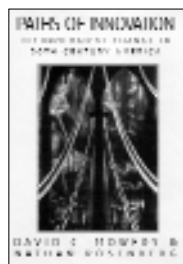


## *Paths of Innovation: Technological Change in 20th Century America*

By David C. Mowery and Nathan Rosenberg, New York, NY: Cambridge University Press, 1998, 214 pp., \$27.95 hardcover.

The key concept of this quick-reading yet thought-provoking analysis of technological change since 1900 lies in the pluralistic nature of the first word of the book's title, *Paths*. How a new innovation, invention or technology moves from initial discovery to becoming a major economic influence is not a simple, easily predicted process. However, Mowery and Rosenberg present a convincing argument that insight may be gained if viewed from a macroeconomic, historical perspective.

Both authors are established experts and writers on the impact of technology on economic growth. Nathan Rosenberg, Professor of Economics at Stanford University since 1974, was awarded in 1996 the Leonardo da Vinci Medal of the Society for the History of Technology, the Society's highest recognition. His 1983 book, *Inside the Black Box: Technology and Economics*, is used as a text or key reference in many undergraduate and graduate economics programs on the dynamics of technological change on economic growth. David



C. Mowery, who received his Ph.D. in Economics from Stanford in 1981, is Professor at the Haas School of Business, University of California, Berkeley, and co-authored several other books with Nathan Rosenberg, including *Technology and the Pursuit of Economic Growth* (1989), as well as a number of other books and articles on the subjects of technological change, international trade, U.S. technology policy, and the relationship between public policies and the private sector.

In decoding five years' research of a century of innovation into a concise but thorough presentation, the authors focus their discussion on three dominant technologies: the internal combustion engine, chemicals, and electric power. They also add a review of the more recent history of the electronics revolution.

They begin with a chapter on the transformation of the structure and organization of the innovation process. Funding is analyzed, from individual enterprise to industry and government-sponsored research and development efforts to venture capital. How U.S. antitrust policy and changes in patent law influenced the growth of industrial R&D is also discussed. A comparison of U.S. R&D investment and structure to four other large foreign economies (West Germany, France, the United Kingdom and Japan) lays the foundation for a continuing thread throughout the book: differentiating the success and speed of deployment of new technologies in the United States versus the global

community.

The next three chapters underscore the importance of "the initial conditions under which an innovation appears and is refined for economic exploitation" in how a technology's path evolves.

With the internal combustion engine, it was the domestic abundance of natural resources (e.g., low-cost petroleum) as well as the geographic dispersion, high middle-class income, and individualistic nature of the U.S. population that led to consumer demand for low-cost individual transportation (the automobile) and faster commercial transportation (the airplane). Another theme of the book is developed here: the resulting intersectoral flow of knowledge gained (e.g., the role of university-based experimentation and testing that replaced a lack of scientific theory, as in the case of aircraft design) and processes developed ("Fordism") into other areas and products.

The development paths discussed in the story of the chemical industry highlight again the interaction of R&D structure, availability of natural resources, sources of funding, and external influences (World War II), but with a different twist. In this situation, the economic outcomes are not consumer end-products, but intermediary products such as dyes, plastics, and synthetic fibers used by other industries and products.

Electricity, similar to chemicals, became a major economic factor not as an end-product itself. The developmental journey to decrease the cost of

electricity brought about the outgrowth of products whose technology had been available for years but never exploited (such as vacuum cleaners, dish-washing and clothes-washing machines), as well as known materials whose exploitation was also not economically feasible (such as aluminum). It is interesting to note that the story of electricity demonstrates how certain technology “paths” result in a negative economic influence. The increase in oil prices and the drive for cleaner air that resulted in costly investment in alternative fuel sources, coupled with the enormous federal commitment to nuclear power generation, ended a long-term decreasing trend in the cost of electricity in the late 1960s.

The electronics industry chapter highlights another element, the role of human capital, as in the case of software development. It also underscores the constantly shifting sources of R&D funding in the role played by universities in the U.S. R&D system. Whereas funding for electricity R&D in the universities came primarily from state and industry sectors, electronics R&D was primarily funded by the government/defense sector. It is also now a well-known story that the drive to exchange ideas and information among defense-related university researchers led to the development of the ARPA network, the foundation for the Internet.

Beyond an interesting review of economic history, is this book useful to a practicing business economist? The authors quote Alfred North Whitehead’s observation in *Science and the Modern World* (1925), “One element in the new method is just the

discovery of how to set about bridging the gap between scientific ideas and the ultimate product.” Understanding how to bridge this gap is a question often asked of many professionals, especially economists. The authors make a strong case that the basis for understanding technological change lies in understanding its economic history.

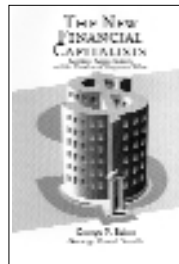
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### ***The New Financial Capitalists: Kohlberg Kravis Roberts and the Creation of Corporate Value***

*By George P. Baker and George David Smith, Cambridge, UK: Cambridge University Press, 1998, 257 pp., \$24.95*

A good deal of merger and acquisition activity has received a bad press, with most of the “financial engineers” involved lumped together as insensitive corporate raiders. For a different perspective, Professor George Baker of the Harvard Business School and Professor George David Smith of the Stern School of Business at New York University present a more sympathetic view, using as an example the widely known firm of Kohlberg Kravis Roberts & Co (KKR). Familiar names associated with KKR’s activities include Houdaille Industries, Beatrice



Companies, RJR Nabisco and Safeway.

KKR originally retained the authors to document the details and patterns of nearly two-decades of its investments in a systematic fashion for the benefit of its younger generation of professionals and its widening circle of investors. Baker and Davis then persuaded the senior KKR partners to permit them to write a more complete history for public consumption. The authors wanted the book to be policy oriented, presenting the leveraged buyout (LBO) as a example of economically productive financial engineering. Complete access to KKR’s files and personnel was obtained. Choices of subject matter, themes and interpretations were left entirely to the authors. No censorship was involved. The authors agreed that KKR could review the text and have the opportunity to offer corrections of factual errors and keep proprietary information confidential. This relatively short, readable and interesting book is the result.

The initial chapter provides an overview of the LBO and offers the general conclusions of the study. Succeeding chapters give specific examples of the major features of an LBO: financing techniques and incentive structure for highly leveraged transactions; postacquisition governance and management; distressed buyout investments; and then a discussion of KKR as an institutional phenomenon.

Four major themes emerge from the book. First, financial structure matters. In contrast to much of the theory of modern capital structure, the way a company is financed affects the distribution of cash flows as well as the way the company is managed. Second,

value creation is a long-term rather than short-term pursuit that requires work and constant vigilance. Third, aligning management and ownership interests leads to good results; good managers are not fired but retained and given incentives so that they become risk-bearing owners. Finally, flexibility in financing and adaptability to unforeseen events are crucial determinants of success.

An abiding question in corporate governance in the United States is the reconciliation of the interests of corporate shareholders and corporate managers. As financing requirements for corporations required huge equity offerings, a new breed of investment bankers played key roles in promoting and financing these transactions, as well as encouraging efficiency and often monopoly. But financial capitalism was succeeded by managerial capitalism, which required a new technocrat, the professional executive. This step separated management from ownership, and the links between management personal interest and corporate business interests were weakened. Managers were tempted to allocate resources in ways that would, in the long run, not enhance shareholder value, nor did friendly boards of directors hold managers responsible.

Managerial opportunism surged in the early 1960, when antitrust legislation prevented anticompetitive mergers but permitted surplus cash to be used to pull together companies in unrelated industries, presumably to achieve synergies of lower cost of capital and economies of scope. As the conglomerate wave began to ebb, dissatisfied shareholders were given a different opportunity, accepting a tender offer at

well-above market prices, a move that bypassed both management and boards of directors. From this emerged the idea that a leveraged buyout might be a friendly alternative to a hostile bid. Thus financial capitalism once again emerged on the financial scene.

KKR was part of this new wave of mergers and acquisitions, perfecting the techniques with increasingly large and complex buyouts. An important part of their efforts was a careful study of the cash flow potentials of the company to be acquired, a significant increase in the use of leverage (aided by the "junk bond" market that developed for these types of takeovers), by involving the old or new management in the success of the merger by tying management personal fortunes to the success of the venture, and by careful monitoring the results of the company to ensure that it was on track. The controlling corporate organization was the LBO association, which was composed of KKR, its fund investors and the managers of the constituent companies. Each of its constituent companies was organized and funded by a separate investment partnership.

The ultimate objective, over a period of years, was to sell a relatively debt-free company in the market for a significant profit. Unlike other corporate raiders, KKR had certain fundamentals that formed the basis for buyouts: good cash flow characteristics; clear potential for substantially decreasing debt levels, and thus increasing equity values, within three to five years; a good CEO in place or in the offing; a prospective buyout acceptable to the target company's board; and managers had to be persuaded to participate.

Little note is made in of the book of the personal hardships that many replaced managers and other employees experienced as well as the distress in many communities as a result of the drive to greater efficiencies. KKR's partners argue that there is no virtue in sustaining people or assets in inefficient or unproductive uses, and in the long run the more efficient use of resources benefits society as a whole.

Short and easily read, the book is deceptive in its thoroughness. It provides the philosophies and the operating details of one particular kind of financial engineering, describing both its successes and some of its failures. Certainly the operations of all financial engineers are not the same. This book provides a fascinating study of a pioneer and a most successful practitioner of the art.

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## ***The Financing of Catastrophe Risk***

*Edited by Kenneth A. Froot, Chicago, IL: The University of Chicago Press (Chicago/NBER Series), 1999, 520 pp., \$68.00.*

This is one of the first academic books in a small but rapidly growing trade and academic property-casualty (P/C) reinsurance literature that focuses on catastrophe ("cat") derivatives and hedging for earthquakes and hurri-



canes. It is a collection of papers presented at The Financing of Property Casualty Risks Conference, organized by Kenneth A. Froot, Professor and Director of Research at the Harvard Business School, and sponsored by the National Bureau of Economic Research (NBER).

An introduction is followed by ten papers with comments and concludes with four panel discussions of conference topics. Participants were academic researchers, reinsurance top managers and other experts. The editor's intent is to facilitate understanding and start a serious discussion of issues and basic problems. The introduction covers the present system and argues that the current redistribution of large cat risks is inefficient and incurs unnecessarily large costs. Next, determinants of greater insurer demand for cat reinsurance, including higher leverage, lower liquidity and lower ratings, along with higher cat exposure and larger insurers, are presented.

Alternative means of redistributing catastrophic risk in a national risk-management system are described. One objective is to internalize disaster risk. One alternative would be to mandate all hazards insurance for new homes; a federal excess-of-loss (XOL) program is recommended. Excess loss is also studied from the pricing perspective. Pricing XOL in reinsurance contracts against catastrophic loss would be an important factor in any national program. An XOL premium pricing methodology is used to assert that a recent national XOL reinsurance program proposal probably protects insurers against catastrophic losses

and limits federal losses.

Many challenges face the insurance industry in managing catastrophic risks. Earthquake scenarios for a model city are used to evaluate both alternative funding and mitigation strategies to minimize cat market failure. Also, after large losses, an increased volatility pattern of cat prices would be expected. A chapter is devoted to explaining statistically postloss volatility by shifts in the supply of capital. Another chapter covers the significant asymmetrical information and adverse selection associated with catastrophic and cataclysmic losses. Tax issues are discussed. It is argued that the Tax Reform Act of 1986 led insurers to overstate reserves. However, those overstatements were later revised. The next chapter covers the transformation of federal disaster policy since 1803. It is an historical summary of federal disaster policy and recommends that disaster coverage be a part of every property insurance policy, with the federal government launching a stop-loss reinsurance program.

An interesting question arises of who insures the insurers. Moral hazard effects, similar to those of bank deposit insurance and guaranty-fund insurance, induce distressed insurers to take untoward advantage of the float between premium payments followed in distant time by claims. Various ways of reducing those effects are presented.

Since the early 1970s, derivatives successes were mainly due to aggressive new product development by OTC firms and exchanges, the diffusion of option pricing theory that allowed firms to estimate fair prices and evalu-

ate arbitrage opportunities, and a series of unexpected but fortuitous external shocks to industries resisting or deciding whether to accept derivatives. Reinsurance derivatives are the third and newest success, preceded by financial and energy OTC and exchange-traded instruments.

Financial derivatives started in the early 1970s and grew throughout the 1980s and 1990s. Currencies were followed by interest rates, stock indexes, and others such as credit. The end of gold convertibility and the change in Federal Reserve targeting policies increased the demand for hedging by making currencies and interest rates, respectively, more volatile. Energy derivatives started in the late 1970s and early 1980s. Heating oil and gasoline were followed by crude oil, natural gas, and electricity. The Iranian Revolution increased the demand for hedging by scaring major oil companies about secure Middle East crude oil supplies. Reinsurance derivatives, particularly cat contracts at the Chicago Board of Trade, started trading in late 1992, and health was approved to trade in early 1993 by federal regulators. Hurricane Andrew in 1992 and the Northridge Earthquake in 1994 increased the demand for hedging as the P/C industry demand for adequate capital to pay higher claims increased, and their price expectations became more volatile.

P/C markets have collectively, but not unanimously, decided to develop derivatives to hedge and to access new national and international capital markets. They are already sorting themselves out by leaders, followers, and naysayers. In a few years, the industry

will have learned how to hedge while it obtains new, cheaper capital with new instruments in a new market structure.

The book is a confirmation that reinsurance derivatives have successfully breached the insular business practices of reinsurance markets. Academic researchers encouraged this decision and are already producing research and educating managers in the use of insurance derivatives in the same way financial derivatives are used in product management.

Reinsurance derivatives are expanding in two directions. First, reinsurers are moving left from just derivatives risk management of rarer events at the far right tail of the loss distribution toward more common events or “working layers,” where risks can also be profitably diversified.

They will copy mortgage companies that sell mortgages into secondary markets where they are pooled, subdivided into many new products like strips, and resold to investors and speculators. Reinsurers will continue to offer customized coverage that has too much basis risk, but the rest of their book will be sold into secondary markets, repackaged, and then resold.

Second, reinsurers are already expanding from cat risk management to other P/C lines, such as auto, marine and fire, into life and health reinsurance. While cat was the first success, health reinsurance will be like a silent freight train that appears out of nowhere to dominate reinsurance derivatives markets nationally and internationally, because the public policy debate over how to pay for health services will adopt derivatives

to make insured delivery systems more efficient. Savvy business economists might expect that HCFA, for example, will auction Medicare and Medicaid risk contracts to hedged insurers, just like government securities are auctioned to primary government securities dealers.

I liked the book and recommend it. More books on this subject and other reinsurance markets including health are sure to come.

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### ***Passion and Craft: Economists at Work***

*Edited by Michael Szenberg, Ann Arbor, MI: University of Michigan Press, 1999, 314 pp., hardcover \$59.50, paper \$22.95.*

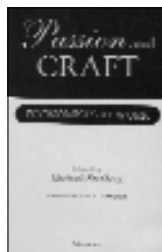
**P**assion and Craft presents the observations of twenty economists about their profession, work habits and careers. This is an extraordinary collection. “Usually,” as Paul Samuelson points out in his introduction, “it is only elderly celebrities who get to publish their autobiographies. *Passion and Craft* is an exception in that it sought deliberately to recruit active scholars in the active phase of their lifetime career.”

Michael Szenberg, the editor of *Passion and Craft*, is a Professor of Economics at Pace University and the Editor-in-Chief of the *American Economist*. The book is an extension

of an earlier volume that Szenberg edited. That collection of autobiographical essays, *Eminent Economists: Their Life Philosophies*, presented the views of an older group of distinguished economists.

The contributors to *Passion and Craft*, most of whom are at about the midpoint of their careers, were selected based on their scholarly awards, positions in professional organizations, citations and diversity. Their interests encompass a wide range of macro and micro concerns, including economic history and modeling; labor, political and environmental economics; legal issues; and economics of race and gender. The essayists also display concerns that extend beyond economics into several other interrelated disciplines, including technology, sociology, history and government. Szenberg, to his surprise, found that the economists in this group, in spite of their diversity, could be divided into three categories: (1) applied theorists, (2) empiricists and (3) professional critics or detached observers.

Readers will find *Passion and Craft* entertaining because the authors have succeeded in placing economics in a human context and demonstrating that they are insightful practitioners of what is far from a “dismal science.” Drawing on their varied backgrounds, interests and experiences, they employed colorful vignettes, candid comments and trenchant observations to liven their writing. Descriptions of how gender, race, politics and gadfly status affected the author’s career can be found in some essays. The contributors appear to have found what Gregory Mankiw claims to be the secret of a happy life: “Find out what



you like to do, and then find someone who will pay you to do it.”

While some of the authors in this volume have held positions in the public, private and nonprofit sectors for brief periods of time, all but one are academicians. The exception is David Warsh, a syndicated columnist for the *Boston Globe*.

The contributors provide a variety of explanations for their decisions to become economists. Some cited an interest in being detectives or solving puzzles as drawing them to the ability of the discipline to solve many of society's important problems. Susan Rose-Ackerman saw economics “as a way to use logic to explain the seemingly absurd.” Concerns about economic inequalities and the welfare of society led a few to enter the profession. Almost all of the writers mentioned how inspired teachers sparked their interest in economics. Surprisingly, more mention was made of the rewards of being a researcher than those derived from being a teacher.

How were these twenty economists able to accomplish so much by mid-career? “Ask any six economists,” according to Avinash Dixit, “and you will get six dozen recipes for success.” Nonetheless, two common threads can be found in the essays. One is that their authors appear to be perpetual students, as evidenced by the great love of learning reflected in their writings. The other commonality is an enthusiasm for their work. All of them apparently followed Rachel McCulloch's advice: “Make the passions of your life a part of your work and your work a passion of your life.”

A variety of other factors were identified as contributing to the

authors' success. “In talking about the economist's craft,” as Richard Schmalensee points out, “it is almost impossible to overstate the importance of clear and persuasive writing.” Many described how mentors guided and assisted them during their careers. Several cited the benefits that they derived from collaborating with colleagues. Perseverance was also mentioned as a factor in their success.

The authors are not blind to the faults of their profession. “What seems terribly hard for many economists to accept,” Paul Krugman points out, “is that all of our models involve silly assumptions.” A lack of intuition and excessive reliance on formal models were said to impede the work of many economists. William Landes bemoaned the fact that, “Research is increasingly aimed at demonstrating technical skills and solving technical problems rather than at analyzing social problems.” Fault was found with the tendency of some of their colleagues to find monocausal solutions to complex economic problems.

Readers should find the authors' observations informative because, besides providing benchmarks that can be used to evaluate one's own work habits, interests and achievements, they contain practical advice. Many contributors stressed the importance of writing well, which, as Mankiw points out, “requires that you revise, revise, and revise. Then, when you think you are done, you should revise again.” Benjamin Friedman points out in order to present economics effectively to noneconomists it is necessary to use a vocabulary and furnish information in a context that is meaningful to the audience. Also included were comments on

the importance of not striving for perfection, the benefits of imposed deadlines, the need to avoid taking oneself too seriously and the value of managing time. Hal Varian, for example, advises that a project should not be undertaken unless the project is expected to produce benefits that will cover its opportunity costs. Finally, instead of being enamored by this year's “hot topics,” Dixit states that one should, “do what captures your intellectual interest and creative imagination.”

*Passion and Craft*, in addition to demonstrating that economists can write clearly and entertainingly, provides practical advice that can be employed in many professions. It is an absorbing and informative volume that should appeal to everyone with an interest in economics.

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*Kean University*

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### ***Wall Street to Main Street: Charles Merrill and Middle-Class Investors.***

*By Edwin J. Perkins, New York, NY: Cambridge University Press, 1999, 283 pp., hardcover \$29.95.*

Most business economists are probably familiar with Merrill Lynch, the large Wall Street brokerage and financial services firm. It's probably just as likely that most know very little about the history of the firm



and its principal founder, Charles Merrill (1885-1956). In his book, *Wall Street to Main Street: Charles Merrill and Middle Class Investors*, University of Southern California History Professor Edwin J. Perkins seeks to rectify this knowledge gap. Indeed, Perkins goes so far as to make the following claim for Merrill: "Because of his unparalleled contributions to the development and democratization of twentieth-century capital markets, future historians should place (him) in the same rarefied company with such familiar names as Andrew Carnegie, John D. Rockefeller, Thomas Edison, Henry Ford, Sam Walton, Bill Gates and John Pierpont Morgan."

Two disparate thoughts leap immediately to mind after reading such a testimonial: Either the author has hopelessly fallen under the spell of his subject; or history has been rather unkind to Mr. Merrill. Although Professor Perkins bravely pleads guilty to the former, the reader cannot but be impressed by the scholarly effort that, in large measure, validates the latter as well. In short, very few, if any, associate Charles Merrill with the aforementioned luminaries, because no one had yet made the effort to do so.

Charles Merrill was a native Floridian whose grandparents, interestingly enough, fought on opposite sides of the Civil War. Imbued with the qualities of Southern hospitality and Yankee entrepreneurship, Merrill was an up and comer who, not a college graduate, began his formal business career as an office boy for a textile manufacturer in 1907. By 1914, he opened his own merchant banking firm, which mostly underwrote securi-

ties for firms in three main industries: chain stores (grocery and general merchandise); automobiles; and motion pictures. Although he made a rather sizable amount of money in the motion picture business, Merrill made most of his money, and achieved most of his notoriety, in the 1920s in the emerging chain store industry. The list of companies he helped finance through underwriting efforts is certainly impressive, e.g., start-ups like J.C. Penney, Walgreen Drug, Western Auto and Safeway. According to Perkins, Merrill was not only a fervent believer in the future of mass retailing, but he had the foresight to pursue "aggressive purchases of securities of untested firms in growth sectors of the economy." Sounds an awful lot like today's investors flocking to the burgeoning Internet-related sector!

Another parallel, in some minds anyway, concerns his view of the equity markets in 1928 and 1929. In Chapter 6, Professor Perkins details Merrill's efforts to bolster the firm's cash reserves in 1929. Heeding the warnings issued by the Federal Reserve Board, Merrill came to believe that a significant market correction was in the offing. Merrill's partners, however, were far from convinced. In the end, to their eternal gratitude, he effectively forced his partners, among them, Eddie Lynch (1885-1938), to scale back their market exposure before the crash of 1929.

While the firm was as prepared as it could be to ride out the storm, Merrill, believing a bear market was likely for a very long time, decided to get out of the day-to-day business of the financial services industry. He essentially transferred the brokerage

part of the business to E.A. Pierce, one of the nation's largest brokerage firms. As the largest shareholder in Safeway Stores, Merrill instead decided to devote all of his energies to building the retail grocery business. This endeavor effectively lasted a decade, since, by 1939, E.A. Pierce was on the ropes. Riding in as a white knight, albeit at the behest of his long-time friend, former partner (and future Merrill directing partner, Win Smith), Merrill began his third career, returning to Wall Street to build a financial empire.

The last half of Professor Perkins' book details Merrill's efforts to build a financial services firm with few equals. Merrill largely accomplished this by, first, using the retailing strategies he applied successfully at Safeway (low margins compensated by large volumes) and, second, by convincing large numbers of American middle class households that they could substantially boost their living standards over time through regular investments in growth-oriented, blue-chip equities. According to Perkins, Merrill was a great believer in the democratization of capitalism: the more people participated in it, the better off society became. In large measure, says Perkins, today's investor class, where an overwhelming percentage of Americans own equities in some fashion—whether through 401(k)s, pension plans or mutual funds—was something Merrill hoped to build someday.

Interestingly, however, Merrill failed to see the potential of mutual funds. In spite of the headstrong efforts of future Treasury Secretary, and Merrill subordinate, Don Regan, to convince him otherwise, Merrill Lynch

effectively left the door wide open for firms like Fidelity and Vanguard. This shortcoming, however, cannot offset the many innovations and advancements Charles Merrill devised during his second tenure on Wall Street. Not only was he an early and ardent proponent of financial market transparency, he especially enjoyed tweaking the Ivy League “striped pants” crowd. His firm was also the first major Wall Street house to issue an annual report, to institute a training program for brokers and, most important in Merrill’s mind, the firm’s decision to pay their brokers on a salary basis rather than on the traditional commission basis. Another Merrill Lynch innovation was widespread use of advertising and customer polling to set policy and overcome investor fears of investing in equities.

Perkins provides many additional interesting sidelights. Among these include a fascinating discussion of college life in the early part of the twentieth century, and a short history of U.S. financial market regulation through the New Deal era. For those time-short individuals seeking a condensed version, Professor Merrill was kind enough to provide two summary chapters that contain most of the key points he makes. All in all, this is an interesting read for those seeking a fuller accounting of the history behind Merrill Lynch and, perhaps more crucial, the rise of today’s investor class.

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## ***Cost, Uncertainty, and Welfare: Frank Knight’s Theory of Imperfect Competition***

*By Stephen John Nash, Brookfield, VT: Ashgate Publishing, 1998, 205 pp., \$55.95.*

In *Cost, Uncertainty, and Welfare: Frank Knight’s Theory of Imperfect Competition*, Stephen John Nash presents a broad survey of Frank Knight’s contributions to economic theory and takes issue with the commonly held belief that Knight’s work can be split into either “social philosophy” or “economic theory.” Nash argues that it is the methodology commonly used to evaluate Knight’s work, rather than the substance of the work itself, that leads to that faulty distinction. This faulty methodology has three fundamental assumptions, according to Nash: (1) It assumes that a valid distinction can be drawn between Knight’s economic theory and his social philosophy; (2) it assumes that Knight’s only significant contribution to economic theory is his risk-uncertainty model; (3) it assumes that most of Knight’s other published work is properly viewed as social philosophy and, as such, is largely irrelevant to economic theory. The most practical and relevant chapter of the book for practicing business economists is the closing chapter, “Some Policy Implications.” Preceding chapters are, however, critical for developing the system of thought used to justify the policy recommendations presented in the final chapter.

The book opens with Nash exploring Knight’s economic thought as the integration of three economic objec-

tives. Economic freedom, the first such objective, is extremely difficult to define because of what Knight calls the “complex mixture of categories, none of which can be clearly defined.” Nonetheless, Nash attempts a reasonably precise definition of economic freedom along the lines outlined by Knight. Economic freedom pertains to the minority of an economic agent’s activities—the majority of which are controlled by “character,” which varies according to the particular environment of the individual. The scope for economic freedom is reduced by observation of customs in conjunction with the formal enforcement of customs. These restrictions define the boundaries of “formal” freedom. Those actions not governed by either custom or habit comprise the activities in which the individual can express his own interests. These are the actions where we find the individual enjoying substantive economic freedom.

The second critical component of Knight’s system is the balance of economic power. The third and final component is that of economic efficiency. Nash concludes that the examination of Knight’s conception of welfare economics reveals the existence of the “Knightian Pyramid.” His social welfare function comprises these three components, and it is through the balancing of all three parts of the social welfare function that Knight believes we preserve the free market system. Simultaneously balancing economic efficiency with both economic freedom and the imbalances of economic power is certainly a daunting task, but it is the task that Knight assigns to economic theory.

Nash then turns toward an exami-

nation of intellectual influences upon Knight's theory. He concludes that Knight adheres to the basic axioms of the German Historical School, which are generally accepted by yet another influence on Knight's thought, J.B. Clark. Knight, however, significantly revised Clark's analysis of dynamic economics. It is noted that in Knight's revisions of Clark's moral approach to economics, he built upon the conception of heterogeneity of the information available to individual economic actors. Knight also focuses on how the firm seeks to minimize the costs that uncertainty imposes upon it. Expansion of the scale of production here is aimed at monopolizing access to the stock of available market information, as such access holds the key to reducing the costs that uncertainty places upon the firm.

The final part of Knight's revision to J.B. Clark's economics is through Clark's analysis of overhead costs. Knight shows that the scale of a firm's operations can alter its costs: as the firm grows in size, the costs of gathering information fall and the costs of bearing uncertainty can be spread over a much wider volume of production, so that these costs fall per unit of production. These advantages then require government regulation of monopoly. Instead of excluding uncertainty, Knight actually centers his analysis of imperfect competition on how uncertainty affects the cost functions of firms. Nash points out that, after Knight's contribution, we can say that firms are no longer thought to compete under conditions of perfect knowledge, but that they actually compete for access to market knowledge. These costs shape the capacity of the

firm to operate under uncertainty and "In turn, these capacities fashion the ability of firms to participate in the expansion of wealth, which accompanies economic progress. Consequently, Knightian uncertainty forces a moral dimension upon economic theory; a conclusion shared with J.B. Clark, whose work forms the foundation of Knight's analysis."

Nash turns to a comparison of Knight with both Robinson and Chamberlin and then commences a discussion of Knight's policy response to imperfect competition with an outline of the policy response to imperfect competition given by Chamberlin and Robinson. Applied economists are not apt to turn to Knight's philosophical work when seeking to broaden their understanding of the power of economics in creating effective policy. However, it is on this very point that Nash makes a powerful argument. It is precisely because of a lack of understanding regarding Knight's work, he argues, that we do not turn to that work more frequently in the applied realm. Nash writes, "Knight's analytical contribution has not been regarded as being important for economic policy, especially welfare economics. This is because his theoretical analysis is not clearly understood; the commonly held opinion that Knight establishes profit as being the reward for bearing uncertainty is incorrect."

This closing chapter first defines the existence of a distribution problem where benefits of lower "uncertainty-control costs" are shared by nonmarginal firms only, i.e., the economic community as a whole fails to benefit from preferential access to market knowledge. In concentrated markets,

Nash considers and recommends a lump-sum tax to tax away the economic rent that the large firm derives from preferential access to market knowledge. The efficiency question is also addressed here, and Nash argues that aggregate output can be increased by eliminating small firms from the industry because of the enhanced allocative efficiency resulting from increased output. By leaving only the lowest cost firm, Nash argues that "we can create a regulated monopoly where price is equal to the marginal cost of production." In today's world of deregulation, this is a controversial view.

Nash's examination of Knight's work and his controversial argument in drawing from Knight's insights even at the most practical levels of policymaking are certainly an important development in the field of applied economics. Those economists involved in policymaking should especially look at Nash's conclusions and might be interested in many of the issues Knight addressed. ■

Brandon Dupont

*Principal Capital Management*

#### EDITOR'S NOTES

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