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**Edith Penrose: Seeing into the  
“Insides” of the Firm**

by

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# Edith Penrose: Seeing into the “Insides” of the Firm

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## ABSTRACT

Edith Penrose was far from underappreciated in management theory, where she was considered the inspiration for more than one research program. But she was virtually unknown in economics, the discipline in which she was trained and in which she considered herself to be working. This essay chronicles the life and work of Edith Penrose. It examines the streams of thought she influenced – and didn’t influence. As a special bonus, the essay also considers another underappreciated economist, George Richardson, who built on Penrose’s work and overcame some of its limitations. Following Brian Loasby, the essay ultimately argues for understanding Penrose and Richardson as industrial organization economists in the tradition of Adam Smith and Alfred Marshall.

JEL codes: B25, B31, B52, B53, L2, L65, O32

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## ***Introduction.***

It may seem inappropriate to include Edith Penrose in a volume focused on underappreciated economists. In the early twenty-first century, one scholarly article described her as “one of the more influential economists of the twentieth century” (Rugman and Verbeke 2004, p. 205). According to Google, her seminal book *The Theory of the Growth of the Firm* (Penrose 1959) has been cited more than 46,000 times. In fact, however, the authors making this pronouncement were not economists but management scholars writing in a management journal. And the vast majority of the citations to Penrose’s book (henceforth *TGF*, I’m afraid to say) have been in management and strategy. It is telling that, as others have noticed, the blurbs for the 1995 reprint of *TGF* came from two noted management scholars and an economist noted for being heterodox. As an economist, and among economists, Edith Penrose is indeed underappreciated, unread, and perhaps even unknown in the more fashionable precincts of the profession. As John Kay (2024, p. 99) has pointed out, Penrose’s name never appeared in the indexes of the most influential Nobelist-authored industrial organization textbooks of the late twentieth century (Milgrom and Roberts 1992; Tirole 1988).

Penrose’s life was largely coextensive with the twentieth century, and she was present for, and sometimes involved in, many of the signal events of her era. Hers was a life of adventure and sometimes tragedy, and her academic path was a complex and unusual one. This may speak in part to the originality of her work, though, as is often the case, there may be a certain amount of endogeneity in such a judgment. The theory she developed in *TGF*, both its enduring value and some of its limits, must be understood in the context of the post-war era during which she wrote, a period dominated by large vertically integrated corporations under the control of salaried managers rather than individual entrepreneurs (Langlois 2023).

Edith Elura Tilton was born in 1914 in Los Angeles and grew up in San Luis Obispo (Penrose 2017; Penrose and Pitelis 2002). Her father was a surveyor and road engineer who was involved in designing not only some of the most scenic stretches California's storied Route 1 but also the entry road to William Randolph Hearst's San Simeon estate. As a result, the young Edith often found herself in road camps, where on one occasion her mother was forced to defend her by shooting a rattlesnake. A stellar student, Edith matriculated at the University of California Berkeley at the height of the Great Depression, and by accident fell into the study of economics. She was active in debate and campus politics at Berkeley, apparently taking a progressive but liberal-centrist stance during this highly polarized time. While still an undergraduate, she married a law student called David Denhardt. In 1938, while running for District Attorney in the rural Central Valley of California, Denhardt was shot and killed in what may or may not have been a hunting accident.<sup>1</sup>

Entrusting her newborn son to her parents in Sacramento, Edith returned to Berkeley to work as assistant to the British economist Ernest F. Penrose, known to her as Pen, for whom she had worked briefly as an undergraduate. In 1939, Pen moved to the International Labor Office in Geneva. Edith came with him, taking a position as a researcher. It was during this period that she began honing a craft that would later serve her well. After the war broke out, she and Pen were active in helping Jews – including the economist Ludwig von Mises and his wife (Mises 1976, pp. 55-56) – escape to the United States. Before long, ILO staff, including Pen and Edith, were themselves forced to flee across France and Spain to Portugal before returning to North America.

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<sup>1</sup> This was far from the only tragedy in Edith's life. Both of her younger brothers became Air Force pilots and were killed in air crashes, one of them in combat. Her first son with Ernest Penrose would die at age 18 months.

In 1941, John Winant, the head of the ILO (and formerly the first head of the Social Security System), became U. S. ambassador to Britain, bringing Pen along to London as his economic advisor. Once again, Edith came too. Still in her mid-twenties, she would meet and interact with some of the most significant economists of the century, including F. A. Hayek, James Meade, Lionel Robbins, and Austin Robinson. It was in this environment that she would be exposed to the inner negotiations between John Maynard Keynes and his American counterpart Harry Dexter White that would shape the post-war Bretton Woods monetary structure. After the war, she began working for the newly formed United Nations, where she assisted Eleanor Roosevelt in the writing and passage of the Universal Declaration of Human Rights.

In 1947, Pen accepted a professorship in geography and international relations at Johns Hopkins. Edith – now his wife – enrolled in the graduate program, working with the émigré Austrian economist Fritz Machlup, who had been a student of Mises in Vienna. She received her Ph.D. in 1951, with a dissertation on the international patent system that would be published by Johns Hopkins University Press (Penrose 1951). (Her central argument was that international arrangements should require compulsory licensing of patents, especially in less-developed countries, and that those countries ought not to be forced to sign international enforcement treaties.) She stayed on at Johns Hopkins to work on another Machlup project – on the growth of firms. But this was the era of the second Red Scare, and Owen Lattimore, a distinguished sinologist at Johns Hopkins, was accused of having been one of the American “China hands” who had “lost” China to Communism. The Penroses rose to Lattimore’s defense, and Edith became secretary of his defense fund (Levallois 2011). Although charges against Lattimore were

eventually dropped, the Penroses became disillusioned with life in the U. S., and they began to take gigs outside the country as Pen neared retirement, first in Australia and then in Baghdad.

In 1959, Edith took up a position (soon to become a chair) at the School of Oriental and African Studies of the University of London, moving to INSEAD in Fontainebleau, France in 1978. Much of her later work focused on the multinational enterprise, especially in the oil industry, with which she had come into contact in Baghdad. She also traveled extensively, especially in the Middle East and Africa. When Pen died in 1984, she retired to Waterbeach in Cambridgeshire, remaining active until her own death in 1996. Indeed, it would not be until after her retirement that Edith Penrose would rise to prominence in the academic world – even if not perhaps in economics.

### ***The Theory of the Growth of the Firm.***

Along with G. H. Evans, then the head of the economics department at Johns Hopkins, Fritz Machlup had secured a grant from the Merrill Foundation to study the growth of business firms (Penrose 2017, p. 120). This was mostly an empirical exercise, but Penrose's role in the project would be to provide the theory. Supported by a grant from the Foundation for Economic Education, she spent the summer of 1954 embedded at the Hercules Powder Company (Penrose 1960). One of the powder companies spun off in the court-ordered breakup of Du Pont in 1911, Hercules had become a large, successful maker of chemicals and related products. Penrose's understanding of the nature and growth of the firm would spring from this inside view of corporate decision-making.

Having absorbed her mentor's attitude toward economic semantics (Machlup 1963), she argued that "the firm" has no fixed and unambiguous meaning: the term's definition should

depend on the questions being asked. For Penrose, the firm is distinguished from the market in that it is an administrative organization, one whose coherence as an entity emerges from the *collection of productive resources* it employs. The “primary economic function of an industrial firm is to make use of productive resources for the purpose of supplying goods and services to the economy in accordance with plans developed and put into effect within the firm. The essential difference between economic activity inside the firm and economic activity in the ‘market’ is that the former is carried on within an administrative organization, while the latter is not” (Penrose 2009, p. 13).

The productive resources within a firm can be tangible or intangible, so long as they are durable resources that continue to generate services over time (Penrose 2009, pp. 21-22). Resources thus include not only plant and equipment but even the human capital of the workers themselves, who can be considered durable assets in the sense that the firm suffers a capital loss when knowledgeable workers leave the firm. Workers, including managers, acquire human capital over time in contexts that are specific to each firm, which implies that firms assemble unique bundles of resources: firms inevitably differ from one another in what they know how to do well (Penrose 2009, p. 48).

The firm grows to the extent that entrepreneurs – very much including managers within an administrative organization – perceive and seize opportunities to profit from applying the services of the resources the firm has at its disposal. Because resources are lumpy, a firm always has “excess” resources, overheads that it could apply cheaply to new activities. “For the most part, resources are only obtainable in discrete amounts, that is to say, a ‘bundle’ of services must be acquired even if only a ‘single’ service should be wanted” (Penrose 2009, p. 60). This means that the growth of the firm is what we would nowadays call path dependent: which resources are

available at any time for new uses will depend on resources inherited from the past and thus on decisions made in the past. Growth in this model is thus opportunistic. The firm seeks out new profitable activities that can take advantage of existing excess resources. Of course, existing resources may not be adequate or a perfect fit for the new entrepreneurial activity, which means that the firm will have to create new resources in the process of utilizing old resources. These new resources will also be lumpy, and the firm will then look for more opportunities to use these new resources: and the process will proceed indefinitely, rather like assembling a large jigsaw puzzle.

As Penrose realizes, what she has created is in the end a theory of growth through related diversification. Significantly, she sees “relatedness” not in terms of the products or services the firm generates but rather the relatedness of the resources it uses to produce. “Each type of productive activity that uses machines, processes, skills, and raw materials that are complementary and closely associated in the process of production we shall call a ‘production base’ or ‘technological base’ of the firm, regardless of the number of types of products produced” (Penrose 2009, p. 97). A firm can have more than one production base, and each production base can generate many different, seemingly unrelated products in multiple markets. Here is where industrial research comes into the picture. Research is often closely related to existing technological bases, but it generates new resources, which can then be applied to new opportunities.

Sometimes firms develop resources without any clear idea what opportunities might arise to use them. For example, during World War II, Hercules developed a new cellulose gum in an

effort to replace a lubricant that had become unavailable.<sup>2</sup> But the firm was sure there would be many other uses. They simply didn't know what those uses would be. So they placed an ad in the trade press challenging potential customers to come up with uses for the product (Penrose 1960, p. 9). Soon a wide variety of companies were buying the substance for a wide variety of seemingly unrelated products. "Thus whether research be originally undertaken merely because the firm is convinced that profitable new opportunities will come out of it, or because it is considered necessary for survival in a competitive world, it enables at least the large firms to turn aside the process of 'creative destruction' and to thrive on the novelty which might otherwise have destroyed them" (Penrose 2009, p. 101).

### ***Penrose and strategic management.***

To the extent that *TGF* had an early influence on the academic literature, it was in the context of the so-called managerial theory of the firm (Baumol 1962; Williamson 1964), one of whose main proponents, Robin Marris (1966), was a Penrose acquaintance. In the days when salaried managers rather than stockholders seemed to be in control of the large corporation, this literature attempted to model the discretionary behavior of managers rather than to assume that those managers maximized shareholder value. The work of Penrose entered solely as part of an argument that, because resources could not be instantaneously acquired, management would necessarily become a constraint on the rate of growth of firms – an idea that came to be called the "Penrose effect" (Uzawa 1968).

This was also the era in which policy-oriented industrial organization had coalesced around the structure-conduct-performance paradigm of antitrust analysis. This approach so

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<sup>2</sup> Penrose generated a business history of Hercules Powder, which was originally to have been part of *TGF*, but it was left out for reasons of length and published separately in *Business History Review* in 1960. Interestingly, *TGF* never refers to Hercules let alone draws on examples from the firm.

sometimes called the Harvard School, in that it emanated from the students of Edward S. Mason, notably Joe Bain (1959) and his student and colleague Richard Caves (1964). The SCP paradigm envisaged market competition as a process in which firms constantly position themselves to earn rents in product markets by various strategies that effectively throw up barriers to entry. In one of the most significant moves in the history of management theory, Michael Porter (1980), a student of Caves, flipped the script of the SCP paradigm: if economists could analyze strategic positioning and barriers to entry for purposes of antitrust, why couldn't management scholars – and consultants – use the same ideas to instruct managers in how to use to their advantage these very same forms of strategic positioning and barriers to entry. Porter's "five forces" quickly became a dominant approach to strategic management.

Yet the 1980s were a period in which American firms were being pummeled by foreign competition and technological innovation. Mere strategic positioning in product markets seemed to be of little avail. Indeed, one of the lessons of Japanese competition seemed to be not that the Japanese were better strategists but that they were simply better at making high-quality, low-cost products. Thus when in 1984 – the year of Penrose's retirement – Birger Wernerfelt (1984) proposed an alternative to Porter that came to be called the Resource-Based View (RBV) of the firm, it instantly struck a responsive chord. Drawing explicitly on Penrose, Wernerfelt argued that managers and management theorists should worry less about positioning in product markets and pay attention instead to their underlying resources – Penrose's production bases – as a source of competitive advantage. The RBV came to dominate thinking in strategic management, as managers were told in no uncertain terms to turn inward to the supply side – to stick to their knitting and build their "core competences." And Edith Penrose became the guiding light of strategic management theory.

As a number of authors have pointed out, however, despite the footnotes and references lavished upon Penrose by the RBV, in the end that approach actually incorporates surprisingly little of what was novel in Penrose and strays far less than advertised from mainstream economics or even from the Harvard School (Foss 2002; Rugman and Verbeke 2002). The principal objective of the RBV strategist is to profit from differential rents accruing to superior factors of production whose services are not easily imitated by others (Barney 1991). Although RBV theorists do see a heterogeneity among resources and differences in the costs of acquiring and protecting them, they “forget that it is the actual application in production, and not the mere possession, of resources that creates revenue” (Foss 2002, p. 158). The RBV became a theory of how to manipulate existing knowledge bases to advantage and not – like that of Penrose – an account of the nature and creation of knowledge bases.

### ***Penrose, Chandler, and Richardson.***

The ideas of Penrose also made their way into business schools along a quite different path. Not long after Penrose had spent time at Hercules, Alfred Chandler, then an associate professor of history at MIT, was asked to work with Alfred P. Sloan, the recently retired head of General Motors, on what would be Sloan’s second autobiography, *My Years with General Motors* (Sloan 1964). Chandler had already begun to theorize about the nature and structure of the American corporation (Chandler 1959) – an inclination that set him apart from the antiquarian style of contemporary business historiography and set him on the path to create the modern field of business history. Working with Sloan, Chandler had access to the GM archives (McKenna 2006). The result was his first major work, *Strategy and Structure* (1962), which both chronicled and theorized about the multi-divisional (or M-form) structure at firms like GM and Du Pont. Only when the book was near publication did Chandler become aware of Penrose and *TGF*.

“While using somewhat different data and asking somewhat different questions, Dr. Penrose’s findings have many similarities with mine. Her superlative study focuses on the economics of growth and not on structure and on its relation to strategy. My empirical data, however, certainly do help to support her theoretical concepts about the growth of the firm which are defined more rigorously than the more impressionistic generalizations developed here” (Chandler 1962, p. 453).

The Penrosean theory of the growth of the firm would be at the heart of Chandler’s *magnum opus*, *The Visible Hand* (1977) which narrates the growth of the large multiunit enterprise in the nineteenth and twentieth centuries and interprets that growth as deeply connected to the rise of the professional manager. Although Chandler thinks that the large firms sometimes took on new activities for “defensive” reasons – reasons not unlike those envisaged by the later RBV – he focuses principally on “productive” diversification, which involves precisely the process Penrose described. “Because the large integrated industrial had more and different types of operating units than other kinds of business enterprises, the likelihood that units might be underutilized was greater. It was rare for all units in such an enterprise to be operating at the same speed and capacity. Such disequilibrium provided constant pressure for the growth of the firm” (Chandler 1977, p. 489). Here Chandler footnotes Penrose and *TGF*.

Another important figure deeply influenced by Penrose was George Richardson – himself an unjustly neglected economist who might well have merited his own place in this volume.<sup>3</sup> In “The Organisation of Industry,” Richardson argued that “production has to be undertaken (as Mrs. Penrose has so very well explained) by human organisations embodying specifically

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<sup>3</sup> I fully agree with Brian Loasby’s opinion that Richardson (1972) “must be a close contender with Young’s (1928) exposition of increasing returns for the title of the best article ever written on industrial organization” (Loasby 2002, p. 52).

appropriate experience and skill.” In his view, “we cannot hope to construct an adequate theory of industrial organization and in particular to answer our question about the division of labour between firm and market, unless the elements of organisation, knowledge, experience and skills are brought back to the foreground of our vision” (Richardson 1972, p. 888). What Penrose had called *resources*, Richardson calls *capabilities*, the “knowledge, experience, and skills” of the firm.

Unlike Penrose, Richardson explicitly considers ways of creating and coordinating capabilities *outside* of the structure of the firm. Years earlier Ronald Coase (1937) had considered markets and firms as alternative ways of coordinating economic activity, even if in 1972 his ideas remained “much cited and little used” (Coase 1972, p. 63). A central thrust of Richardson’s argument is that market actors have at their disposal a wide array of coordinating mechanism – what we would now think of as relational contracts and hybrid organizational forms – that lie between the ideal types of the anonymous market on the one hand and the managerial enterprise on the other.

In Richardson’s capabilities account of economic organization, capabilities can be either *similar* or *complementary*. (They can also be completely unrelated, of course.) Capabilities are similar when the knowledge, experience, and skills useful in activity A could be cheaply adapted to activity B. This is the fundamental idea in the Penrose-Chandler account of related diversification. But along a chain of production, capabilities are necessarily complementary to each other – even if they are quite dissimilar. (A simple example: the woodworking skills needed to make rifle stocks are dissimilar from the metalworking skills necessary to turn the barrels; but they are complementary in that both sets of skills are necessary to making rifles.) “Where activities were both similar and complementary,” Richardson wrote, “they could be co-

ordinated by direction within an individual business. Generally, however, this would not be the case and the activities to be co-ordinated, being dissimilar, would be the responsibility of different firms. Co-ordination would then have to be brought about either through co-operation, firms agreeing to match their plans ex ante, or through the processes of adjustment set in train by the market mechanism” (Richardson 1972, p. 895). As Brian Loasby (2002) put it, we need both a theory of growth and a theory of coordination, and the use and accumulation of idiosyncratic knowledge must be the raw materials of both.

The idea of capabilities – and eventually of “dynamic” capabilities – would also find its way into management and strategy as a development of the resource-based approach.<sup>4</sup> But, despite adopting Richardson’s terminology, this approach would be influenced to some extent by Penrose but essentially not at all by Richardson. A conception of capabilities fundamentally similar to that of Richardson would be reinvented through another channel.

### ***Penrose and economics.***

In the middle of the twentieth century, an economist called Richard Lester sent questionnaires to American firms asking them if they behaved the way the basic neoclassical model predicted, that is, whether they set price equal to marginal cost. Almost all the respondents said no; many had no idea what marginal cost meant. We set price by simply adding a markup to what we pay for our inputs, Lester was told. Not surprisingly, this ignited a heated response from mainstream economists, in what came to be called the marginalist controversy (Langlois 1986, pp. 240-241). In the forefront of the response was Fritz Machlup, who would later summarize his defense of

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<sup>4</sup> Dynamic capabilities are “the firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments” (Teece, Pisano and Shuen 1997, p. 516).

marginal analysis in a presidential address to the American Economic Association (Machlup 1967).

Another economist who had entered the fray was Armen Alchian (1950). Suppose, said Alchian, that thousands of motorists set out from Chicago on a variety of different routes. Suppose also that there are gas stations on only one of the routes. We can safely predict that only motorists who happened to pick the route with gas stations will get very far. But we can be assured in our prediction not because we assumed any of the motorists consciously selected the best route; rather, the lucky motorists were themselves selected by the impersonal forces of the environment. What looks like fully informed rational choice is really Darwinian selection.

There were two responses to Alchian's idea (and to related defenses of marginalism). The dominant response was to breathe a sigh of relief: because there is a Darwinian mechanism operating in the background, we can stop worrying and go on with our optimizing models as usual. Milton Friedman (1953, p. 22) held that "given natural selection, acceptance of the [maximizing] hypothesis can be based largely on the judgment that it summarizes appropriately the conditions for survival." But there was another response, rarer and more interesting. If what really lies behind economic activity is some kind of selection mechanism, then perhaps we should pay much more attention to analyzing how that mechanism works.

In a comment on Alchian's selection argument, Penrose (1952, p. 812) pointed out that in biological evolution, selection operates on traits that can reproduce themselves. But in the story about drivers dispersing from Chicago, there is no reproduction. If another thousand drivers leave again the next day, they have retained no information from the previous day and are on average no better at finding gas stations than the drivers the day before. In an important sense,

rational economic agents are also much like Alchian's drivers. They too have no persistence of memory; they take each day afresh as they search for a new optimal solution. But for selection to operate, there has to be at least some stickiness, some repetitiveness of behavior. As Sidney Winter (1971, p. 245) put it, "to make a 'natural selection' argument plausible in economics, some mechanism playing the role of genetic inheritance must be discovered."

An obvious candidate model, already long aired within social science, would be to suppose that economic agents follow rules. Rules are sticky almost by definition; and rules, or something very like them, might be a good candidate for the genetic element in an evolutionary story. In the 1950s and 1960s, the arrival of the digital computer made the rule-following model all the more salient. Influenced by the computer – and indeed interwoven with the field of computer science – the Carnegie School of Richard Cyert, James March, Herbert Simon, and others proposed accounts of rule-like human behavior (Cyert and March 1963; March and Simon 1958). Simon (1956) famously argued that humans are subject to severe cognitive limitations that make it impossible for them constantly to optimize in any strong sense. Humans are "boundedly rational," Simon suggested, and as a result they must often "satisfice" rather than optimize. And satisficing typically means the following of rules in a world too complex for nonstop optimization.

Influenced by the Carnegie School, Richard Nelson and Sidney Winter painted a sophisticated portrait of an evolutionary approach to economics. In their account, both individual agents and organizations follow *routines*, which are rule-like forms of behavior. The forces of selection then operate on the routines, which serve as the analogue of genetic material: routines are genes (Nelson and Winter 1982, p. 15). Organizations thus appear as a collection of routines – of ways of doing things – that exist independently of the individual personnel who

follow the routines. An automobile assembly plant, for example, continues to operate – and learn – even as workers come and go (Levitt, List and Syverson 2013). For Nelson and Winter, routines are organizational memory, “the organizational analogue of individual skill” (Nelson and Winter 2002, p. 30). Like Richardson, they called these organizational skills *capabilities*.<sup>5</sup>

As Nelson and Winter were developing their version of capabilities theory in the 1970s, economists were also beginning to use Coase’s little-used 1937 paper. At the forefront of this revival was Oliver Williamson (1971, 1975). Williamson too was influenced by the Carnegie School. He had been a doctoral student at Carnegie during the first years of the 1960s, a time of great interdisciplinary intellectual ferment (Mahoney and Nickerson 2022, pp. 196-197). This experience had initially led him to become one of the early practitioners of the managerial theory of the firm (Williamson 1964). But his interests soon turned in a Coasean direction. Just as Coase had seen the firm as arising because of limitations to the market – “a cost of using the price mechanism” (Coase 1937, p. 390) – Williamson saw the firm as arising because of the limits and complexities of market transactions.

David Teece, a student and colleague of Williamson, was among the first to attempt to bring these two lines of research together – to connect the Nelson-and-Winter account of the capabilities of firm, with a dash of Penrose, to the Coase-Williamson account of the boundaries of the firm<sup>6</sup> (Teece 1980, 1982). As had happened with Penrose, however, this new instantiation

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<sup>5</sup> It is one of many charming Penrosean paradoxes that, whereas evolutionary economists would reinvent a concept of economic capabilities fundamentally similar to her own, she herself remained hostile to evolutionary theorizing in economics (as her 1952 comment suggest), possibly because she linked it to Social Darwinism (Levallois 2011).

<sup>6</sup> According to David Teece (private communication), it was his citation of Penrose that called Wernerfelt’s (1984) attention to *TGF*. Teece was aware of George Richardson’s 1960 book *Information and Investment*, which bore no influence from Penrose (Richardson 2002, p. 37), but he was long unaware of Richardson’s 1972 article.

of the theory of capabilities found its home in business schools far more readily than in economics departments.

Clearly, the work of Penrose made little inroads in economics because it challenged conventional models of the firm. In her forward to the third edition of *TGF* in 1995, a time by which she had attained prominence in related realms of the academy, Penrose seemed willing to cast herself as something of a critic of the economists' model of the firm. "Few economists thought it necessary to enquire what happened inside the firm—and indeed their 'firm' had no 'insides' so to speak" (Penrose 1995, p. x). Yet she believed that it was not useful to "integrate" the two approaches. Famously, she held, theorists should tend their own gardens (Penrose 2009, p. 9).

Many have found it ironic that Fritz Machlup, who championed the marginalist firm against its detractors, was Penrose's close friend and mentor. It is a "fascinating paradox" (Penrose and Pitelis 2002, p. 19). Of course, tending one's own garden was part of Machlup's worldview as well. More fundamentally, however, Machlup was not defending the hard-core Walrasian model of the firm that was becoming increasingly central as the twentieth century wore on. He was defending the kind of common-sensical price theory we teach to freshmen (Langlois and Koppl 1991). Brought up in the Austrian tradition, Machlup had as his marginalist lodestar Carl Menger not Léon Walras.

Indeed, we might see both Machlup and Penrose as Marshallians in a loose sense. Brian Loasby has made this argument compellingly for Penrose and Richardson. "The central notion is a combination of Smith and Marshall: the division of labour, both within and between firms, leads to the development of skills and the perception of possibilities, while firms within a similar

line of business will develop somewhat different skills and perceptions. Enterprise grows out of management, as Say and Marshall had argued; and it is driven by human purpose, seeking to discover and exploit causal relationships by producing new goods for new markets, in accordance with Menger's theory" (Loasby 2002, pp. 51-52).

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