

Is the Most Unproductive Firm the Foundation of the Most Efficient Economy? Penrosian Learning Confronts the Neoclassical Fallacy

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ABSTRACT

Edith Penrose's 1959 book *The Theory of the Growth of the Firm [TGF]* provides intellectual foundations for a theory of innovative enterprise, which is essential to any attempt to explain productivity growth, employment opportunity, and income distribution. Properly understood, Penrose's theory of the firm is also an antidote to the deception that is foundational to neoclassical economics: The theory, taught by PhD economists to millions upon millions of college students for over seven decades, that the most unproductive firm is the foundation of the most efficient economy. The dissemination of this "neoclassical fallacy" to a mass audience of college students began with Paul A. Samuelson's textbook, *Economics: An Introductory Analysis*, first published in 1948. Over the decades, the neoclassical fallacy has persisted through

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18 revisions of Samuelson, *Economics* and in its countless “economics principles” clones. This essay challenges the intellectual hegemony of neoclassical economics by exposing the illogic of its foundational assumptions about how a modern economy functions and performs.

The neoclassical fallacy gained popularity in the 1950s, during which decade Samuelson revised *Economics* three times. Meanwhile, Penrose derived the logic of organizational learning that she lays out in *TGF* from the facts of firm growth, absorbing what was known in the 1950s about the large corporations that had come to dominate the U.S. economy. Also, during that decade, the knowledge base on the growth of firms on which economists could subsequently draw was undergoing an intellectual revolution, led by the business historian, Alfred D. Chandler, Jr. He was engaged in the first stage of a career that would span more than a half century, during which Chandler documented and analyzed the centrality to U.S economic development of what he would come to call “the managerial revolution in American business.”

In combination, the works of Penrose and Chandler form intellectual foundations for my own work on the Theory of Innovative Enterprise—an endeavor that has enabled me, as an economist, to recognize not only the profound importance of organizational learning for economic theory but also the illogic of the neoclassical theory of the firm for our understanding of the central institution of a modern economy, the business corporation. In this essay, I argue that the key characteristic of the innovative enterprise is fixed-cost investment in the productive capabilities of the company’s employees to engage in organizational learning. The purpose of this investment in organizational learning is to develop a higher-quality product than was previously available. When successful, the development of the higher-quality product enables the firm to capture a large extent of the market, transforming high fixed cost into low unit cost. The result is sustainable competitive advantage that enables the growth of the firm, contributing to the growth of the economy as a whole.

I argue that to get beyond the neoclassical fallacy, economists have to stop relying on constrained-optimization methodology. Rather, they need to be trained in a “historical transformation” methodology that integrates history and theory. It is a methodology in which theory serves as both a distillation of what we have learned from the study of history and a guide to what we need to learn about reality as the “present as history” unfolds.

JEL Codes: A2, B3, B4, D2, D4, D8, J3, L1, L2, M2, N8, O1, O3

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1. Penrosian Learning and Innovative Enterprise

Edith Penrose's 1959 book *The Theory of the Growth of the Firm [TGF]* fits the definition of a "classic": a work that many cite but few have read.¹ The view that I advance in this essay is that no one should be granted a PhD in economics who has not read *TGF* and understood what this profound economist had to say. Penrose's theory of how firms grow has transformative implications for comprehending how a modern economy functions and performs. It provides intellectual foundations for a theory of innovative enterprise, which is essential to any attempt to explain productivity growth, employment opportunity, and income distribution.

Properly understood, Penrose's theory of the firm is also, as I demonstrate in this essay, an antidote to the deception that is foundational to neoclassical economics: The theory, taught by PhD economists to millions upon millions of college students for over seven decades, that the most unproductive firm is the foundation of the most efficient economy. I call this academic nonsense the "neoclassical fallacy." Its dissemination to a mass audience of college students began with Paul A. Samuelson's neoclassical textbook, *Economics: An Introductory Analysis*, first published in 1948. Over the decades, the neoclassical fallacy has persisted through 18 revisions of Samuelson's *Economics* and in its countless "economics principles" clones. This essay challenges the intellectual hegemony of neoclassical economics by exposing the illogic of its foundational assumptions about how a modern economy functions and performs.

The neoclassical fallacy gained popularity in the 1950s, during which decade, as an MIT professor, Samuelson revised *Economics* three times. Meanwhile, Penrose formulated the logic of organizational learning that she lays out in *TGF* from the facts of firm growth, absorbing what was known in the 1950s about the large corporations that had come to dominate the U.S. economy. Also during that decade, the knowledge base on the growth of firms on which economists could subsequently draw was undergoing an intellectual revolution led by the business historian, Alfred D. Chandler, Jr., who was engaged in the first stage of a career that would span more than a half century. Chandler's contribution documented and analyzed the centrality to U.S economic development of what he would call "the managerial revolution in American business."²

¹ Edith T. Penrose, *The Theory of the Growth of the Firm*, Blackwell, 1959

² Alfred D. Chandler, Jr., *Strategy and Structure: Chapters in the History of the American Industrial Enterprise*, MIT Press, 1962; Alfred D. Chandler, Jr., *The Visible Hand: The Managerial Revolution in American Business*, Harvard University Press, 1977. As it happened, like Samuelson, Chandler was on the faculty of MIT from 1950 to 1963 as he researched and wrote his seminal work on U.S. business history, including his article, highly influential among historians, "The Beginnings of 'Big Business' in American Industry," *Business History Review*, 33, 1, 1959: 1-31. As it also happened, in 1963 Chandler moved to a professorship at Johns Hopkins University, where Penrose had researched *TGF* in the 1950s. By this time, Penrose had a joint appointment to the faculties of the School for Oriental and African Studies (SOAS), University of London and the London School of Economics. Penrose was unaware of Chandler's work when she published *TGF*. Chandler first mentions Penrose in a 1968 comment as one of a number of economists whose work is useful to historians, but goes on to say, "alas, such writings were too late for my work in investigating the rise of the large corporation [in *Strategy and Structure*]." Alfred D. Chandler, Jr., "Comment [on a paper by Alfred H. Conrad]," *Explorations in Economic History*, second series, 6, 1, 1968, p. 66. To my knowledge, the first time that Penrose and Chandler met was in 1986 at the International Economic History Congress in Berne, Switzerland (I saw them there, chatting). Michael Best proposed that Chandler and Penrose share a plenary session at the Business History Conference at Harvard Business School in 1993. For some reason, the conference organizers did not act on this suggestion, and Penrose and Chandler only appeared together as discussants on a panel of papers in a parallel session. For an illuminating biography of Penrose, see Angela Penrose, *No Ordinary Woman: The Life of Edith Penrose*, Oxford University Press, 2018.

In *TGF*, Penrose depicts the large industrial corporation as one that grows by investing in organizational learning that endows with unique productive capabilities. Its long-term strategy is to build on its success in developing capabilities in one line of business by redeploying these capabilities to a new, technologically related lines of business as the older one matures. As Chandler shows in his seminal book *Strategy and Structure: Chapters in the History of American Industrial Enterprise*, published just three years after *TGF*, from the 1920s through the 1950s U.S. industrial firms implemented the multidivisional structure to enable one company to manage efficiently many different lines of business in its process of growth.³

Covering the same subject matter and time period as Penrose, Chandler's *Strategy and Structure* confirmed that her theory of the growth of the firm depicted the type of industrial corporation that had in fact driven the growth of the U.S. economy from the 1920s through the 1950s. Indeed, in 1960, one year after the publication of *TGF*, Penrose made a direct contribution to what would become known as Chandlerian business history with her prize-winning publication in *Business History Review* of a case study of growth through multidivisionalization at Hercules Powder Company, a corporation that she had studied through field research in 1954.⁴

For both Penrose and Chandler, multidivisionalization overcame managerial constraints on the growth of the firm by placing strategic control of the growth process in the hands of salaried executives who, by virtue of being career employees, had deep understanding of the evolving technologies and markets of the industries in which the companies that they led competed. The multidivisional structure could be used to manage multiple lines of business efficiently if these businesses were in industries related by technological capability and/or product markets. The importance of that proviso would become clear when, justified by the ideology that a good manager could manage anything, the conglomerates that expanded through merger and acquisition in unrelated businesses in the 1960s collapsed in the 1970s and 1980s under their own unmanageable weight.⁵

The particular technological and market characteristics of an industry are important to the Penrosian perspective because a firm that can grow successfully is one that engages in organizational learning specific to that industry. In *TGF*, Penrose conceptualizes the modern corporate enterprise as an organization that administers a collection of human and physical resources. People contribute labor services to the firm not merely as individuals but as team members that engage in learning about how to make best use of the firm's productive resources.

³ Chandler, *Strategy and Structure*.

⁴ Edith Penrose, "The Growth of the Firm—A Case Study: Hercules Powder Company," *Business History Review*, 34, 1, 1960: 1-23. This article won the Newcomen Prize for best article in *Business History Review* in 1960. Hercules Powder Company became an independent company in 1911 when the Du Pont explosives monopoly was broken up under U.S. antitrust law. Du Pont itself was a key company in Chandler's analysis of the evolution of the multidivisional structure from the 1920s to the 1950s.

⁵ See Mary A. O'Sullivan, *Contests for Corporate Control: Corporate Governance and Economic Performance in the United States and Germany*, Oxford University Press, 2000, ch. 4; William Lazonick, "Corporate Restructuring," in Stephen Ackroyd, Rose Batt, Paul Thompson, and Pamela Tolbert, eds., *The Oxford Handbook of Work and Organization*, Oxford University Press, 2004: 577-601; William Lazonick, "Alfred Chandler's Managerial Revolution: Developing and Utilizing Productive Resources," in William Lazonick and David J. Teece, eds., *Management Innovation: Essays in the Spirit of Alfred D. Chandler, Jr.*, Oxford University Press, 2012: 89-121.

This learning is organizational; it cannot be done all alone, and hence is collective, and it cannot be done all at once, and hence is cumulative.⁶

At any point in time, this organizational learning endows the firm with experience that gives it productive opportunities unavailable to other firms, even in the same industry, that have not invested in these learning processes and, therefore, have not accumulated the same innovative experience. The accumulation of these unique capabilities enables the firm to overcome the “managerial limit” that, in the neoclassical theory of the firm, causes the onset of increasing cost and constrains the growth of the firm. The innovating firm can transfer and reshape its existing productive capabilities to take advantage of new market opportunities.

Each strategic move into a new line of business enables the firm to utilize productive capabilities, including human capabilities, that had been accumulated through the process of organizational learning in generating its previous, now mature, products. These unused productive capabilities, along with reinvestment of some of the profits that they previously generated, provide foundations for the further growth of the firm, achieved through in-house complementary investments in new productive capabilities or the acquisition of other firms that have already developed these complementary capabilities. For Penrose, the growth of the firm through movement into new lines of business is not a random process but rather entails strategic investments to ensure the utilization, and the further development, of the productive capabilities of the firm’s employees over the course of their careers.

In his 1977 book *The Visible Hand*, which covers the historical period for the half century before the 1920s that set the stage for the emergence of the multidivisional structure, Chandler’s focus is on the use of managerial coordination to integrate mass production and mass distribution, achieving what he calls “economies of speed”—or economies of scale per unit of time.⁷ This high-speed (or high-throughput) utilization of productive capabilities transforms the high fixed cost of investing in productive capabilities into low unit cost of sold output. Chandler emphasizes that the source of high fixed cost is investment not only in plant and equipment designed for mass production but also in distribution channels required to access a large enough extent of the market so that the mass-produced goods can be sold at competitive prices. The higher the rate of throughput from investment in input to sold output, the lower the unit cost and the greater the profit that can be generated.

This profit is then available to be reinvested in the productive capabilities of the firm and/or shared among those who have contributed to the value-creating processes that have been the source of profit. Building on my analysis of how cooperation between employers and employees served to generate productivity gains in which both parties could share, as set out in my 1990 book *Competitive Advantage on the Shop Floor*, my contribution to the Chandlerian historical analysis of the relation between managerial coordination and economies of speed has been to show how, by the 1920s, this “win-win” outcome was partially achieved, even without unions, in U.S. mass-

⁶ See Michael H. Best, *The New Competition: Institutions of Industrial Restructuring*, Harvard University Press, 1990, p. 125. In contemporary business schools, Penrosian learning is central to the “dynamic capabilities” perspective, developed by David Teece and his colleagues. See David J. Teece, *Dynamic Capabilities and Strategic Management: Organizing for Innovation and Growth*, Oxford University Press, 2009; David J. Teece, *Strategy, Innovation, and the Theory of the Firm*, Edward Elgar Publishing, 2012.

⁷ Chandler, *The Visible Hand*.

production workplaces. With mass layoffs of blue-collar workers in the 1930s, however, cooperative relations between management and labor broke down in major U.S. industrial enterprises. The consequent rise of mass-production unionism, with its protection of workers' seniority rights, resurrected management-labor cooperation in the immediate post-World II decades, contributing to more stable and more equitable growth in the U.S. economy as a whole. By the 1970s, however, by virtue of their even more thorough organizational integration of shop-floor workers into the processes of mass production, the Japanese were outcompeting U.S. business in industries such as automobiles, electronics, and steel, in which U.S. companies had been the world's leading mass producers.⁸

In *The Visible Hand*, Chandler focuses on the *utilization* of productive capabilities while largely ignoring the *development* of productive capabilities, which is the primary emphasis of Penrose's theory of the growth of the firm. As a result, in this earlier work, Chandler does not explicitly analyze investment in human capabilities as a component of fixed cost. But in his 1990 book *Scale and Scope*, in which he compares "the dynamics of industrial capitalism" in the United States, Britain, and Germany, Chandler begins to focus on the development of productive capabilities through organizational-learning processes. This business activity is inherent in the concept of *economies of scope*; the spreading of a firm's fixed costs across many lines of business, organized through multidivisionalization, as Chandler had previously documented and analyzed in *Strategy and Structure*. Recognizing the importance of the development, and not just the utilization, of productive capabilities to the growth of the firm, in 1993 Chandler launched what he called his "paths of learning" project, researching and writing two books, one on the history of the consumer electronic and computer industries and the other on the evolution of the chemical and pharmaceutical industries.⁹

In combination, the works of Penrose and Chandler provide intellectual foundations for my own work on the Theory of Innovative Enterprise (TIE)—an endeavor that has enabled me, as an economist, to recognize not only the profound importance of organizational learning for a theory of economic development but also the illogic of using the neoclassical theory of the firm for understanding the central institution of a modern economy, the business corporation. In the next section of this essay, building on Penrosian theory and Chandlerian history, I outline the basic assumptions and concepts of TIE. In Section 3, I make use of TIE to demonstrate the neoclassical fallacy: the argument that the most unproductive firm is the foundation of the most efficient economy. Then, in Section 4, I draw out the implications of the neoclassical fallacy for what I call "the myth of the market economy": the dominance in economic thinking of the view that, ideally even if not actually, a modern economy should rely on markets to allocate resources to their most efficient uses—in effect viewing the large corporation as a massive "market imperfection." In the concluding section of this essay, I summarize the methodological implications of TIE for studying the operation and performance of a modern economy.

⁸ William Lazonick, *Competitive Advantage on the Shop Floor*, Harvard University Press, 1990; William Lazonick, "Organizational Learning and International Competition," in Jonathan Michie and John Grieve Smith, eds., *Globalization, Growth, and Governance*, Oxford University Press, 1998: 204-238.

⁹ Alfred D. Chandler, Jr., *Scale and Scope: The Dynamics of Industrial Capitalism*, Harvard University Press, 1990; Alfred D. Chandler, Jr., *Inventing the Electronic Century: The Epic Story of the Consumer Electronic and Computer Industries*, Harvard University Press, 2001; Alfred D. Chandler, Jr., *Shaping the Industrial Century: The Remarkable Story of the Evolution of the Modern Chemical and Pharmaceutical Industries*, Harvard University Press, 2005.

2. The Theory of Innovative Enterprise

The Theory of Innovative Enterprise (TIE) that I have constructed through decades of research and teaching provides an analytical perspective on the microfoundations for achieving stable and equitable economic growth—or what, as a shorthand, I call “sustainable prosperity.” There is no way in which an economy can attain stable and equitable growth unless its major business enterprises focus on investing in productive capabilities for the sake of generating innovative products. Beginning with a characterization of the innovation process as *uncertain, collective, and cumulative*, TIE articulates three “social conditions of innovative enterprise”—*strategic control, organizational integration, and financial commitment*—that can support the innovation process. Armed with TIE, we can analyze the impacts of the innovation process on employment opportunity, income distribution, and productivity growth. We can ask whether the dominant characteristics of the nation’s major business enterprises support or undermine the attainment of stable and equitable growth in the national economy as a whole.

TIE is an analytical framework for understanding how a business enterprise can generate a product that is higher quality and lower cost than products previously available, and thus be a source of productivity growth. As noted above, the innovation process that can generate a higher-quality, lower-cost product is uncertain, collective, and cumulative:¹⁰

- **Uncertain:** When investments in transforming technologies and accessing markets are made, the product and financial outcomes cannot be known; if they were, the process would not be innovation. Hence the need for *strategy*.
- **Collective:** To generate a higher-quality, lower-cost product, the enterprise must integrate the skills and efforts of large numbers of people with different hierarchical responsibilities and functional specialties into the learning processes that are the essence of innovation. Hence the need for *organization*.
- **Cumulative:** Collective learning today enables collective learning tomorrow, and, to generate a higher-quality, lower-cost product, these organizational-learning processes must be sustained continuously over time until, through the sale of innovative products, financial returns can be generated. Hence the need for *finance*.

Strategic control, organizational integration, and financial commitment enable the firm to manage the uncertain, collective, and cumulative character of the innovation process.

- **Strategic control:** For innovation to occur in the face of technological, market, and competitive uncertainties, executives who control corporate resource allocation must have the *abilities and incentives* to make strategic investments in innovation. Their abilities depend on their knowledge of how strategic investments in new capabilities can enhance the enterprise’s existing capabilities. Their incentives depend on alignment of their personal interests and values with the company’s purpose of generating innovative products.
- **Organizational integration:** The implementation of an innovative strategy requires integration of people working in a complex division of labor into the *collective and cumulative*

¹⁰ William Lazonick, “The Theory of Innovative Enterprise: Foundation of Economic Analysis,” AIR Working Paper, August 2015, at http://www.theairnet.org/v3/backbone/uploads/2015/08/Lazonick.TIE-Foundations_AIR-WP13.0201.pdf.

learning processes that are the essence of innovation. Work satisfaction, promotion, remuneration, and benefits are instruments in a reward system that motivates and empowers employees to engage in collective learning over a sustained period of time.

- **Financial commitment:** For collective learning to cumulate over time, the sustained commitment of “patient capital” must keep the learning organization intact. For a startup company, *venture capital* can provide financial commitment. For a going concern, *retained earnings* (leveraged, if need be, by debt issues) are the foundation of financial commitment.

The uncertainty of an innovative strategy is embodied in the fixed-cost investments required to develop the productive capabilities that may, if the strategy is successful, result in a higher-quality product than those available on the market. The higher-quality product, for which those buyers who are less price sensitive will be willing to pay a premium, gives the innovating firm a competitive advantage on the market. Assuming that the firm can maintain this higher quality as it increases output to serve a larger market, it will drive down unit cost as it spreads out its fixed cost over a larger quantity of sold output, which in turn gives the firm greater access to those buyers who are more price sensitive.

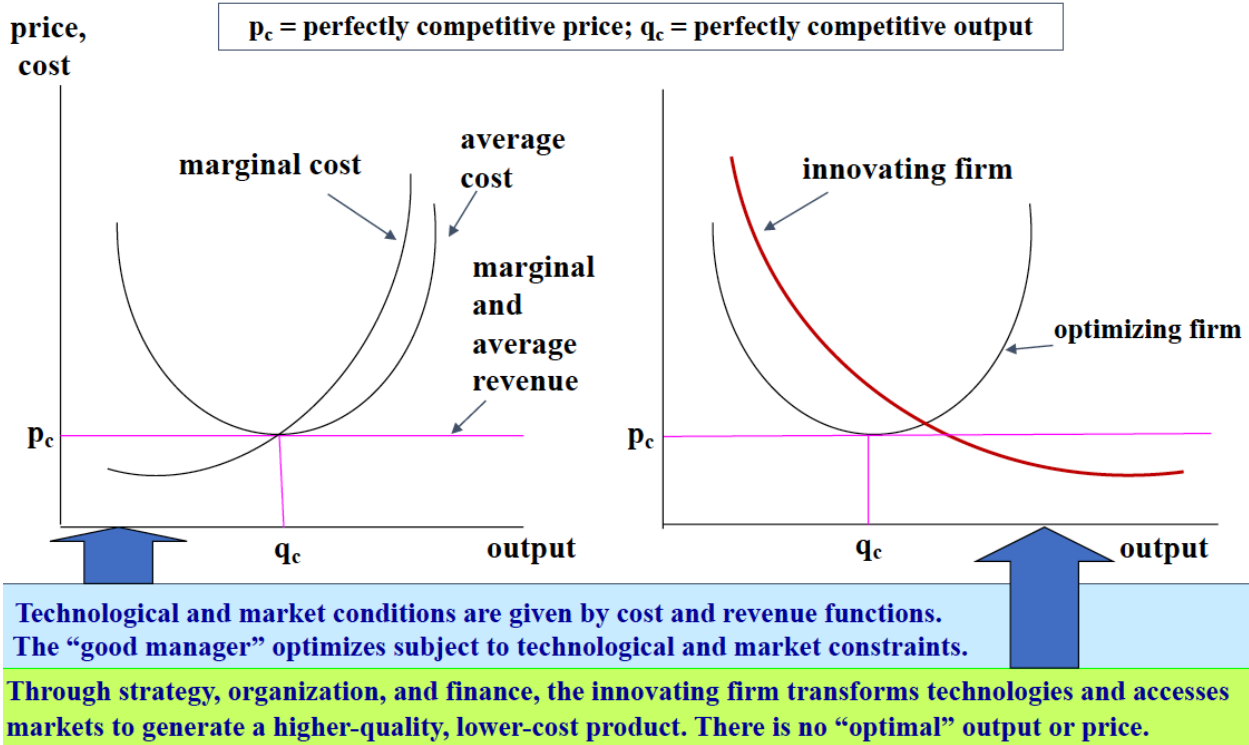
By the same token, if the expansion of the firm’s output necessitates the utilization of additional variable inputs (purchased at a constant factor price on the particular factor market as required for the firm to expand its output) that turn out to be inferior in quality to those used previously, the rise in average variable cost (AVC) will to some extent offset the decline in average fixed cost (AFC) as the firm expands output. If the rise in AVC more than offsets the decline in AFC, then average total cost (ATC) will rise. Economists call this cost condition “internal diseconomies of scale,” depicted in the textbooks by the U-shaped cost curve, shown on the left-hand side of Figure 1.

The neoclassical theory of the firm assumes that profits are competed away as more identical firms enter an industry. Reflecting the neoclassical fallacy, under conditions of “perfect competition”—assumed to be the best of all possible economic worlds—the profits that each firm maximizes by equating marginal cost and marginal revenue equal zero. The action of maximizing profit (or, alternatively, minimizing cost) is known as “optimizing” subject to given technological and market constraints—or “constrained optimization”—and hence, as shown on the right-hand side of Figure 1, we can compare the cost structures of the “innovating firm” of TIE and the “optimizing firm” of the neoclassical textbooks.

In the neoclassical theory of the firm, the perfectly elastic demand curve shown in Figure 1 indicates that the firm can sell output up to the point at which it can maximize profit (marginal revenue equals marginal cost) without placing discernible downward pressure on the price of the product it is selling. The industry demand curve is typically (and in most cases reasonably) assumed to be downward sloping, but in “perfect competition” each of the large numbers of identical firms in the industry is so small relative to the size of the industry as a whole that it can sell any level of output needed to maximize profit at the current industry price. If the market price of the product happens to be greater than the minimum price on the average cost curve, neoclassical theory argues, more identical firms will enter the industry, driving down the product price to the point at which all firms maximize profit at a price-output equilibrium at which profits are zero.

Neoclassical economists have long called this state of industry affairs “perfect competition”—a concept to which we shall return when we dissect the neoclassical fallacy in Section 3 of this essay.

Figure 1. The innovating firm outcompetes the optimizing firm



Key to TIE is the argument that, through the combination of strategy, organization, and finance, an innovating firm may be able to differentiate itself from its competitors and generate a higher-quality, lower-cost product that, as shown in Figure 1, gives it a sustained competitive advantage. Note, however, that an innovative strategy that may eventually enable the firm to generate a higher-quality, lower-cost product may place the innovating firm at a *competitive disadvantage* at low levels of output, as indicated in Figure 1. The reason is that an innovative strategy tends to entail higher fixed cost than the fixed cost incurred under the strategy of optimizing subject to given technological and market constraints. As an essential part of the innovation process, the innovating firm must transform technology and access a sufficient extent of the market for its product to transform high fixed cost into low unit cost (see Figure 1), and, thereby, convert competitive disadvantage at low levels of output into competitive advantage at high levels of output.

The higher fixed cost of the innovating firm derives from both the *size* and the *duration* of the innovative investment strategy. The innovating firm will have a higher fixed cost than the optimizing firm incurs if, as is typically the case, the innovation process requires the *simultaneous development* of productive capabilities across a broader and deeper range of integrated activities than those undertaken by the optimizing firm. Put differently, the innovating firm chooses to “make” rather than “buy”: Investment in the organizational learning that may be able to generate a higher-quality product means that, strategically, the innovating firm may have to eschew the purchase of certain “variable-cost” inputs on the market that would be needed to expand output, investing instead in vertically integrated operations to supply that particular factor of production.

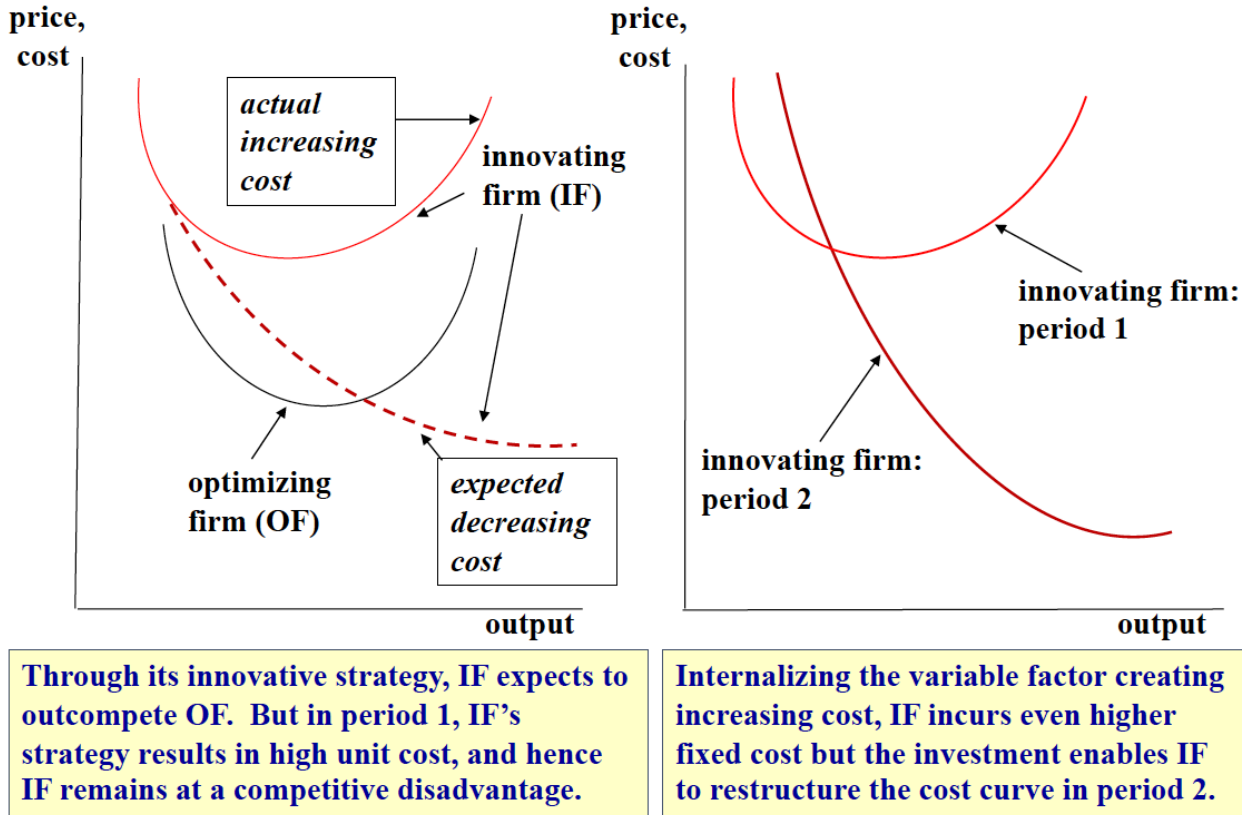
For the sake of developing a higher-quality product, the innovating firm chooses to incur fixed cost rather than avail itself of the option that the existence of one or more factor markets holds out for incurring variable cost.

In addition to the size of the fixed cost of the innovative investment strategy at a given point in time, the firm's fixed cost will increase with the duration that is required to transform technologies and access markets until these processes result in products that are sufficiently high quality and low cost to generate returns through product-market sales. If the size of investments in physical capital tends to increase the fixed cost of an innovative strategy, so too does the duration of the investment required for an organization of people to engage in the collective and cumulative—that is, organizational—learning that innovation requires. As we have seen, organizational learning to transform technologies and access markets is the central characteristic of the innovation process.

The high fixed cost of an innovative strategy creates the need for the firm to attain a high level of *utilization* of the productive capabilities that it has developed and thus to achieve “economies of scale.” Meanwhile, as already discussed, when it needs an input that is available on a certain factor market in sufficient quality and quantity, the innovating firm can choose to purchase additional quantities of the input as required to expand output, thus incurring the variable cost of using the market as opposed to the fixed cost of investing in the firm. Yet, during the innovation process, the strategic decision-maker's initial assumption that the innovating firm can expand output by accessing an increasing quantity of variable input of the required quality may not be borne out as more output is produced for sale. Given the productive capabilities that it has developed, the innovating firm may experience increasing cost because of the problem of maintaining the quality of a variable input as it employs a larger quantity of this input in the production process.

But rather than, as in the case of the optimizing firm, take increasing cost as a given constraint on the growth of the firm, the innovating firm attempts to transform its access to high-quality productive capabilities at high levels of output. To do so, it invests in the *development* of that productive capability, the *utilization* of which has become the source of increasing variable cost. To overcome the constraint on its innovative strategy posed by reliance on the market to supply it with an input—which is what accessing a variable factor of production entails—the innovating firm integrates the supply of that factor into its internal operations, as depicted in Figure 2. In the process, it transforms a variable cost into a fixed cost, and then seeks to develop the productive capability of that integrated input to justify the augmented fixed-cost investment.

Figure 2. Innovative strategy and the restructuring of the cost curve



Previously this productive resource was utilized as a variable input that could be purchased incrementally at the going factor price as extra units of the input were needed to expand output. But having found that the expansion of output results in a deterioration in the quality of the variable input, the innovating firm changes its strategy from “buy” to “make.”¹¹ Having, as a result, added to its fixed cost in order to overcome the constraint on enterprise expansion posed by increasing variable cost, the innovating firm is then under even more pressure to generate a higher-quality product so that it can expand its sold output to transform high fixed cost into low unit cost. In effect, to restate the first principle of economics enunciated by Adam Smith in *The Wealth of Nations*,¹² economies of scale are limited by the extent of the market. The firm’s higher-quality product enables it to access a larger extent of the market than its competitors. Indeed, learning about what potential buyers want and convincing potential buyers that the firm’s product is actually “higher quality” add to the fixed cost of the innovative strategy. Since its fixed cost results from investments in not only transforming technology but also accessing markets, the innovating firm’s increase in fixed cost requires an even larger extent of the market to convert high fixed cost into low unit cost.

¹¹ For the sake of argument, in Figure 2, the innovating firm chooses to “make” rather than “buy” the input at a point at which the deterioration in the quality of the input that it previously purchased has gone so far as to create internal diseconomies of scale, as depicted by the innovating firm’s U-shaped cost curve. But a much less dramatic increase in AVC (one that does not outweigh the decrease in AFC) may trigger this vertical-integration decision.

¹² Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations*, fifth edition (edited by Edwin Cannan), Methuen, 1904, ch. 1 (“On the Division of Labour”); originally published in 1776.

When, through the development and utilization of productive capabilities, the innovating firm succeeds in the conversion of high fixed cost into low unit cost, it does not merely “unbend” the U-shaped cost curve but rather restructures it. By reshaping the cost curve in this way, the innovating firm creates the possibility of securing competitive advantage over its “optimizing” rivals who, as instructed by the economics textbooks, accept increasing diseconomies of scale as a given constraint (see Figure 1 above).

A potent way for an innovating firm to attain a larger extent of the market is to share some of the gains of this cost transformation with its customers in the form of lower prices. If so, the innovating firm may sell a higher quantity of output at a lower price than its “optimizing” competitors. If the innovating firm continues to expand its market share, it will drive optimizing firms out of the market because they are, relatively, unproductive firms.

The emergence of an innovative enterprise—one that secures a large market share by generating a higher-quality, lower-cost product than was previously available—depends on the social conditions of innovative enterprise. The decision of the firm to confront uncertainty depends on the abilities and incentives of those who exercise strategic control. The larger socioeconomic environment provides the opportunity for innovation, but to set innovation in motion, the particular people who occupy positions of strategic control must possess abilities to lead the innovation process and incentives to take up a challenge despite a distinct possibility of failure.

These strategic decision-makers must identify the organizational-learning processes in which to invest in order to generate a higher-quality product, and they must put into place incentive systems designed to integrate the work of large numbers of people with different hierarchical responsibilities and functional specialties to achieve the collective and cumulative learning that is the essence of innovation. The incentive system must include not only pay structures to motivate and reward productive effort but also promotion opportunities through which each employee can build a career in the hope that it will span decades. As Penrose recognizes, organizational integration entails investment in people, who, in effect, represent part of the innovating firm’s fixed cost.

Finally, those in positions of strategic control must mobilize financial resources to sustain the innovation process until it can generate the innovative products that yield financial returns. For new ventures, some form of private equity provides this committed finance, with a listing on a public stock market representing an “exit strategy” through which the private-equity investors can extract returns from their investments in the firm. For established companies that are generating profits, the fundamental source of financial commitment is the cash that a company retains out of profits and reinvests in productive capabilities.

To sum up: In my elaboration of TIE, I use the distinction between fixed cost and variable cost to argue that an innovating firm that experiences rising variable cost as it seeks to expand output will recognize the need to exercise control over the quality of the variable input, the use of which is causing the rise in cost. To do so, the innovating firm will integrate the production of that input into its internal operations, thus transforming the variable cost of using the market into a fixed cost of investing in the enterprise. This strategic move will place the innovating firm at a competitive disadvantage at low levels of output (as shown in Figure 1), increasing the imperative that it attain

a large market share to drive down unit cost. Moreover, there is often a high fixed cost of accessing the product market and securing a large share of it through branding, advertising, distribution channels, a salaried sales force, etc. Indeed, in some industries the fixed cost of accessing a large market share is greater than the fixed cost of investing in the transformation of production technologies.

Whether done for the sake of transforming technologies, accessing markets, or both, investment in productive capabilities, including first and foremost those of its labor force, drives innovation and the growth of the firm. To retain and motivate those whom the firm has hired and trained, and who have accumulated productive experience through their work, the innovating firm generally offers these employees higher pay, more employment security, superior benefits, and more interesting work, all of which add to the fixed cost of the productive asset that an employee's labor represents. The innovating firm makes its employees better off, but it can afford, and indeed profit from, the increased labor expense when that labor's productive capability enables the firm to gain a competitive advantage by generating a higher-quality, lower-cost product.

The innovating firm shares the gains of innovation with its employees by making investments in what I have called their "collective and cumulative careers."¹³ Under such circumstances, increases in labor incomes and increases in labor productivity tend to show a highly positive correlation—an interconnection that, I argue, was prevalent in U.S. business enterprises in the decades after World War II when, for white males at least, the "career with one company" was the employment norm.¹⁴

When successful, the innovating firm may come to dominate its industry, with output that is larger and unit cost—and hence, potentially, its product price—that is lower than if a large number of small firms continued to populate the industry. The overall gains from innovation will depend on the relation between the innovating firm's cost structure and the industry's demand structure, while the distribution of those gains among the firm's various "stakeholders" will depend on their relative power to extract the value that they helped to create.¹⁵ Indeed, as documented in my book with Jang-Sup Shin, *Predatory Value Extraction*,¹⁶ and as will be discussed in the conclusion of this essay, problems of unstable employment, inequitable incomes, and slowing productivity arise when those who have the power to extract the most value from the firm are those whose make the smallest—and in many cases negative— contributions to the value-creation process.

¹³ William Lazonick, Philip Moss, Hal Salzman, and Öner Tulum, "Skill Development and Sustainable Prosperity: Collective and Cumulative Careers versus Skill-Biased Technical Change," Institute for New Economic Thinking Working Group on the Political Economy of Distribution Working Paper No. 7, December 2014, at <https://ineteconomics.org/ideas-papers/research-papers/skill-development-and-sustainable-prosperity-cumulative-and-collective-careers-versus-skill-biased-technical-change>; Matt Hopkins and William Lazonick, "Who Invests in the High-Tech Knowledge Base?" Institute for New Economic Thinking Working Group on the Political Economy of Distribution Working Paper No. 6, September 2014 (revised December 2014), at <http://ineteconomics.org/ideas-papers/research-papers/who-invests-in-the-high-tech-knowledge-base>.

¹⁴ William Lazonick, "Labor in the Twenty-First Century: The Top 0.1% and the Disappearing Middle Class," in Christian E. Weller, ed., *Inequality, Uncertainty, and Opportunity: The Varied and Growing Role of Finance in Labor Relations*, Cornell University Press, 2015: 143-192.

¹⁵ Lazonick, *Competitive Advantage on the Shop Floor*; Lazonick, "The Theory of Innovative Enterprise".

¹⁶ William Lazonick and Jang-Sup Shin, *Predatory Value Extraction: How the Looting of the Business Corporation Became the U.S. Norm and How Sustainable Prosperity Can Be Restored*, Oxford University Press, 2020.

There are gains to innovative enterprise that can be shared, and the ways in which these gains are shared determine the extent to which the innovative enterprise contributes to stable and equitable growth in the economy as a whole. In expanding output and lowering cost, it is theoretically possible (although by no means inevitable) for the gains to innovative enterprise to permit, simultaneously, higher pay, more stable employment, and better work conditions for employees; a stronger balance sheet for the firm; more secure paper for creditors; higher dividends and stock prices for shareholders; more tax revenues for governments; and higher-quality products at lower prices for consumers. Innovative enterprise provides a foundation for achieving sustainable prosperity.

3. The Neoclassical Fallacy

The theory of perfect competition, which is the neoclassical economist's ideal of economic efficiency, views the firm as impotent and the market as omnipotent in allocating the economy's resources. By the neoclassical theory's key assumptions, the firm in perfect competition is, as Paul Samuelson himself revealed (and then, as we shall see, concealed), *an unproductive firm*. Indeed, the more unproductive the firm, the smaller the firm's output as a proportion of industry output, and, hence, the more "perfect" the competition! Yet, neoclassical theory posits the firm in perfect competition as the microfoundation of an economy in which the allocation of resources results in the ideal of economic efficiency, even if because of "market imperfections" that ideal is difficult or impossible to attain.

If neoclassical logic concerning the relation between firm productivity and economic performance sounds absurd, that is because it is. Over seventy-five years ago, Joseph Schumpeter, with his focus on innovation as the fundamental phenomenon of economic development, argued that "perfect competition is not only impossible but inferior, and has no title to being set up as a model of ideal efficiency." The reason: Large-scale enterprise is "the most powerful engine of [economic] progress and in particular of the long-run expansion of total output."¹⁷

The neoclassical theory of the firm in perfect competition cannot explain why for well over a century very large firms have dominated the U.S. economy.¹⁸ In the 1950s, when Penrose researched and wrote *TGF*, the large industrial corporation was central to U.S. economic power, and within the United States this power was concentrated in a relatively small number of large corporations. In 1959, 44 of the world's 50 largest corporations in terms of revenues were based in the United States, with the remaining six headquartered in Europe. In that year, U.S. corporations with assets of \$100 million or more accounted for one-tenth of one percent of all corporations, but over 55 percent of all corporate assets, almost 55 percent of before-tax corporate profits, and 68 percent of all corporate dividends.¹⁹

In 2016, 1,046 companies that had 10,000 or more employees in the United States, with an average workforce of 35,157, were only 0.017 percent of all U.S. businesses. But these 1,046 companies had 10 percent of all establishments, 29 percent of employees, 33 percent of payrolls, and an

¹⁷ Joseph A. Schumpeter, *Capitalism, Socialism, and Democracy*, Harper, 1950, third edition, p. 106; originally published in 1942.

¹⁸ Lazonick, "Alfred Chandler's Managerial Revolution."

¹⁹ Carl Kaysen, *The American Corporation Today*, Oxford University Press, 1996, p. 25.

estimated 37 percent of all revenues. For 2,102 companies with 5,000 or more employees in 2016, these shares were 12 percent of establishments, 35 percent of employees, 40 percent of payrolls, and an estimated 46 percent of revenues.²⁰ How these large companies allocate the resources under their control has profound implications for employment opportunity, income distribution, and productivity growth in the United States.

Given their adherence to the “perfect competition” ideal, neoclassical economists view these large firms as “market imperfections,” also known as monopolies or oligopolies. By focusing economic analysis on how the efficiency of the large-scale enterprise falls short of an absurd ideal, the neoclassical perspective precludes an analysis of the productive power of these large firms—and of how they may, or may not, contribute to the achievement of stable and equitable economic growth. In short, neoclassical economics lacks a theory of innovative enterprise. More generally, neoclassical economics avoids the analysis of how, through organizational learning, businesses *develop* productive capabilities as well as the conditions under which innovative investment activities can contribute to stable and equitable growth in the economy as a whole.

If we go back to the basics of the neoclassical theory of the firm, we can perceive what Schumpeter meant when he wrote that “perfect competition...has no title to being set up as a model of ideal efficiency.” As conventionally defined, perfect competition exists when each among a very large number of identical firms in an industry has such a small share of total industry output that any individual firm, acting on its own, can produce its profit-maximizing output without influencing the price of the industry’s product. Each of these identical firms is constrained to be very small by the assumption that at a very low level of the firm’s output relative to the size of the industry’s total output the firm’s increasing AVC overwhelms decreasing AFC, so that the firm faces a U-shaped cost curve in deciding how much output to produce. It follows mathematically that the firm maximizes profit at the output at which marginal revenue equals marginal cost. Thus, we have the theory of the *optimizing firm* that holds center stage—and indeed the only stage—in virtually every introductory economics textbook used worldwide.²¹

With the publication of *Economics: An Introductory Analysis* in 1948, Paul Samuelson created the model for the modern “principles” textbook. It was reissued in 18 subsequent editions with Samuelson as the sole author through the 11th edition, published in 1980.²² The large corporation was by no means unknown to Samuelson. In the first edition, in a section entitled “The Giant Corporation,” he observes: “A list of the 200 largest nonfinancial corporations reads like an honor roll of American business, almost every name being a familiar household word.”²³ After naming a number of the largest of these companies and referring as well to the 60 largest financial corporations, Samuelson states:

The tremendous concentration of economic power involved in these giant corporations may be gauged from the following facts: they alone own more than half of the total assets of all

²⁰ United States Census Bureau, “2016 SUSB Annual Data Tables by Establishment Industry,” December 2018, at <https://www.census.gov/data/tables/2016/econ/susb/2016-susb-annual.html>. The latest data on firm size for 2016 do not include revenues (collected only every five years). I have estimated 2016 revenues, extrapolating from previous years’ data.

²¹ I would be pleased to be informed of any microeconomics textbook that rejects what I have called the neoclassical fallacy and provides an alternative theory of the firm.

²² “Economics (textbook),” *Wikipedia*, at [https://en.wikipedia.org/wiki/Economics_\(textbook\)](https://en.wikipedia.org/wiki/Economics_(textbook)).

²³ Paul A. Samuelson, *Economics; An Introductory Analysis*, first edition, McGraw Hill, 1948, p. 124.

nonfinancial corporations, more than a third of all banking assets, and four-fifths of life insurance assets. In manufacturing alone, the 100 most important companies employed more than one-fifth of all manufacturing labor and accounted for one-third of the total value of all manufactured products.²⁴

Samuelson recognizes that “their power did not grow overnight” and that “large size breeds success, and success breeds further success.”²⁵ He devotes five pages to “the evil of monopoly” and “the pyramiding of holding companies” enabled by the separation of share ownership from managerial control.²⁶ Samuelson then tells the reader that, “lest it be thought that the present chapter emphasizes too strongly the defects of the big business,” he is quoting a statement from Joseph Schumpeter’s *Capitalism, Socialism, and Democracy* in which “the world-famous economist” notes the contributions of large corporations to rising standards of living. After assessing the evidence, Schumpeter concludes in the statement Samuelson quotes that “a shocking suspicion dawns upon us that big business may have had more to do with creating that standard of life than keeping it down.”²⁷

According to Samuelson, Schumpeter’s perspective “suggests that the future problem may not be one of choosing between large monopolistic corporations and small-scale competitors, but rather that of devising ways to improve the social and economic performance of large corporate aggregates.”²⁸ How, then, did these large corporations attain their dominant positions, and why did the top 100 manufacturers achieve high labor productivity relative to all manufacturers? The existence of very large, highly productive firms should have led economists to search for a theory of innovative enterprise as a foundation of economic analysis.²⁹ Yet not only Samuelson’s scientific papers, which being virtually all mathematical are devoid of empirical content, but also his famous “principles of economics” textbook in its successive editions promulgated the theory of the unproductive firm in perfect competition as the ideal of economic efficiency.

Perfect competition idealizes the very small firm, its growth constrained by rising AVC as it expands output. But why does AVC rise? And why does it rise to such an extent that it outweighs declining AFC, resulting in the U-shaped cost curve? Current textbooks do not supply an explanation. For example, N. Gregory Mankiw, in his *Principles of Microeconomics*, simply states that the cost curve is U-shaped—representing “cost curves for a typical firm”³⁰—and illustrates

²⁴ Ibid., p. 125.

²⁵ Ibid.

²⁶ Ibid., pp. 126-131.

²⁷ Ibid., p. 132. For the passage that he quotes, Samuelson cites J. A. Schumpeter, “Capitalism, Socialism, and Democracy”, Harper & Brothers: New York 1942. (This passage appeared on page 82 of the 1942 edition of *Capitalism, Socialism, and Democracy*.)

²⁸ Samuelson, *Economics*, first edition, p. 132.

²⁹ In the 1940s, economists could have built on Schumpeter’s focus on innovation as the fundamental phenomenon of economic development, a proposition put forward in Joseph A. Schumpeter, *The Theory of Economic Development*, Harvard University Press, 1934 (first published in German in 1911). See William Lazonick, “What Happened to the Theory of Economic Development?” in Patrice Higonnet, David S. Landes, and Henry Rosovsky, eds., *Favorites of Fortune: Technology, Growth, and Economic Development since the Industrial Revolution*, Harvard University Press, 1991: 267-296. By the 1960s, as I have indicated in the introduction to this essay, Samuelson could have found powerful explanations, both theoretical and historical, for the growth of the firm in Penrose, *The Theory of the Growth of the Firm*, and Chandler, *Strategy and Structure*. In its 19 editions, spanning 1948 to 2009, Samuelson, *Economics*, never references these scholars or the body of research on the growth of the firm and managerial capitalism that their writings have inspired.

³⁰ N. Gregory Mankiw, *Principles of Microeconomics*, Cengage Learning, eighth edition, no date, p. 259.

this “principle” with made-up numbers for a hypothetical coffee shop in which AVC increases from \$0.30 for an output of one cup of coffee to \$12.00 for an output of ten cups, with rising AVC surpassing declining AFC after six cups.³¹ Similarly, Paul Krugman and Robin Wells, in their *Essentials of Economics*, argue that a “realistic marginal cost curve has a ‘swoosh’ shape”³² and give the example of a salsa maker whose AVC rises from \$12.00 for an output of one case of salsa to \$120.00 for an output of ten cases, with rising AVC surpassing declining AFC after an output of three cases.³³ Be it Mankiw or Krugman/Wells or a slew of other prominent economists who compete in the introductory principles market, the textbook “explanation” for the U-shaped cost curve *is simply a made-up numerical example!* They make no attempt to explain to students what constrains the growth of the firm.

Not so with Samuelson’s *Economics*, at least in the first through fifth editions, published between 1948 and 1961.³⁴ In these editions, Samuelson explains the U-shaped cost curve by assuming that labor is the firm’s main variable-cost input and that, with the addition of units of labor as the firm expands output, the average productivity of labor falls because of, in Samuelson’s words, “limitations of plant space and management difficulties.” As the professor puts it (with my emphasis) in the fifth edition of *Economics*, published in 1961 (with wording only slightly different from that in the first edition): “After the overhead has been spread thin over many units, it can no longer have much influence on Average Cost. Variable items become important, and as *Average Variable Cost begins to rise because of limitations of plant space and management difficulties, Average Cost finally begins to turn up.*”³⁵ There it is, the explanation of the most important “principle” of the neoclassical theory of the firm, and indeed of neoclassical microfoundations of macroeconomic performance, buried away on page 524 of an 853-page textbook. With this explanation of the limits on the growth of the firm, Samuelson argues that the most unproductive firm is the foundation of the most efficient economy. How so?

Note, first, that in Samuelson’s explanation quoted above, he states (with my emphasis) that “Average Cost *finally* begins to turn up.” The word “finally” betrays Samuelson’s methodological bias because if the average cost curve does not turn up—that is, if rising AVC does not outweigh declining AFC as the firm’s output increases—then the decision rule of marginal revenue equals marginal cost in determining the firm’s optimal output will not come into operation. Yet the general applicability of this principle of constrained optimization is Samuelson’s key methodological contribution to economic analysis.³⁶

More important, however, is Samuelson’s cryptic, yet clear, explanation of why “Average Cost finally begins to turn up.” When I used the fifth edition of Samuelson’s *Economics* in my very first economics course in 1964, I was told that what Professor Samuelson was arguing was that, as the firm expands output and more workers are added to the workplace as variable inputs, their average productivity falls because of overcrowding that causes them to bump into one another—that is, Samuelson’s “limitations of plant space”—and because the increase in the number of workers to

³¹ Ibid., p. 254.

³² Paul Krugman and Robin Wells, *Essentials of Economics*, Worth Publishers, fourth edition, 2017, p. 189.

³³ Ibid., p. 185.

³⁴ I am grateful to Wynn Tucker for searching through the first edition of Samuelson, *Economics*, to locate the explanation of the U-shaped cost curve.

³⁵ Paul A. Samuelson, *Economics: An Introductory Analysis*, fifth edition, McGraw-Hill, 1961, p. 524.

³⁶ Paul A. Samuelson, *Foundations of Economic Analysis*, Enlarged Edition, Harvard University Press, 1983.

be supervised makes it more difficult for the employer to prevent workers from shirking—that is, Samuelson’s “management difficulties.” The resultant decline in labor productivity as output increases causes AVC to rise. In other words, Samuelson’s explanation for rising AVC is that *workers can’t work and won’t work*. And the faster the average productivity of labor declines as the firm expands output, the lower the level of output at which “Average Cost finally begins to turn up.”

For the theory of the optimizing firm to be applicable, it is not sufficient for AVC to increase as output expands. The cost curve gets its U shape when the rise in AVC is so large that it overwhelms the fall in AFC. The rising ATC, reflecting declining productivity as the firm expands its output, constrains the growth of the firm. It follows that the lower the level of output at which, because of limitations of plant space and management difficulties, the rise in AVC outweighs the decline in AFC, the smaller the firm relative to the size of its industry, and hence the more the fundamental condition for “perfect competition” prevails.

And since, according to neoclassical economists, perfect competition is the ideal of economic efficiency, it follows from Samuelson’s own explanation of the limits to the growth of the firm that the most unproductive firm—one in which, at the lowest level of output, the inability and unwillingness of workers to work cause “Average Cost [to] finally...turn up”—provides the microeconomic foundation for the most efficient possible economy!

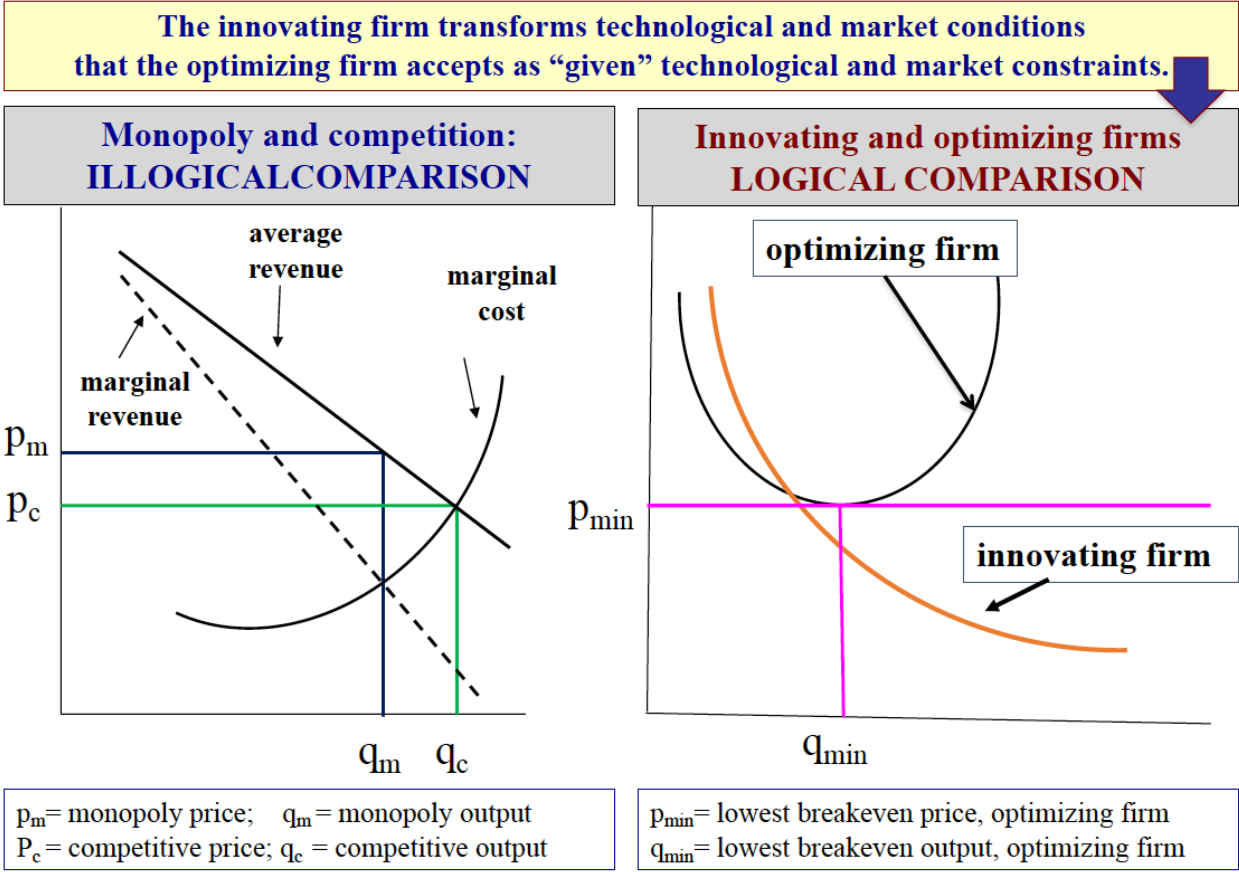
Let me repeat this crucial point: The theory of perfect competition idealizes a situation in which the rise of AVC outweighs the decline of AFC at very low levels of firm output relative to industry output. As a result, there are very large numbers of identical competitors in the industry, each of which, by virtue of its small size, can sell its profit-maximizing output without having a discernible impact on the industry’s product price (part of the definition of perfect competition). By Samuelson’s own explanation of why “Average Cost finally begins to turn up,” *the firms in perfect competition are very small relative to the size of the industry because they are very unproductive, employing labor whose average productivity falls as the firm’s output expands*. Thus, the unproductive firm is the foundation of the neoclassical ideal of economic efficiency known as “perfect competition.”

“Just a minute,” the well-trained neoclassical economist would complain. “What about the neoclassical theory of monopoly that one can also find in every introductory economics textbook, with its demonstration that, in contrast to the ideal firm in perfect competition, the monopolist, maximizing profit subject to a downward-sloping demand curve, restricts output and raises the product’s price? Isn’t that proof of perfect competition as the ideal of economic efficiency?”

No, it is not, as Schumpeter recognized some years before Samuelson published the first edition of *Economics*. There is a logical flaw in the neoclassical monopoly model that yields the “results”—restricted output, higher price—that the neoclassical theory of perfect competition as the ideal of economic efficiency requires. As shown in Figure 3, this model assumes that the monopolist maximizes profit *while subject to the same cost structure* as the perfect competitors. But then how did the monopolist become a monopolist?

In the neoclassical theory of the firm, rather than confront “limitations of plant space” and “management difficulties,” the employer just optimizes subject to these “given” constraints. In sharp contrast, the employer in the theory of innovative enterprise could confront “limitations of plant space” by investing in more spacious plant and “management difficulties” by creating incentives such as employment security to induce workers to supply higher levels of effort. These investments and incentives would add to the firm’s fixed cost, but if the innovating firm can increase its productivity sufficiently by making and implementing these expenditures, it may be able to outcompete the optimizing firm, as shown in Figures 1 and 2 above and in the right-hand size of Figure 3.

Figure 3: The logical flaw in the neoclassical monopoly model



According to TIE, the firm grows large, and outcompetes perfect competitors, by *transforming the cost structure*—by, for example, investing in more spacious plant to prevent overcrowding, creating positive incentives for employees to expend more work effort, or, in a knowledge-intensive industry, launching an R&D initiative that may yield a higher-quality product. Compared with perfect competitors, who follow the neoclassical directive to optimize subject to given constraints, the innovating firm increases output and, by driving down AFC as it expands output, can lower the product price to consumers while still increasing its profits. For the prosperity of the economy, that’s a big plus. For neoclassical theory, however, that’s a big minus.

Samuelson's theory requires the firm that is the "ideal of economic efficiency" to be and to remain small and unproductive. If the economy is dominated by firms in which, to use Samuelson's own words, "large size breeds success, and success breeds further success," then perfect competition as the "ideal of economic efficiency" disappears and "constrained optimization" may not be the management practice that achieves superior economic performance.

As Samuelson writes in the Introduction to his textbook, "the test of a theory's validity is its usefulness in illuminating observed reality."³⁷ On that test, the theory of the unproductive firm as the ideal of economic efficiency receives a failing grade. As Samuelson himself puts it in the concluding sentence of the Introduction: "When a student says, 'That's all right in theory but not in practice,' he really means, 'That's not all right in the relevant theory,' or else he is talking nonsense."³⁸

Thank you, Professor Samuelson. In propounding the theory of the unproductive firm as the foundation of the most efficient economy, you were talking nonsense, and your students, broadly construed, have been repeating this drivel ever since. As we have already seen, Samuelson was well aware that the real-world economy can be dominated by large firms that are highly productive. In Chapter 2 ("Central Problems of Every Economic Society") of the fifth edition of *Economics*, Samuelson discusses "Increasing Costs" and "The Famous Law of Diminishing Returns" (both subheadings) and provides a table with a numerical example that bears the heading "Diminishing returns is a fundamental law of economics and technology" and the caption "Returns of corn when units of labor are added to fixed land."³⁹ On the very next page, however, he has the subheading, "Economies of Scale and Mass Production: A Digression,"⁴⁰ with the explanation: "Economies of scale are very important in explaining why so many of the goods we buy are produced by large companies...They raise questions to which we shall return again and again in later chapters."⁴¹

Samuelson makes his "honor roll of American business" remark, cited above, 100 pages later. But it would be an exaggeration to say that the professor kept his promise to "return [to this central problem of every economic society] again and again." After all, for Samuelson the actual importance of economies of scale to the productive economy was just "a digression" from his obsession with "the famous law of diminishing returns" as a "fundamental law of economics and technology."⁴²

Was Paul Samuelson aware of this fundamental flaw in his economic thinking? There is "smoking-gun" evidence that in the course of revising *Economics* in the early 1960s, Professor Samuelson

³⁷ Samuelson, *Economics*, 1961, p. 12.

³⁸ Ibid.

³⁹ Ibid., p. 25.

⁴⁰ Ibid., p. 26.

⁴¹ Ibid., p. 27.

⁴² Note that in the first three editions of *Economics*, the section in Chapter 2 on "The Famous Law of Diminishing Returns" appears just *after* the section on "Economies of Scale: Mass Production and Decreasing Costs" ("Economies of Mass Production and Decreasing Costs" in the first edition). In the fourth edition, however, Samuelson reverses the order of these two sections, placing "The Famous Law of Diminishing Returns" first, while changing the subhead for the section on decreasing costs to "Economies of Scale and Mass Production: A Digression." Samuelson then repeats this formulation in the fifth and sixth editions. A separate paper would be required to document Samuelson's changing portrayal of the large corporation in *Economics*. But these changes made in the fourth edition, and particularly the addition of the term "a digression," appear to be an attempt by Samuelson to diminish the role of big business in his presentation of how a modern economy functions and performs.

gave this glaring contradiction between neoclassical ideology and economic reality some deeper thought and came to realize the fallacy of arguing that the unproductive firm is the ideal of economic efficiency. Once the light bulb went off in his brain, he could have then resolved the problem by renouncing the neoclassical theory of the firm and calling for the construction of a theory of innovative enterprise—drawing upon, for example, Edith Penrose’s seminal contribution, *The Theory of the Growth of the Firm*, published in 1959, and Alfred Chandler’s pioneering historical research documented in his 1962 book *Strategy and Structure*.⁴³

But Samuelson simply ignored the work of Penrose and Chandler as he rolled out successive editions of *Economics*. Like economies of scale and mass production, these eminent scholars were apparently mere digressions. Instead, as part of a significant revision of the material on cost curves in the sixth edition of *Economics*, Samuelson concealed the neoclassical fallacy as articulated in the five previous editions *by excising the sentences quoted above about overhead being spread thin and average cost increasing because of limitations of plant space and management difficulties*.

Beginning with the sixth edition, published in 1964, Samuelson would invoke the “famous law of diminishing returns” to justify the nonsense that the unproductive firm in perfect competition is the ideal of economic efficiency—with absolutely no explanation of why increasing cost sets in and a rise in variable cost causes the average total cost curve to turn up. And, over the subsequent generations, economists such as N. Gregory Mankiw and Paul Krugman, among other luminaries of the economics profession, have published textbooks that reproduce this nonsense as a principle of economics, taught routinely to students and requiring neither examination nor explanation.

The problem with perfect competition as the ideal of economic efficiency is not just that millions upon millions of economics students have been, and continue to be, miseducated about the role of the business enterprise in the economy. The much larger problem is that the “well-trained” PhD economists who are supposed to be the educators—including those to whom the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel, popularly known as the Nobel Prize in Economics,⁴⁴ has been meted out—internalize the inanity that the unproductive firm is the ideal of economic efficiency, and in so doing portray the “ideal” firm as a powerless entity that does not, and should not, interfere with the market’s coordination of the allocation of the economy’s resources.

In my own teaching, I have called this view of the world “sweatshop economics” because the overcrowded and unmotivated firm that Samuelson describes as the microfoundation of ideal efficiency does, in fact, have the characteristics of a sweatshop. If such firms actually dominated the economy, we would, in a nation such as the United States, all be living in poverty.⁴⁵ And, in fact, in many parts of the world where sweatshops prevail, the “neoclassical” firm and mass poverty go hand in hand.⁴⁶

⁴³ Penrose, *The Theory of the Growth of the Firm*; Chandler, *Strategy and Structure*.

⁴⁴ See Avner Offer and Gabriel Söderberg, *The Nobel Factor: The Prize in Economics, Social Democracy, and the Market Turn*, Princeton University Press, 2016.

⁴⁵ Lazonick, “Innovative Enterprise or Sweatshop Economics?”

⁴⁶ See Jason Hickel, “Rethinking Sweatshop Economics,” *Foreign Policy in Focus*, July 1, 2011, at https://fpif.org/rethinking_sweatshop_economics/; Christopher Blattman and Stefan Dercon, “Everything we knew about

Meanwhile, the “well-trained” economist views the highly productive firms that grow large, and perhaps even dominate the industries in which they operate, as massive “market imperfections” that impede the purported efficiency of market resource allocation. In the real economic world, however, the innovative enterprise is a powerful entity that, by transforming technologies and accessing markets, succeeds in generating the higher-quality, lower-cost goods and services that constitute productivity growth. Far from being a market imperfection, the innovative enterprise, properly supported and regulated, can by confronting and transforming the “neoclassical constraints” on the growth of the firm provide the productive foundations for achieving stable and equitable economic growth. If we want economic policies that advance these objectives, then we need a theory of innovative enterprise as a foundation of economic analysis.

The sad irony, however, is that the myth of the market economy that builds on the neoclassical fallacy *actually undermines* the social conditions of innovative enterprise that, if put in place with proper government support and regulation, could enable big business to contribute to stable and equitable economic growth. The next section of this essay explains what I mean by “the myth of the market economy.” The final section outlines how the neoclassical fallacy provides a theoretical foundation for the destructive ideology that a company should be run to “maximize shareholder value,” while it precludes “well-trained” economists from contemplating, let alone analyzing, the social conditions of innovative enterprise.

4. The Myth of the Market Economy

If PhD economists were to go back to the fifth edition of Samuelson’s *Economics*, from which the “unproductive firm” explanation for the U-shaped cost curve had not yet been excised, their teaching on “perfect competition” would require them to embrace a theory of the firm that rests on nine assumptions that build on one another, with each assumption more preposterous than the previous one. The nine assumptions of what I have called the neoclassical fallacy are:

- i. Assume (as Samuelson states on page 524 of the fifth edition of *Economics*) that the growth of the firm is constrained because of overcrowding of the workplace and loss of control over labor effort as the firm seeks to expand output and more units of labor are added as a variable cost.
- ii. Assume that the increase in AVC outweighs the decrease in AFC, causing a rise in ATC that in turn yields a U-shaped cost curve and, hence, a rising marginal cost (i.e., supply) curve.
- iii. Assume that the “entrepreneur” simply optimizes subject to these productivity and cost constraints, opting not to make investments in the firm to deal with overcrowding and control loss.
- iv. Assume that ALL FIRMS in the industry are equally constrained by an unwillingness to take risk (e.g., by investing in a more spacious plant) or manage labor (e.g., by offering positive incentives to employees), so that no firm in the industry is able or willing to make any investments to overcome internal diseconomies of scale.

sweatshops was wrong,” *New York Times*, April 27, 2017, at <https://www.nytimes.com/2017/04/27/opinion/do-sweatshops-lift-workers-out-of-poverty.html?emc=eta1>.

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- v. Assume that the level of output at which rising AVC outweighs declining AFC is SO SMALL relative to industry output that each firm can sell its profit-maximizing output without having a discernible impact on the industry's product price (i.e., the industry is in a state of "perfect competition").
- vi. Assume as proof that "perfect competition" is the ideal of efficiency that a firm that has emerged as dominant in an industry (i.e., a "monopolist") maximizes profit at an output that is lower and a price that is higher than the industry output and price under "perfect competition"—and that it does so because it maximizes profit subject to the same cost structure that would characterize the "perfect competitors" that the monopolist has purportedly displaced.
- vii. Assume, therefore, that the large-scale industrial enterprise is a massive "market imperfection."
- viii. Assume from this illogical monopoly model that a state of "imperfect" competition represents a deviation from "perfect" competition that reduces economic efficiency.

And once, on the basis of these eight assumptions, you as a PhD in economics conclude that the most unproductive firm is the foundation of the most efficient economy, the all-important ninth assumption naturally follows:

ix. *Assume you are a well-trained economist.*

You will then, wittingly or not, become an intellectual purveyor of the myth of the market economy. You will assume that, to achieve economic efficiency, market forces must determine economic outcomes, with highly unproductive firms contributing to efficiency by responding to the dictates of supply and demand as they equate marginal revenue and marginal cost to maximize profit. You will then believe that competition in the markets for products, labor, and finance result in the most efficient product prices, wage rates, and interest rates. And, intellectually captive to the myth of the market economy, you will remain impervious to the reality of how an actual economy functions and performs.

Comparative-historical study reveals that markets in products, labor, and finance, as well as in land, are *outcomes*, not causes, of economic development.⁴⁷ Product competition assumes the existence of business enterprises that have developed the productive capabilities to generate goods and services of a quality that buyers want or need and that can be sold at prices they are willing or able to pay. Markets in stocks and bonds depend on the existence of business enterprises with the productive capabilities to issue and pay yields on these securities. Employment opportunities that can be accessed via labor markets assume the existence of business enterprises and government agencies that have developed the productive capabilities to employ labor productively. A market for land exists because households, governments, and businesses have invested in the infrastructure of a particular locality.

For the sake of continued innovation, the organizations on which the economy depends for investments in productive capabilities *need governments to regulate markets* once they have

⁴⁷ Lazonick, *Business Organization and the Myth of the Market Economy*; Lazonick, "The Theory of the Market Economy and the Social Foundations of Innovative Enterprise"; William Lazonick, "Varieties of Capitalism and Innovative Enterprise," *Comparative Social Research*, 24, 2007: 21-69.

emerged.⁴⁸ In the absence of regulation, markets tend to disrupt and undermine the organizational processes that enable investment in productive capabilities. Here are four well-known examples:

- Inadequate minimum wages that result from overcrowded markets for commoditized labor have left many hardworking families in poverty in the United States, even when the heads of households are holding down two full-time jobs.
- The “free-market” approach to college tuitions and student loans that prevails in the United States has made higher education unaffordable to most working-class households, in a nation that had once been in the forefront of free or low-cost public higher education.
- We need only look back to the financial crisis of 2008-2009 to see the vast devastation visited on American homeowners by government failure to regulate housing markets.
- The physical destruction of communities occurs through “natural” disasters caused by the failure to regulate industries whose processes and products contribute to climate change.

These outcomes are not “market failures”; they are regulatory failures. And the policy responses of “well-trained” neoclassical economists who are concerned by these adverse economic and environmental outcomes fail because these economists are intellectually captive to the myth of the market economy.

The TIE approach to understanding the operation and performance of the economy stands in stark contrast to the neoclassical focus on market coordination of economic activity. The neoclassical theory of the market economy poses an almost impenetrable intellectual barrier to analyzing and understanding the organizational foundations of economic development. Steeped in the neoclassical fallacy, neoclassical economists assume that an advanced economy is a market economy in which millions of household decisions concerning the allocation of the economy’s resources are aggregated into prices for inputs to and outputs from production processes. Any impediments to this process of market aggregation are deemed to be “market imperfections,” and, among neoclassical economists with a liberal social outlook, any undesirable social outcomes from the process are deemed to be “market failures.”

Markets *are* of utmost importance to our economy and society; they can allow us *as individuals* to choose the work we do, by whom we are employed, where we live, and what we consume. Insofar as we have market choices, however, it is because the economy is wealthy, and it is wealthy because of investments in productive capabilities by business enterprises, supported by investments in infrastructure by government agencies and investments in the labor force by many tens of millions of household units.

I call these three types of organizations—business enterprises, government agencies, and household units—working in concert to develop a nation’s productive capabilities “the investment triad.”⁴⁹ If market processes cannot explain investment in productive capabilities, then the theory of the market economy cannot explain the wealth of nations. Economists who want to devise public policies to shape the processes and influence the outcomes of investment in productive capabilities

⁴⁸ See, for example, Lazonick, *Competitive Advantage on the Shop Floor*; William Lazonick, “The Functions of the Stock Market and the Fallacies of Shareholder Value,” Institute for New Economic Thinking Working Paper No. 58, July 20, 2017, at <https://www.ineteconomics.org/research/research-papers/the-functions-of-the-stock-market-and-the-fallacies-of-shareholder-value>.

⁴⁹ William Lazonick, “Innovative Enterprise and Sustainable Prosperity,” The Academic -Industry Research Network Working Paper, January 2019, at <http://www.theairnet.org/v3/backbone/uploads/2019/03/Lazonick-IESP-20190118.pdf>

need to construct an economic theory of “organizational success.” At its center is a theory of innovative enterprise.

5. Innovative Enterprise and Sustainable Prosperity

Most economists would agree that the purpose of economic policy should be to help the economy achieve stable and equitable growth. Building on the Penrosian insight that the growth of the firm depends on investments in organizational learning, TIE focuses on the social conditions that determine who controls the firm’s investment strategy, how the firm integrates the skills and efforts of large numbers of employees into organizational-learning processes, and what sources of finance the firm mobilizes to sustain the innovation process until it can generate competitive products. The growth of the firm through innovation—the generation of higher-quality, lower-cost products than previously existed—provides the microeconomic foundation for macroeconomic growth.

That growth can become a foundation for sustainable prosperity when the corporation shares with employees the gains from innovation, which in a given accounting period manifest themselves as profits, in the form of secure employment, higher wages, superior benefits, promotion opportunities, and satisfying work. Indeed, the history of modern capitalism shows that when a nation’s major business corporations share the gains of innovation with employees, a substantial portion of the population experiences upward socioeconomic mobility that results in a strong and growing middle class.⁵⁰ The prosperity is *sustainable* because the innovative enterprise rewards employees whose skills and efforts have contributed to the productivity from which higher wages and benefits can be paid. If managed properly, moreover, the ongoing integration of these employees into collective and cumulative learning processes can renew the innovative capabilities, embodied in its labor force, with which the enterprise can compete on product markets.

Hence the importance to U.S. economic development both of Penrose’s focus on the firm’s redeployment of unused productive capabilities into new lines of business in which it can generate innovative products, and of Chandler’s focus on managerial organization in the multidivisional structure to enable the growth of the firm. By the 1950s, when both Penrose and Chandler did their seminal research, employment relations within major U.S. business corporations had become characterized by the expectation of a career with one company for members of both the blue-collar and white-collar labor forces. Adopting a “retain-and-reinvest” resource-allocation regime, major U.S. corporations retained a substantial portion of profits and reinvested in the productive capabilities of their employees, sharing with them, in the form of secure employment and rising remuneration, the gains of innovative enterprise that these employees helped to create. As a result, in the U.S. economy as a whole, the growth of real wages tracked the growth of productivity, and there was a tendency toward less income inequality.⁵¹

⁵⁰ Lazonick, *Competitive Advantage on the Shop Floor*; William Lazonick, *Sustainable Prosperity in the New Economy? Business Organization and High-Tech Employment in the United States*, Upjohn Institute for Employment Research, 2009; Lazonick, et al., “Skill Development and Sustainable Prosperity”; Lazonick, “Labor in the Twenty-First Century”; William Lazonick, Philip Moss, and Joshua Weitz, “Fifty Years After: Black Employment in the United States Under the Equal Employment Opportunity Commission,” book manuscript, The Academic-Industry Research Network, December 2019.

⁵¹ Economic Policy Institute, “The Productivity-Pay Gap,” updated July 2019, at <https://www.epi.org/productivity-pay-gap/>; Lazonick and Shin, *Predatory Value Extraction*, ch. 1.

Since the late 1970s, however, there has been a growing gap between productivity growth and wage growth, resulting in downward socioeconomic mobility for Americans with only high-school educations. Over these decades U.S. business corporations have transitioned from the “retain-and-reinvest” resource-allocation regime, characterized by career-with-one-company employment, to a “downsize-and-distribute” resource-allocation regime. Under the latter, major U.S. corporations downsize their labor forces—at times terminating long-time employees even when the firm is profitable, often in the context of outsourcing and offshoring—and distribute corporate cash to shareholders in the form of dividends and buybacks.⁵² Based on the business practices Penrose observed in the 1950s, she assumed that, through diversification, the business corporation would seek to make use of its “unused resources,” by which she meant first and foremost the labor services of its experienced employees. By the 1990s, however, as the downsize-and-distribute regime became widespread, the assumption that a corporation would seek to make use of its unused labor services could no longer be made.⁵³

The rise in the late 1980s of the corporate-governance ideology that a company should be run to “maximize shareholder value” (MSV) legitimized the replacement of retain-and-reinvest by downsize-and-distribute as the dominant regime of corporate resource allocation in the United States.⁵⁴ The leading academic advocate for MSV was Michael C. Jensen, a Chicago-School “agency theorist,” who from 1985 disseminated this ideology as a professor at Harvard Business School. Jensen argued that for the sake of superior economic performance corporations should “disgorge” their “free cash flow” so that financial markets would be able to allocate these financial resources to their most efficient uses.⁵⁵ The term “disgorge” implies that the funds that a company retains out of profits are ill-gotten when controlled by the corporation rather than distributed to its shareholders, while the term “free” could be applied to cash flow made available by laying off employees, including longstanding personnel who had contributed to the growth of the firm and had held the realistic expectation of a career with one company.

Economists who have absorbed the neoclassical fallacy, to which both Chicago-School conservatives (acolytes of Milton Friedman) and Harvard-MIT liberals (acolytes of Samuelson) adhere, do not have a theoretical explanation for why labor, which they view as a variable cost, would actually represent a part of a firm’s fixed cost—that is, a productive asset in which the firm invests.⁵⁶ For TIE, superior labor productivity derives partly from the development of employees’ capabilities through their work experience and partly from the utilization of those capabilities to capture product markets in order to reap economies of scale and scope.⁵⁷

⁵² Lazonick et al., “Skill Development and Sustainable Prosperity”; Lazonick “Labor in the 21st Century”; Lazonick et al., “Fifty Years After.”

⁵³ Lazonick, *Sustainable Prosperity in the New Economy?*; Lazonick “Labor in the Twenty-First Century”; William Lazonick, “Stock Buybacks: From Retain-and-Reinvest to Downsize-and-Distribute,” Center for Effective Public Management, Brookings Institution, April 2015, pp. 10-11, at <http://www.brookings.edu/research/papers/2015/04/17-stock-buybacks-lazonick>;

⁵⁴ William Lazonick and Mary O’Sullivan, “Maximizing Shareholder Value: A New Ideology for Corporate Governance,” *Economy and Society*, 29, 1, 2000: 13-35; Lazonick, “Innovative Enterprise and Sustainable Prosperity.”

⁵⁵ Michael C. Jensen, “Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers,” *American Economic Review*, 76, 2, 1986: 323-329 (the term “disgorge” is used on pages 323 and 328).

⁵⁶ These economists fail to recognize the potential productivity benefits of labor as a fixed-cost investment even though, as tenured professors, the very same economists have occupied the most secure career employment positions that exist.

⁵⁷ For a pioneering exploration of these issues, influenced by the work of Penrose and Chandler, see David J. Teece, “Economies of Scale and Scope of the Enterprise,” *Journal of Economic Behavior and Organization*, 1, 3, 1980: 223-247.

Nor can neoclassical economists comprehend the growth dynamic linking productivity and pay that, occurring within the innovating firm, can raise the living standards of the company's labor force. Rather, they see wage determination by the forces of supply and demand on labor markets as resulting in the most efficient allocation of the economy's resources. More generally, espousing the fallacy that the most unproductive firm is the foundation of the most efficient economy, they lack a theory of how, through the productivity-pay dynamic, the actual efficiency of the economy can change over time as wages increase on a sustainable basis.

Similarly, once one has accepted the validity of the neoclassical fallacy, one assumes, as all neoclassical economists do, that financial markets allocate resources to their "most efficient uses"—yet they lack a theory of how the most efficient uses come to exist. Nor can the believer in the neoclassical fallacy comprehend theoretically how economic performance can be enhanced when corporate executives retain strategic control over the allocation of some or all of the firm's profits to invest in the firm's productive capabilities rather than "disgorge the free cash flow," ostensibly to be reallocated to its "most efficient uses" via financial markets.

The consequences of the colossal intellectual failure of neoclassical economics are not merely academic. Guided by the theory of innovative enterprise, research by my colleagues and me explains how, since the mid-1980s, MSV ideology has functioned to legitimize the implementation of the Chicago-School agenda by means of massive open-market issuer repurchases—aka stock buybacks. The purpose of stock buybacks done as open-market repurchases is to manipulate a company's stock price, concentrating income in the bank accounts of the richest households and making most Americans worse off.⁵⁸

As I have detailed elsewhere,⁵⁹ TIE explains the risk-taking roles of households as taxpayers and households as workers in contributing to the value-creation processes that can generate corporate profits. These "stakeholders" have a claim to a share of those profits if and when they occur. In contrast, *sharesellers*, including senior executives, investment bankers, and hedge-fund managers, reap financial gains by timing their stock trades around buybacks at the expense not only of taxpayers and workers but also of those shareholders who, as the word says, *hold* their shares for the sake of dividend yields. Intellectually captive to the neoclassical fallacy, even "progressive" neoclassical economists who are deeply concerned with income inequality have failed to mount a critique of the MSV agenda to "disgorge the free cash flow" as a prime source of the extreme income inequality that prevails in the United States.

The transformation of the U.S. business corporation from retain-and-reinvest to downsize-and-distribute that the MSV agenda legitimizes occurred in the decades after Penrose published *TGF*.⁶⁰ Yet the massive value extraction represented by the distribution of the corporation's financial

⁵⁸ William Lazonick, "Profits Without Prosperity: Stock Buybacks Manipulate the Market and Leave Most Americans Worse Off," *Harvard Business Review*, September 2014, pp 46-55; Lazonick, "Stock Buybacks: From Retain-and-Reinvest to Downsize-and-Distribute"; Lazonick, "Innovative Enterprise and Sustainable Prosperity"; Lazonick and Shin, *Predatory Value Extraction*; Ken Jacobson and William Lazonick, "A License to Loot: Opposing Views of Capital Formation and the Adoption of SEC Rule 10b-18," The Academic-Industry Research Network, in progress, January 2020.

⁵⁹ For a recent statement of my MSV critique, see Lazonick, "Innovative Enterprise and Sustainable Prosperity."

⁶⁰ Lazonick and O'Sullivan, "Maximizing Shareholder Value." In the foreword to the third edition of *TGF*, published in 1995, Penrose recognizes the possibility of the financialization of the firm since she originally researched the growth of the firm in the 1950s. See Edith T. Penrose, *The Theory of the Growth of the Firm*, 4th edition, 2009, p. 236.

resources, via dividends to shareholders and via buybacks to sharesellers, assumes a prior era of innovative value creation in the history of the particular firm. Understanding the phenomenon that, in our recent book, Jang-Sup Shin and I call “predatory value extraction” requires a theory of innovative enterprise. As I have argued in this essay, Penrosian learning provides an essential building block for a theory of innovative enterprise, which in turn exposes the neoclassical fallacy.

In *TGF*, however, Penrose herself averts a confrontation with the neoclassical theory of the firm by arguing that its proponents are welcome to go on tending their intellectual garden while she will use her own methods to tend hers. As she puts it in *TGF*:

Educated laymen as well as economists studying the vagaries of actual business behavior often show an understandable impatience with the ‘theory of the firm’, for they see in it little that reflects the facts of life as they understand them. It is therefore worth a little trouble, perhaps, to discuss at the very beginning the nature of the ‘firm’ in the ‘theory of the firm’, to indicate why it provides an unsuitable framework for a theory of the growth of firms, but at the same time to make clear that we shall not be involved in any quarrel with the theory of the ‘firm’ as part of the theory of price and production, so long as it cultivates its own garden and we cultivate ours. Much confusion can arise from the careless assumption that when the term ‘firm’ is used in different contexts it always means the same thing.⁶¹

Penrose is in effect portraying what I have called the “optimizing firm” and the “innovating firm” as two distinct theories of the firm that can be used for different analytical purposes. On this point, Penrose fails to see the profundity of the theory of the firm that she constructed by focusing on its growth—or one might say its “historical transformation”—over time. As I first pointed out in my contributions in the early 1980s to the debate on Britain’s economic decline,⁶² what economists call constrained-optimization analysis can be useful for examining how the firm’s decision-makers adapt to the technological and market conditions that constrain their price and output choices *at a given point in time*.⁶³ But as I demonstrated by analyzing the twentieth-century performance of British industry in global competition, the optimizing firm will fail to remain competitive in its industry when confronted by one or more innovating firms that, refusing to take existing technological and market conditions as “given constraints,” instead use strategic control, organizational integration, and financial commitment to transform these conditions so as to generate higher-quality, lower-cost products than had previously existed.

The “historical transformation,” methodology, which is consistent with Penrose’s approach to the theory of the firm, focuses on how, in particular historical contexts, the innovating firm transforms technologies and accesses markets—remaking industrial conditions that the optimizing firm takes

⁶¹ Penrose, *Theory of the Growth of the Firm*, p. 9.

⁶² William Lazonick, “Factor Costs and the Diffusion of Ring Spinning in Britain prior to World War I,” *Quarterly Journal of Economics*, 96, 1, 1981: 89-109; William Lazonick, “Production Relations, Labor Productivity, and Choice of Technique: British and U.S. Cotton Spinning,” *Journal of Economic History*, 41, 3, 1981: 491-516; William Lazonick, “Competition, Specialization, and Industrial Decline,” *Journal of Economic History*, 41, 1, 1981: 31-38; William Lazonick, “Industrial Organization and Technological Change: The Decline of the British Cotton Industry,” *Business History Review*, 57, 2, 1983: 195-236; Bernard Elbaum and William Lazonick, “The Decline of the British Economy: An Institutional Perspective,” *Journal of Economic History*, 44, 2, 1984: 567-583.

⁶³ See William Lazonick, “Innovative Enterprise and Historical Transformation,” *Enterprise & Society*, 3, 1, 2002: 35-54.

as “given constraints”—to generate a higher-quality, lower-cost product.⁶⁴ When successful, as we have seen, the innovating firm outcompetes the optimizing firm by virtue of its superior productivity. In view of this analysis of the relation between the two “theories of the firm,” Penrose might have added: Neoclassical economists may prefer to tend their own theoretical garden, but they should recognize that without the nutrients supplied by investment in productive capabilities, the firms that populate their theoretical terrain will wilt and fade away.

In the presence of “Schumpeterian competition,” innovative enterprise vanquishes the optimizing firms that neoclassical economists idealize. In seeking to compete through constrained optimization (as the neoclassical economist would advise), the optimizing firm fails to invest in the productive capabilities that would enable it to respond to the new competition by itself transforming the technological and market conditions that it faces. Economists who ignore the theory of the growth of the firm and the historical transformation of technological and markets conditions that are at its core are left with the argument that firms that engage in constrained optimization are doing the best that can be done in achieving economic efficiency.

The neoclassical fallacy is, then, an extreme version of the neoclassical economist’s methodological commitment to the constrained-optimization technique for analyzing the firm’s output and price: the more constrained the firm as a productive entity, the more efficient the industry and economy of which these powerless firms are a part. Hence, as stated previously in this essay, adherence to the neoclassical fallacy enables the neoclassical economist to view the firm as impotent and the market as omnipotent in allocating the economy’s resources.

Intellectually captive to constrained-optimization methodology, neoclassical economists fail to recognize the competitive limitations of constrained-optimization decision-making in industries dominated by innovative enterprise. As a prime example of this obeisance to constrained-optimization methodology, in a survey of work in business history, business policy, and organizational behavior published in the *Journal of Economic Literature* in 1980, Richard Caves, a prominent neoclassical industrial-organization economist, concludes that “the well-trained professional economist could have carried out many of the research projects cited in this paper more proficiently than did their authors, who were less effectively equipped by their own disciplines.”⁶⁵ He continues:

If one accepts the weak postulate that the firm is a purposive organization maximizing some objective function, it follows that its strategic and structural choice represents a constrained-optimization problem. My reading is that students of business organization with disciplinary bases outside of economics would accept that proposition but have lacked the tools to follow its blueprint. Constrained-maximization problems are mother's milk to the well-trained economist.

⁶⁴ William Lazonick, “The Integration of Theory and History: Methodology and Ideology in Schumpeter’s Economics,” in Lars Magnusson, ed., *Evolutionary Economics: The Neo-Schumpeterian Challenge*, Kluwer, 1994: 245-263; Lazonick, “Innovative Enterprise and Historical Transformation.”

⁶⁵ Richard Caves, “Industrial Organization, Corporate Strategy and Structure,” *Journal of Economic Literature*, 18, 1, 1980, p. 88. Caves was a professor in the Harvard Economics Department from 1962 to 2003, and chair of the PhD in Business Economics, a joint degree of the Harvard Economics Department and Harvard Business School, from 1984 to 1997. “Richard E. Caves,” *Wikipedia*, at https://en.wikipedia.org/wiki/Richard_E._Caves.

Caves highlights Chandler's *Strategy and Structure* and *The Visible Hand* as among the works by scholars "who were less effectively equipped by their own disciplines" to carry out research into, in this case, business history. Caves references Penrose, *The Theory of the Growth of the Firm*, in a footnote as "an important antecedent" to arguments made by others concerning "the expansion of the firm holding fixed assets that cannot be costlessly divested in the short run,"⁶⁶ thus grossly mischaracterizing Penrose as a "constrained-optimization" economist. Remember, as I stated at the outset of this essay, the definition of a "classic": a work that many cite but few have read.

Worse is the case of an economist who commented extensively on drafts of *TGF* but then chose not to cite Penrose's book because it did not fit with his constrained-optimization view of the world. I am referring to Fritz Machlup, who was Penrose's faculty advisor at Johns Hopkins University when she was studying for her doctorate from 1947 to 1951 and, subsequently, one of two Johns Hopkins faculty members who supervised Penrose as the researcher on their project on the growth of firms that in 1959 resulted in the publication of *TGF*. Penrose and Machlup remained friends until his death in 1983.⁶⁷ Yet Machlup's 1966 American Economic Association presidential address, entitled "Theories of the Firm: Marginalist, Behavioral, and Managerial," takes up thirty-one pages of text and contains a total of forty-eight bibliographic references, but no mention of Penrose is to be found.⁶⁸

Why? It seems that given the centrality of organizational learning to Penrose's argument, Machlup did not consider *The Theory of the Growth of the Firm* to be "economic theory" but rather "organization theory." As a prelude to the concluding summary of his survey of the three types of theories of the firm, he states:

I am not happy about the practice of calling any study just because it deals with or employs a concept of the firm "economics" or "microeconomics." But we cannot issue licenses for the use of such terms and, hence, must put up with their rather free use. My own prejudices balk at designating organization theory as economics – but other people's prejudices are probably different from mine, and we gain little or nothing from arguing about the correct scope of our field.⁶⁹

Earlier in his address, Machlup warns: "Frankly, I cannot quite see what great difference organizational matters are supposed to make in the firm's price reaction to changes in conditions."⁷⁰ Machlup was the quintessential neoclassical economist, obsessed with "marginalist" constrained-optimization methodology as the definitive tool of economic analysis. Machlup contends that managerial theories of the firm in which the firm's decision-maker seeks to maximize an objective other than money profits can be subsumed within the constrained-optimization framework through "expanded marginalist objective functions"⁷¹ without impeding one's understanding of how the economy functions and performs. As he puts it:

⁶⁶ Caves, "Industrial Organization, Corporate Strategy and Structure," p. 66.

⁶⁷ Penrose, *No Ordinary Woman*, pp. 116-117, 142-146, 172-181.

⁶⁸ Fritz Machlup, "Theories of the Firm: Marginalist, Behavioral, and Managerial," *American Economic Review*, 57, 1, 1967: 1-33. Nor does he mention Penrose or her work in Fritz Machlup, *The Production and Distribution of Knowledge in the United States*, Princeton University Press, 1962.

⁶⁹ Machlup, "Theories of the Firm," p. 29.

⁷⁰ *Ibid.*, p. 13.

⁷¹ *Ibid.*, p. 4.

My charge that there is widespread confusion regarding the purposes of the “theory of the firm” as used in traditional price theory refers to this: The model of the firm in that theory is not, as so many writers believe, designed to serve to explain and predict the behavior of real firms; instead, it is designed to explain and predict changes in observed prices (quoted, paid, received) as effects of particular changes in conditions (wage rates, interest rates, import duties, excise taxes, technology, etc.). In this causal connection the firm is only a theoretical link, a mental construct helping to explain how one gets from the cause to the effect. This is altogether different from explaining the behavior of a firm.⁷²

As Machlup summed up the “theories of the firm” surveyed in his presidential address:

As far as the proponents of managerial theories are concerned, they have never claimed to be anything but marginalists, and the behavior goals they have selected as worthy for incorporation into behavior equations, along with the goal of making profits, were given a differentiable form so that they could become part of marginal analysis. Thus, instead of a heated contest between marginalism and managerialism in the theory of the firm, a marriage between the two has come about.⁷³

Machlup does not mention Penrose in his AEA presidential address because it is impossible to interpret her managerial theory of the firm as marginalism. Somehow, she had failed to imbibe the “mother’s milk” of the “well-trained economist,” as Caves would express it some years later. As Penrose put it in a letter to Machlup in response to his comments on a draft of *TGF*: “Unlike you, I don’t have the answers to all the problems pat from a few simple premises. I don’t think the premises are as easy as you do.” Or as she informed her mentor: “I don’t know all the answers before I start as you do.”⁷⁴ Notwithstanding his unique position for observing the unfolding of Penrose’s work, Machlup’s intellectual attachment to constrained-optimization methodology rendered invisible to him her seminal contribution to economic theory, including her treatment of the relation between facts and logic—that is, history and theory.

From my intellectual perspective, Penrose’s “historical transformation” methodology integrates history and theory. At a certain stage of our intellectual development, theory serves both as a distillation of what we have learned from the study of history and a guide to researching what we need to know as “the present as history” unfolds.⁷⁵ As Penrose articulates it in an essay written in the late 1980s that, putting the shoe on the other foot, chastises historians for ignoring theory:

‘Theory’ is, by definition, a simplification of ‘reality’ but simplification is necessary in order to comprehend it at all, to make sense of ‘history’. If each event, each institution, each fact,

⁷² Ibid., 10.

⁷³ Ibid., p. 29.

⁷⁴ Penrose, *No Ordinary Woman*, p. 145.

⁷⁵ Paul M. Sweezy, *The Present as History: Essays and Reviews on Capitalism and Socialism*, Monthly Review Press, 1953. As Sweezy puts it: “Everyone knows that the present will some day be history. I believe that the most important task of the social scientist is to try to comprehend it as history now, while it is still the present and while we still have the power to influence its shape and outcome.” Ibid., p. v.

were really unique in all aspects, how could we understand, or claim to understand, anything at all about the past, or indeed the present for that matter? If, on the other hand, there are common characteristics, and if such characteristics are significant in the course of events, then it is necessary to analyse both the characteristics and their significance and ‘theoretically’ to isolate them for that purpose.

Then, applying the boot to “well-trained” economists, Penrose concludes: “universal truths without reference to time and space are unlikely to characterise economic affairs.”⁷⁶ She might have added, a failure to integrate history and theory has led three generations of economists to accept the neoclassical fallacy as a universal truth. The next generation needs new economic thinking. Read Penrose’s “classic” for a start.

⁷⁶ Edith Penrose, “History, the Social Sciences and Economic ‘Theory,’ with Special Reference to Multinational Enterprise,” in Alice Teichova, Maurice Lévy-Leboyer, and Helga Nussbaum, eds., *Historical Studies in International Corporate Business*, Cambridge University Press, 1989: 7-14, quoted from p. 11.