently profits and losses. Only in a static general equilibrium devoid of uncertainty are all rates of return uniform (and equal to the interest rate). The problem does not go away if we postulate that the given firm can produce multiple products, since the unit of analysis is still on “a firm” rather than the capitalist-entrepreneurs who can invest among multiple firms that produce multiple products. To maximize their total profits, capitalist-entrepreneurs may spend only a certain amount of money in one firm such that the firm produces where its MR > MC since they can invest their other funds in other firms to increase their total profits more than they could if they were to solely invest in the original firm up to where its MR = MC. As a result, one cannot look at a firm in isolation in the partial equilibrium approach and figure out how much will be produced or invested in it (Gabor and Pearce, 1952, 1958; Rothbard, 1961, pp. 7–8, 18; Rothbard, 1993; Klein, 2010c [1999], pp. 38–39; Klein and Foss, 2012, p. 238). Although Rothbard (2015 [1953]) does not frame it in terms of MR and MC this is clearly what he is getting at, as he trenchantly writes that “there is no precise theory of the determination of the investment in, and output of, the firm” (Rothbard, 2015 [1953], p. 543).

To clarify, this is not to say that in an isolated firm the maximization of the profit amount for the manager of the firm does not occur at an output level where its MR = MC. Given a total revenue and total cost curve for the firm that includes interest payments, the optimum is clearly where MR = MC. What it does say is that when the vantage point is now from the capitalist-entrepreneurs that supply the funds to the firm, and once the range of investment opportunities is broadened beyond the individual firm to the entire production structure, in a dynamic world where lines of production earn different profitable (i.e., above interest) rates of return, maximization of profit may occur where the firm’s MR > MC since the capitalist-entrepreneurs can invest in other industries where they can reap potentially greater economic profits. Only in the ERE, where all profits are wiped out and all lines of production earn the same uniform interest return will the optimal level of
output be where the firm’s MR = MC. This is because the capitalists cannot invest their funds in another firm to earn a higher than normal rate as such opportunities do not exist (Rothbard, 2009 [1962], pp. 600, 695, 734–736). At such an output level, since profit is zero total revenue will be equal to total cost, assuming the capitalists’ interest return is included as an opportunity cost. At any other output level there will be negative profits. In order for the firm to exist in general equilibrium, it must not earn negative profits, so it will have to produce where its MR = MC. The problem comes when the economy is out of general equilibrium, and all lines of production do not earn the same uniform interest return.

Now the production of a firm may not be where its MR = MC, since the capitalist-entrepreneurs who invest their money in it can invest their money in other more remunerative firms. This dynamic world is what the Austrian general equilibrium approach stresses, since it is the dynamic world that we live in and consequently that we try to understand. On this entire issue, we find much to agree on with Gabor and Pearce, whose articles (1952, 1958) that heavily influenced Rothbard stress this important distinction between the Austrian and neoclassical approaches with regards to optimal production in a given firm in disequilibrium. It is worth quoting them in full:

[T]here is much to suggest that a great deal has been lost by the failure to produce a more adequate synthesis of all that is best in the work of both the Austrian and the neoclassical schools. In the first place, the fact that two theories of profit lead to the same general equilibrium is not sufficient to make them the same theory. The route by which equilibrium is attained is often as important as the equilibrium itself [emphasis Newman]. We have shown elsewhere [Gabor and Pearce, 1952] that, if general equilibrium has not been attained, and the fact that an investment is being contemplated in any industry implies that it has not, then the two theories of profit, the [Austro]-Wicksellian and the neoclassical, lead to different conclusions [Newman] (Gabor and Pearce, 1958, pp. 538–539).

Instead of trying to look at the optimal level of investment in and output of a compartmentalized firm, Rothbard argues that the correct approach is to develop an optimal theory of investment of the capitalist-entrepreneurs who face a gamut of various firms in which they can invest. (Rothbard, 2015 [1953], pp. 543–44). This is what Rothbard seeks to do throughout the rest of Section 4.
Rothbard stresses that a theory of optimal investor decision needs to focus not just on maximizing the rate of return on a given amount of money invested, but on weighing the rate of return with the capitalist-entrepreneur’s rate of time preference. Rothbard calls this the Law of Investment Decision (Rothbard, 2015 [1953], p. 552). The capitalist-entrepreneur will invest his own money in general up to the last discrete point where the average and marginal rate of return are greater than or equal to his average and marginal rate of time preference. In each individual firm, the capitalist-entrepreneur invests up to the last discrete point where his marginal rate of return in that firm is greater than or equal to the marginal rate of return of investing that money elsewhere (Rothbard, 2015 [1953], pp. 551–56).

Rothbard’s revised production theory (2009 [1962]) unfortunately did not explicitly mention any Law of Investment Decision for the capitalist-entrepreneur. However, it did start with an initial analysis of time preference, interest rates, and the important function of the capitalist who invests in a temporal structure of production in the ERE (Rothbard, 2009 [1962], pp. 319–451). The starting point of the ERE is essential because it is what the economy always tends toward, and would reach if the data remained constant. The ERE is necessary to analyze in order to isolate the differences between profit and loss, on the one hand, and interest on the other. In addition, the ERE is indispensable for deducing economic theorems, as it allows the economist to mentally hold constant all changes in data except one in order to isolate the effects of that one change. However, Rothbard extended the edifice in order to describe the processes to the ERE, the processes that describe the dynamic world we live in. The capitalist-entrepreneurs take center stage by choosing to invest in various profitable firms with different periods of production and engage in a rivalrous process of efficient competition with each other that consequently distributes scarce resources according to the intertemporal preferences of consumers. In the end, Rothbard substituted an Austrian general equilibrium for a Marshallian partial equilibrium framework.

VI: CONCLUSION

This paper has provided a comparison of Rothbard’s earlier production framework with his final system. The earlier theory was
closer to the Marshallian partial equilibrium theory. It analyzed production from the perspective of an isolated firm and employed many standard tools such as the competitive-monopoly price distinction, perfect competition, the isoquant-isocost framework used to derive factor demand curves, and the isolated firm. His later revised theory, and in some cases parts of his earlier theory, criticized these tools.

It was shown that Rothbard argued that the competitive-monopoly price distinction is inappropriate for analyzing free market situations because it arbitrarily assumes the existence of a competitive and a monopoly price. In addition, all firms are price searchers that exercise some influence on their output price and consequently engage in “imperfect” competition. Thus, the traditional efficiency benchmark of perfect competition is a poor standard because it is impossible to obtain. The factor demand curve derived from the isoquant-isocost framework does not show that expected output prices determine input prices, and assumes the input price it tries to explain. Finally, and most importantly, in order to understand optimal production in a firm, the correct perspective is not that of the borrowing manager of the isolated firm who seeks to maximize his profit, but rather that of the capitalist-entrepreneurs who supply the money for the firm while seeking to maximize the rate of return on their total capital invested. This is because—unlike the manager—the capitalist-entrepreneurs can invest in multiple firms, which means that in a dynamic world, capitalist-entrepreneurs may not maximize their profit in a given firm up to where its MR = MC.

Ultimately, the evolution of Rothbard’s production theory is from the Marshallian partial equilibrium approach to the Austrian general equilibrium approach. This is because Rothbard shows the causal influence of input and output prices and actually explains their formation, and his mature theory does not analyze production from a single isolated firm that can treat prices as fixed in a static world, but rather from the decisions of competing profit-seeking capitalist-entrepreneurs who invest in the entire production structure in a changing world.
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