MONEY AND MACRODYNAMICS

ALFRED EICHNER AND POST-KEYNESIAN ECONOMICS

MARC LAVOIE
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Introduction

Alfred Eichner and the State of Post-Keynesian Economics

While Alfred S. Eichner is primarily known as the scholar who wrote *The Megacorp and Oligopoly* (1976)—a book mainly devoted to showing the link between growth in capital and research and development expenditures and the size of the pricing markup—his contribution to the modern post-Keynesian economics tradition goes much beyond his innovative microeconomic theory. Besides having helped to build the social network and institutions of post-Keynesianism in the United States, Eichner integrated in his books and articles most of the current fundamental or core ideas of post-Keynesian economics, which he helped to shape. At the same time, perhaps more than any other post-Keynesian economist of his generation, he recognized the importance of establishing intellectual links and integrating research pursued by those in other heterodox currents of thought, especially the institutionalist school, to which he also adhered.

Alfred Eichner had a relatively short academic career. Although he began teaching at Columbia in 1962, his post-Keynesian academic path truly started in 1969 with the publication of his PhD dissertation, *The Emergence of Oligopoly: Sugar Refining as a Case Study*, ending less than twenty years later when he passed away prematurely on February 10, 1988, at the age of fifty.

Boldly announcing that a new paradigmatic theory was in the making, Eichner, along with Jan Kregel, wrote the first survey article on post-Keynesian economics for the *Journal of Economic Literature* (Eichner and Kregel 1975). In their seminal article, they identified the key characteristics that came to be associated with post-Keynesians: the Keynesian reversed causality, in which investment determines saving; a concern with historical time, tied to the analysis of growth and cycles; an alternative theory of income distribution; the importance of considering a monetized production economy; the role of incomplete information and fundamental uncertainty; the relevance of imperfect market structures with oligopolies facing near-constant marginal

costs. All in all, Eichner and Kregel contrasted post-Keynesian economics to neoclassical economics by claiming that the purpose of the former was to explain the real world as it could be observed empirically, rather than to construct models of an optimal imaginary economy. Calling attention to Leontief's famous assertion that the "king is naked" (Leontief 1983, vii), Eichner pointed to a discipline founded on neoclassical assumptions that was vacuous and devoid of empirically relevant presuppositions about the world. Economics was thus in desperate need of an overhaul premised on empirically based, post-Keynesian theoretical constructs (Eichner 1983a).

As shown by Frederic Lee (2000a, b), Eichner was highly instrumental in setting up a post-Keynesian school in North America. Eichner devoted innumerable hours, especially between 1969 and 1981, to organizing and developing post-Keynesian economics. He organized sessions and dinners at the American Economic Association annual meetings, wrote a newsletter to keep social contact with other like-minded economists, compiled an extensive post-Keynesian bibliography to help out new recruits, set up regular seminars on post-Keynesian economics, and corresponded extensively with Joan Robinson to keep her abreast of developments in post-Keynesian economics in the United States. Moreover, with the help of Paul Davidson and Jan Kregel, he created for a while a permanent home for post-Keynesian scholars and students at Rutgers University. In addition, Eichner was a book editor for M.E. Sharpe Inc., where he promoted the publication of nearly twenty post-Keynesian or heterodox manuscripts. Eichner must thus be considered a builder, an architect, and a consensus-seeker as he worked tirelessly to develop the post-Keynesian "institution." As such, he should be remembered along with other post-Keynesians, such as Paul Davidson, who also contributed to institution-building, especially with the founding of the *Journal of Post Keynesian Economics.*

Eichner's contribution to post-Keynesianism goes far beyond theory and organizational skills. While it is true that he worked hard at providing an alternative to neoclassical economics, he saw his role not only as providing some methodological vigor to post-Keynesian theory, but also as showing the policy relevance of post-Keynesian views by testifying numerous times before congressional and other legislative committees. He was convinced that post-Keynesian theory represented the real world more accurately than neoclassical theory, which he once called the "valley of darkness" (1983b).

Perhaps more than any other post-Keynesians of his generation, Eichner not only became a magnet for young researchers seeking new ideas, but also actively fostered the growth of a new cohort of critical thinkers. Indeed, Eichner, always preoccupied by the future of post-Keynesian theory, wanted to convince students of all ages to "turn away" from neoclassical economics. For

him, it was not sufficient merely to produce papers and models. He worked at convincing students that there was "something better" to look forward to (1985, 3). Hence, in his classic handbook, *A Guide to Post-Keynesian Economics* (1979), he assembled a number of articles written by various prominent authors of his generation, pieces that had previously appeared in *Challenge* magazine, also published by M.E. Sharpe. This book gave younger readers an easy and inexpensive access to some of the core ideas of post-Keynesian theory.

Alfred Eichner is remembered as an honest, caring man whose dedication to his students is legendary. He was also extremely friendly with young scholars, as the two oldest of us can personally attest. The present book serves two purposes: to honor the man and his work, and also to show readers that his work is just as relevant today as it was when it first appeared—or, perhaps, even more so. In particular, his monumental work *The Macrodynamics of Advanced Market Economies*, left unfinished at his death, remains surprisingly accurate, refreshing, and remarkably relevant. The book was published posthumously by M.E. Sharpe in 1991, although Eichner had sent out a preliminary version to about 200 colleagues in December 1987, a few months before his death, in the hope of getting their feedback and thus improving the final version.

The Economics of Alfred Eichner

Eichner's deep desire to promote a credible alternative to the deeply flawed neoclassical theory led him to work assiduously at proposing a complete, alternative model that would lead us all "toward a new economics." This "integrated approach"—his "grand design"—is grounded in a contemporary setting he called the "corporate economy." In this new economy, markets are dominated by large social and economic institutions—"large corporations or megacorps, industrial trade unions, credit money and the state" (Eichner 1983b, 1985, 1987, 5; Kregel 1990). These institutions have very different rules and behaviors, which ultimately affect how the economy performs.

Eichner's ambitious plan, as well as his empirical work dealing with various blocks of the economy, culminated in *The Macrodynamics of Advanced Market Economies*. The book, including some largely ignored chapters on money and monetary theory, proposes a new paradigm. At the core of Alfred Eichner's vision is an attempt to describe the functioning of advanced, money-using, capitalist economies. This effort demands a complete rejection of neoclassical theory. Influenced by the approach of such prominent post-Keynesian economists as Luigi Pasinetti, Eichner argues that economic systems consist of a number of interrelated subsystems, each needing careful attention. This "systems approach," according to Eichner, clarifies the study of the dynamics of the overall economic system. In fact, by emphasizing each subsystem,

which he called blocks, and by carefully analyzing its specific characteristics, Eichner is able to explain how they interact with each other and how they influence the overall economy. Decisions taken in one subsystem carry important consequences for the other subsystems.

His analysis begins with the large, multiplant, oligopolistic corporation with its "managerial hierarchy." This implies several important arguments, notably the institutional separation of ownership and management, and hence management's ability to take key decisions, such as deciding on the megacorp's target rate of return on investment, wage increases, and the appropriate markup to impose over prime costs.

The megacorp typically produces with some reserve capacity, thereby allowing it to respond more effectively to changes in demand. Indeed, as Eichner argues, in goods markets, as in labor and credit markets, it is supply that adapts to demand, "making the one a function of the other" (Eichner 1985, 6), independently of the price prevailing in those markets. Eichner advocates the abandonment of supply and demand analysis, which permeates orthodox theory, comparing it to "Divine intervention": "it is an extraneous element which obscures the factors actually at work" (Eichner 1985, viii).

The objective of the megacorp is to dominate and extend its power over markets. Indeed, for Eichner, the "new microeconomics" suggests that the model firm determines not only how much to produce and at what price, but also how much to invest and how to finance it: "The output, price, investment and finance decisions made at the firm level are critical in determining the macrodynamic behavior of the system as a whole" (Eichner 1983b, 136).

Naturally, this argument requires a rethinking of the pricing behavior of the megacorp and, in particular, the way investment is financed. Eichner argues that there are strong reasons for "virtually ignoring" the use of marginal costs in setting prices, largely because "marginal costs, if not actually constant within the normal range of output as all the empirical evidence would suggest, are at least constant in the eyes of those who, in a bureaucratically structured enterprise, have the responsibility of setting price levels" (Eichner 1974, 974).

For Eichner, the megacorp links its pricing behavior to its overall growth objective. Indeed, the goal of the megacorp is to maximize growth, not profits, so the firm must somehow generate sufficient funds for the long-term financing of investment and growth—a claim that has a tight resonance with Pasinetti's (1981) natural prices that incorporate a profit rate equal to the growth rate of the sector. In this sense, given its power to set prices independently of market forces, the megacorp would set prices as a markup sufficient to generate internal funds to finance its planned accumulation of capital. In other words, "pricing decisions, when some degree of power exists, are ultimately linked to the investment decision" (Eichner 1976, x).

This approach deliberately confutes the micro- and macroanalysis of the firm. Indeed, now the microeconomic pricing behavior of the firm is securely placed within the macroeconomic objective of the firm. Although not without its theoretical ambiguities, this innovative approach resonated with post-Keynesians who saw Eichner's analytics as a bridge between micro- and macroanalysis, thereby providing micro- or firm-level foundations to the macroeconomy.

The Structure of This Book

This book is divided into three parts. The first part, which focuses on the link between micro- and macroeconomic analysis, begins with a contribution by Michael J. Radzicki, who wonders whether Eichner can be considered a dynamicist. While the author argues that Eichner never utilized system dynamics and possibly never even knew of its existence, he nevertheless approached economic problems like a system dynamicist. In fact, Radzicki claims that in *The Macrodynamics of Advanced Market Economies*, Eichner put forth an argument about the proper way to conduct macroeconomic analysis that would be well received within the system dynamics community; that, at least in spirit if not in practice, Eichner should be considered a system dynamicist; and that his exemplary work can be profitably extended via the use of system dynamics computer simulation modeling.

In Chapter 2, Frederic S. Lee proposes a heterodox version of the "complete model" that Alfred Eichner never finished. Indeed, while Eichner meant to include this model in his *Macrodynamics* book, the chapter never materialized. Lee therefore undertakes to propose a possible complete model along Eichnerian lines. He first deals with the micro-macro structural organization of economic activity, then delineates the micro framework of the social provisioning process. Finally, Lee proposes a micro-macro model framework of a monetary production economy and then uses it to deal with four micro-macro theoretical issues—the origin of profits; the role of the surplus in generating and coordinating economic activity; the role of prices, wage rates, and profit markups for the distribution of income and social provisioning process; and the existence and relevance of a heterodox theory of value—that together make up Eichner's "complete model."

In studying the relationship between pricing and investment, Elettra Agliardi, in Chapter 3, extends Eichner's model to an environment characterized by post-Keynesian uncertainty over the future rewards from economic activity. Investments are analyzed as discretionary expenditures, incorporating uncertainty, the choice of timing and internal finance. The markup pricing theory is derived as part of the investment decisions. Agliardi's analysis is

extended to investigate how debt policy affects the pricing rule in an uncertain environment in view of the fact that, although debt is a relevant means of financing, post-Keynesian models have offered so far few insights into this question. Agliardi concludes that Eichner's analysis can be reinterpreted in a more general setting with a robust methodology at both the micro- and the macroeconomic levels.

Yet, in Chapter 4, Mario Seccareccia is critical of Eichner's pricing theory when conceived as a mechanism for the internal financing of investment. The author argues that, while Eichner understood very well the post-Keynesian and circulationist approach to money (as explored in the three contributions in Part III of this book), unfortunately the extension of his microeconomic view to the macroeconomy was not without its conceptual ambiguities. The confluence of profit as a determinant of investment as well as a macroeconomic source of financing creates conceptual problems when analyzed in a world of endogenous credit money. The author shows that, both within a flow-of-funds theoretical framework and econometrically, a higher cash flow to corporations merely extinguishes debt of the corporate sector at the expense of other sectors, whose levels of indebtedness would be rising in relation to the former, but it is not necessarily associated with higher rates of business investment.

Part II, which focuses on competition and the globalized world, begins with the contribution by Malcolm Sawyer and Nina Shapiro, who review Eichner's approach to the firm as the megacorp and then discuss some of the macroeconomic implications of this view. The authors then compare Eichner's conception of the megacorp and the stability and growth of a "megacorp economy" with that of a neoclassical economy, one where the representative firm is essentially under "neoclassical proprietorship." The authors speculate on changes in the economy and the operations of firms in the last three decades and how they have affected the nature and conception of the megacorp.

Matthew Fung contemplates the relevance of Eichner's vision of the economy today, given the numerous structural changes that have taken place in the last two decades. The author contends that if Eichner were alive today, he would have looked into these structural changes to see how they affect the operations of the megacorps. Fung considers notably how the globalization of markets and the other structural changes that have occurred since the publication of Eichner's 1987 book have affected the investment and financing behavior of megacorps in advanced market economies. The author concludes, unequivocally, that the mark of a classic work is its ability to speak to readers of different historical periods, stimulating new thoughts and suggesting new modes of inquiry. While Eichner's *Macrodynamics* was written at a time when the U.S. economy was very different from today's economy, his work continues to provide insights that can be applied today.

In Chapter 7, William Milberg continues the discussion of the relevance of open economies. For the author, globalized competition has implications for the dynamics of international payments. He contends that the current U.S. trade deficit as well as the current system of globalized production and liberalized financial markets may be more sustainable than many economists maintain. He argues that capital flows are driven by calculations about risk and return, and that the U.S. import surplus works favorably on both of these fronts since the resulting cost reductions have been important for maintaining markups and the profit share. In turn, this served to attract capital from abroad.

Finally, the last part of the book deals with a somewhat ignored contribution of Alfred Eichner—his analysis of credit and endogenous money. Until now, it was believed that Eichner had little to say about money, let alone endogenous money. For instance, Davidson has claimed that on monetary matters Eichner had "barely scratched the surface" (1992, 185). Yet the three contributions of Part III propose a new interpretation of Eichner's work on credit and money, claiming that it is refreshingly contemporary.

In Chapter 8, Robert P. Guttmann discusses Eichner's view of the role of money in an advanced market economy. While this aspect was relatively underplayed by Eichner, he nevertheless managed to make an important contribution in describing the inner workings of money in contemporary capitalist economies. Post-Keynesians break with the orthodox view on money to stress its linkage to bank credit and derive from that connection its inherently endogenous nature. Eichner (1991) pushed this heterodox tradition a step further by exploring in detail how such endogenous credit-money operates in practice.

According to Marc Lavoie, Eichner had a deep understanding of central bank operations and of money's endogeneity. In Chapter 9, Lavoie, in fact, argues that Eichner's work contains four key arguments that are at the center of post-Keynesian monetary theory: the starting point of monetary theory is the demand for credit, not the demand for money; central banks pursue essentially defensive operations when intervening on the open market or conducting repo operations; the liquidity pressure ratio of banks plays an important role throughout the economy; and an understanding of the economy can be acquired only by going beyond the standard national income and product accounts; that is, by making use of the flow-of-funds accounts.

Finally, in the last chapter, Louis-Philippe Rochon also addresses Eichner's contribution to the discussion of credit-money by emphasizing how well Eichner understood central bank operations. In fact, Rochon argues that had Eichner lived longer, he would have had much to say about the horizontalist and structuralist debates, and the accusation that horizontalism was a "black box." In fact, Eichner's contribution to the study of endogenous money goes

further than that of Basil Moore, for instance, by providing a detailed account of the defensive operations of central banks, which, in many ways, are only now being widely discussed. In that respect, Eichner's work on endogenous money was well ahead of its time and, as such, is perhaps more relevant today than it was two decades ago.

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Part I

The Link Between Micro and Macro

1

Was Alfred Eichner a System Dynamicist?

Michael J. Radzicki

Was Alfred Eichner a system dynamicist? The short answer is no. From the available evidence, which includes his writings and recollections by his students and colleagues, Eichner never utilized system dynamics and possibly never even knew of its existence. Yet the available evidence also shows that Eichner approached economic problems like a system dynamicist and, in his magnum opus, *The Macrodynamics of Advanced Market Economies*, put forth an argument about the proper way to conduct macroeconomic analysis that would be well received within the system dynamics community.[1] The purpose of this chapter is to lay out the case that Alfred Eichner was a system dynamicist in spirit, if not in practice, and to argue that his exemplary work can be profitably extended via the use of system dynamics computer simulation modeling.

What Is System Dynamics?

System dynamics is a computer modeling technique originally developed by Jay W. Forrester at the Massachusetts Institute of Technology for the purpose of simulating socioeconomic systems in a realistic manner.[2] Forrester, a control engineer, pioneer in digital computing, and director of multiple large-scale engineering projects, created a tool and a way of thinking about socioeconomic problems that combined the things he knew best: feedback control theory, organizational behavior, and digital simulation. Forrester's basic idea was that the decision rules followed by individual actors in a complex feedback system, along with the system's physical, financial, social, and institutional structures, could be identified and coded into a system dynamics model. A

digital computer could then be used to reveal the dynamic consequences of the interacting feedback processes. The resulting model could be used to explain why the system was behaving as it was and to design policies (i.e., changes to the system's structure) that would improve the system's performance.

Problems, Not Systems

Properly undertaken, system dynamics modeling is a problem-based, rather than a system-based process. That is, instead of modeling systems, system dynamicists identify and model problems from a systems perspective. Experience has shown that attempting to model systems rather than problems typically results in excessively large models that are difficult to understand and that do not yield insights into the fundamental causes of poor system behavior.

The system dynamics modeling process begins with a statement of the problem being experienced by the system under study. Although the problem can always be stated both verbally and in writing, it is also expressed pictorially by a set of time series graphs of important system variables called a reference mode. These graphs depict measured time series data and/or hand-drawn time shapes of important system variables assembled from written descriptions of the system's behavior and/or from interviews with and/or observations of system experts and participants. The time paths are analyzed both in isolation and in relation to one another.

Circular and Cumulative Causation

Once the problem has been articulated and its associated time paths specified, a system dynamicist will begin searching for the stocks and flows responsible for generating the problematic behavior. Stocks are conceptualized as bathtubs and flows are conceptualized as pipe and faucet assemblies that fill and/or drain the tubs.[3] From a system dynamics perspective, the process of flows filling and draining stocks creates all dynamic behavior in the world, be it in a physical, biological, financial or social system.[4]

A system's stocks and flows do not exist in isolation, however. They are part of interconnected networks of feedback loops. Feedback is the transmission and return of information—information about how much "stuff" has accumulated in each of a system's stocks. This information flows throughout a system and eventually returns to the pipe and faucet assemblies that fill or drain the stocks, thus closing the system's feedback loops. Generally speaking, the information being transmitted via a system's feedback loops is used by the agents in the model to make decisions that cause the pipe and faucet assemblies to open wider, open less, remain constant, or shut down completely.[5]

Two types of feedback loops exist in system dynamics models: positive loops and negative loops. Positive loops, which represent self-reinforcing processes such as the Keynesian-Kahnian multiplier or a wage-price spiral, usually destabilize systems by causing them to move away from their current state. In other words, positive loops are responsible for the (exponential) growth and decline of systems.[6] Anything that can be described as a vicious or virtuous circle is a positive loop, as are economic processes such as speculation, bandwagon effects, increasing returns, and path dependency.

Negative feedback loops, which represent goal-seeking processes such as homeostatic mechanisms and many types of purposeful behavior, attempt to stabilize systems by working to keep them in their current state.[7] If the corrective action they generate is significantly delayed (by stocks), however, they also can destabilize systems by causing them to oscillate.[8] Economic processes such as macroeconomic cycles and spot market clearing behavior are generated by negative feedback loops.

From a system dynamics point of view, a system's positive and negative feedback loops, within which are embedded its stocks and flows, fight for dominance or control of its dynamic behavior. This perspective is in complete harmony with much of post-Keynesian and institutional economics, in which the process of circular and cumulative causation is seen as the fundamental driving force behind the evolution of economic systems.[9] It also has enormous implications for economic policy. If humans exhibit goal-seeking behavior, especially when the goals they seek are incompatible, systems can exhibit policy resistance and counterintuitive behavior. Leverage points (i.e., places where policy interventions can change the dynamics of a system in a positive manner) can be very difficult to locate, and systems can get "worse before better" or "better before worse" in response to policy changes. The separation of cause and effect in time (due to delays caused by stocks) and space, moreover, as well as human cognitive limitations, can make diagnosing the most effective changes in economic policy extremely challenging (Sterman 2000, Chapter 1).

Endogenous Point of View

In system dynamics modeling, explanations for problems are given in terms of the dominant feedback loops that are responsible for the behavior of the system.[10] As such, the explanations are endogenous. Indeed, in system dynamics modeling, exogenous variables that can significantly influence (drive) a system's behavior are avoided whenever possible.[11]

The desire to derive endogenous explanations means that system dynamicists usually create models with broader boundaries and longer time horizons

than is typical in traditional economic modeling. It also means that system dynamicists must integrate knowledge from multiple disciplines and constituencies into their explanations (Sterman 1992, 13). The endogenous point of view thus requires the adoption of a holistic perspective and the belief that economics is truly a *social science.*

Actual Human Decision-Making

Generally speaking, the flow equations in a system dynamics model represent the actual decision-making rules utilized by the agents in the system in all of their (bounded) rational or irrational glory. These rules usually lead to disequilibrium behavior, which is crucial because actual systems rarely, if ever, exist in a state of equilibrium.[12] For example, in a system dynamics model it is quite common to represent what happens when the actual state of the system differs from an agent's desired state or when an agent's expectations are incorrect. As Sterman notes,

> modeling disequilibrium behavior in human systems requires explicit separation and representation of actual, perceived, and desired states. [System dynamicists] must study and model processes of perception, information gathering, and goal formation. Such study nearly always involves field work, qualitative data, soft variables, and other techniques more suited to the ethnographer than the econometrician . . . To mimic the behavior of a system properly the decision rules in [system dynamics] models must capture the information cues, pressures and constraints which condition actual managerial action, warts and all. This often leads to models of bounded rationality, to representations of the heuristics, routines, and rules of thumb a decision maker or organization uses to simplify complex decision tasks. But it can also include emotional pressures and other non-cognitive dimensions. (Sterman 1992, 14–15; 2000, Chapter 15)

The commitment to modeling actual human decision-making forces system dynamicists to turn to cognitive psychology for insights into how humans cope in an uncertain world. It also ensures that a system's overall macro behavior emerges from a realistic micro structure.

Limiting Factors and Nonlinearities

Real systems have physical, financial, cognitive, and social limits. A system's stocks cannot hold an infinite amount of "stuff," and they frequently cannot be drained below zero. Therefore, system dynamicists must identify and model

the limits (e.g., floors and ceilings) a system may run up against as the deci-sions made by its agents cause its behavior to roam far from equilibrium. In addition, system dynamicists must identify and model what happens to systems as they *approach* their limiting factors. These relationships are nonlinear and describe the dynamics of saturation and diminishing returns (Sterman 2000, Chapter 14).

From a system dynamics perspective, to "solve" a dynamic model, any dynamic model (e.g., differential equation, difference equation, discrete event, agent-based, system dynamics), means to determine how much "stuff" has accumulated in each of its stocks at each point in time. Linear systems can be solved either numerically (i.e., via simulation) or analytically (i.e., in closed form), while nonlinear systems can only be solved numerically.[13] The main differences between analytical and numerical solutions are that analytical solutions are exact,[14] global, and nonrecursive,[15] while numerical solutions are approximate,[16] local, and recursive.[17]

Generally speaking, analytical solutions to linear systems involve an atomistic approach to problem-solving. A system is broken into pieces math-ematically, the behavior of each piece is determined in isolation, and then the behavior of the whole is determined by summing up the behaviors of the individual pieces. Numerical solutions to nonlinear systems, on the other hand, involve a holistic or systems approach to problem-solving. The behavior of the pieces, as well as their interactions (i.e., the behavior of the whole), is deter-mined simultaneously. This implies that with nonlinear systems the behavior of the whole is greater than merely the sum of the behavior of the parts.

Modeling for Understanding and Design, Not Prediction

Human beings often have rich mental models of the systems within which they work and play. Unfortunately, due to cognitive limitations humans are very poor at mentally tracing through the dynamics inherent in their feedback-rich, nonlinear, cognitive models. In fact, nonlinear systems have another characteristic that makes them virtually impossible to think through (simulate) mentally: they can endogenously (and abruptly) shift the dominance of their feedback loops.

Forrester has long pointed out that it is impossible in principle to accurately predict the future state of a nonlinear feedback system except in the very short run, when its momentum has already determined its time path. The problem is that decisions that are made on the basis of accurate short-run predictions can influence a system's time path only in the longer run, when accurate predictions are not possible. As a result, system dynamicists believe that modeling should be undertaken for the purposes of understanding and policy (system) design,

not for forecasting. According to Forrester, it is much more important to create a system (e.g., an institution or set of institutions) with a robust design that performs well, regardless of the decision-making skills of its agents, than it is to try and provide all the agents with superior decision-making skills (*Homo economicus*) so that they can successfully guide a poorly designed system.

Building Confidence in System Dynamics Models

System dynamicists believe that the real value derived from a system dynamics model comes from the process of creating the model, not the model itself. The iterative acts of model conceptualization, construction, testing, comparison to the reference mode, revision, and policy design generate insight and learning. As such, system dynamicists do not really focus on the "validity" of a model, but rather on building confidence in a model along multiple dimensions (Radzicki 2003, 2004).

System dynamicists subject their models to a large battery of tests related to structure and behavior (Radzicki 2003, 2004). Generally, these tests involve making sure that the model's structure and behavior correspond as closely as possible to those of the real-world system experiencing the problem. As more tests are passed, more confidence is generated in the model's results.

One of the many confidence-building tests a system dynamics model has to pass is the ability to mimic the reference mode (i.e., the actual behavior of the real system) by endogenously simulating *only* the structure of the system that was actually observed. Forcing a model to fit time series data via curve-fitting techniques, by adding structure that does not exist in the real system, or through the addition of exogenous driving forces is not allowed. If parameter estimation from times series data is desired, however, numerical techniques have been developed for precisely this purpose.[18]

Evidence From Eichner's Writings

Alfred Eichner's magnum opus is his *Macrodynamics of Advanced Market Economies.* In this book he pulled together his thoughts and insights from more than two decades of teaching and research in the areas of post-Keynesian and institutional economics. Although Eichner's life was tragically cut short and the world will never know what he would have ultimately created, *Macrodynamics* is an important documentation of his mental model that provides some clues as to the directions his research might have taken.

Eichner began his book by describing the problem to which it would be devoted: outlining a realistic, empirically testable model that explains the macrodynamic behavior of an advanced market economy. The dynamics of

this system, or the reference mode from a system dynamics perspective, is an interacting trend rate of growth and a cycle(s).

In *Macrodynamics*, Eichner carefully described the important characteristics of advanced market economies that are crucial to understanding their behavior, but that are usually ignored by orthodox economists. These include the production of goods and services by two categories of enterprises: powerful megacorps and competitive family owned firms; the linking of industries to industries, enterprises to enterprises, and enterprises to households via markets; the use of credit money to facilitate exchange; and the existence of other sophisticated institutions such as industrial trade unions and the state. He also insisted that since economics is, and should be treated as, a *social* science, any analysis of the macrodynamics of the economy had to take place within a broader social context. Eichner conceptualized an advanced market economy as part of a larger social system consisting of four interacting subsystems: the economic subsystem, the political subsystem, the normative subsystem, and the anthropogenic or human developmental subsystem.

Eichner's Methods

Before presenting the details of his macrodynamic model, Eichner took great pains to define a modeling process that he felt would help make economics "scientific." He wrote, "the purpose of economics [is] to explain the macrodynamic behavior of the economic system [and] is best served by constructing a model that can meet certain empirical tests, including the ability to simulate the economy's actual historical experience" (1987, 9). In terms of empirical tests, Eichner put forth three requirements for the proper construction of a macroeconomic model:

> **Requirement 1:** All model variables must have real world, observable (measurable) counterparts.
> **Requirement 2:** The theory underlying the model must apply at both the micro and macro levels.
> **Requirement 3:** The model must be comprehensive without losing its coherence. In other words, it must represent the behavior of the important institutions in the economy, with all of their relevant detail, yet at the same time provide a logical explanation for the macro behavior of the system.

Of course, these requirements are in complete harmony with the system dynamics paradigm as described above. In fact, according to Eichner, the third requirement implies that a scientific model of the economy must be based on

a *systems approach.*[19] He wrote, "With a systems approach, it is possible to take into account the entire set of relevant institutions, both economic and noneconomic, without becoming lost in detail or losing sight of the coherence which the system as a whole has" (1987, 14). Eichner clearly felt that using a systems approach would enable economists to do economic analysis properly. For example, in *Macrodynamics* he argued vigorously that economics should not be conceived of as (as Lionel Robbins originally argued) "the study of how 'scarce resources are allocated among competing ends'" (1987, 9), but rather as a social science devoted to understanding the macrodynamic behavior of an economic system. In one of his well-known earlier works, Eichner wrote:

> Economics . . . is largely an outgrowth of the eighteenth-century mechanistic view of the universe . . . over the last several decades, however, quite a different philosophical framework has emerged . . . This is the systems . . . approach. The advantage which it offers . . . is that it can incorporate within its analytical structure (a) purposeful activity, (b) cumulative processes, and (c) the interaction of subsystems, both as part of a larger systems dynamic and in response to feedback from the environment . . . Under the systems approach, economics is no longer the study of how scarce resources are allocated . . . It is instead the study of how an economic system . . . is able to expand its output over time . . . Although the final state cannot be deduced—because the analysis is concerned with historical time—the process of expansion, that is, the dynamics of the system, can be intelligently analyzed. From a post-Keynesian perspective, it is the behavior of the system as a whole . . . which economic theory must be capable of explaining. (1979, 171–172)

In terms of "the behavior of the system as a whole" it is also clear that Eichner, at least implicitly, thought about nonlinear relationships and limiting factors in economic systems. In discussing what his model would *not* address, namely the dynamics of centrally planned economies, developing nations, and the overall global economic system, he wrote that "the perspective throughout [*Macrodynamics*] is primarily that of a single national economy, and for this reason the dynamics of the larger world economy, *which is more than just the sum of the individual parts,* may not be fully captured" (1987, 17). Whether Eichner planned to eventually emphasize nonlinear relationships in his empirical model of the economy, however, is not entirely clear.

Eichner and Feedback

Another idea in *Macrodynamics* that was central to Eichner's overall thinking was feedback. He argued that models devoid of feedback were

"mechanistic" and "almost always inadequate to represent any actual social system" (1987, 26).

Eichner clearly understood the difference between positive and negative feedback loops, and his use of the concept of "homeostasis" (equilibrium) was essentially the same as in system dynamics. In *Macrodynamics*, Eichner conceptualized the structure of economic systems as consisting of "dynamic adjustment processes" that respond to external shocks by either bringing the system back toward its homeostatic state or driving it farther away from this condition (1987, 29–30). From a system dynamics perspective, of course, dynamic adjustment processes of the former type are negative feedback loops while those of the latter type are positive feedback loops. Moreover, disequilibrium to Eichner occurred any time there was a discrepancy between the output state of the system (its stocks) and its homeostatic condition or goal, which is precisely the same as in the system dynamics paradigm.

Eichner and Markup Pricing

One of Alfred Eichner's passions from his doctoral dissertation through *Macrodynamics* was identifying the determinants of the markup and hence of the prices administered by megacorps in the economy. To Eichner, the markup within an industry was determined by the dominant megacorp's desire for investment in new plant and equipment. More specifically, the price leading megacorp monitors its actual rate of capacity utilization and compares it to its desired or "normal" rate of capacity utilization. When the former is projected to regularly exceed the latter, expected demand is seen to be excessive and capacity is thought to be constrained. This triggers the need for investment spending, which is undertaken if the cash flow generated by the current markup is equal to, or exceeds, that which is necessary to pay for the investment spending. When this is not the case, the megacorp will increase its markup to generate the necessary cash flow, as long as other factors such as the expected reactions of competitors and/or the government are deemed to be benign. Stated a bit differently, the megacorp will increase its markup to pay for its new investment spending as long as the cost of doing so does not exceed the cost of obtaining the necessary funds via increasing its external debt (Eichner 1985, 3; 1987, Chapter 6).

System Dynamics and Markup Pricing

Figure 1.1 presents a sector overview of a post–Keynesian-institutionalist system dynamics (PKI-SD) "core" macrodynamics model that is currently being built by the author. It was significantly influenced and inspired

Figure 1.1   **Sector Overview of the Post–Keynesian-Institutionalist System Dynamics Core Model**
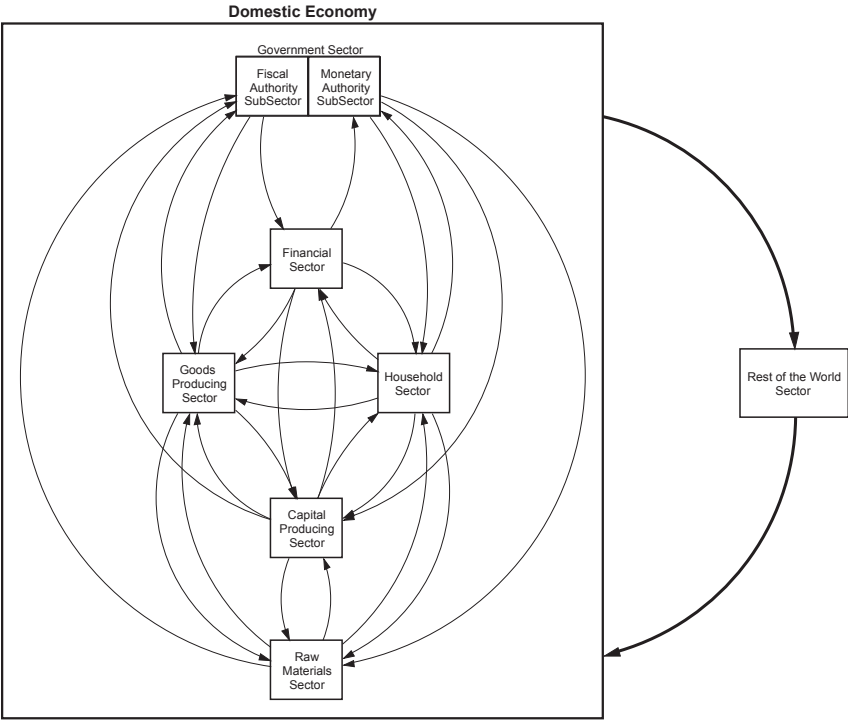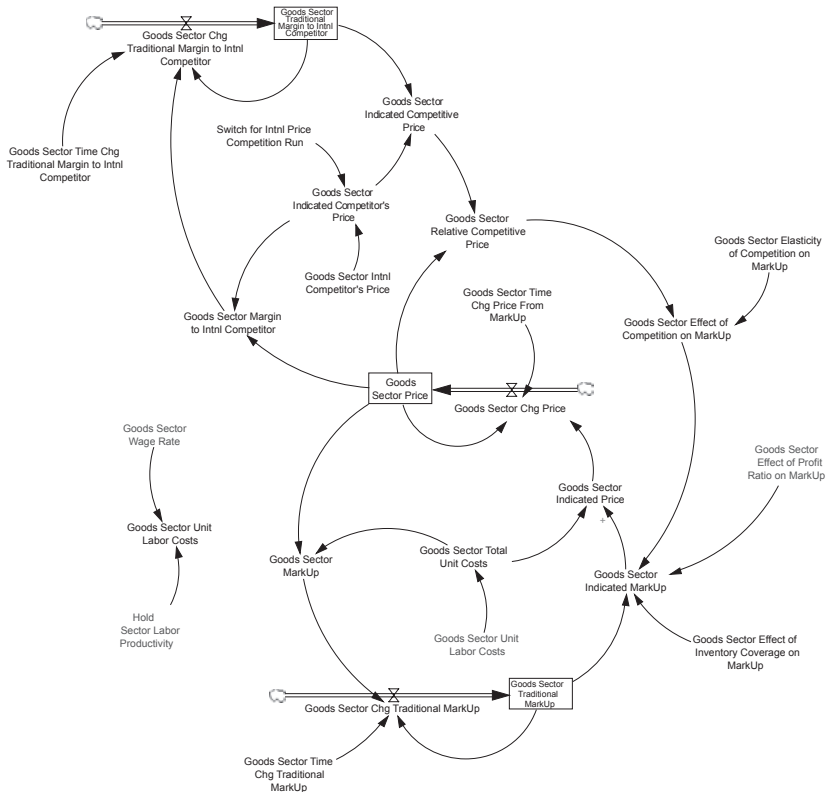

by the work of Alfred Eichner. Although a complete description of the model is beyond the scope of this chapter, it is designated a core model because it embodies the essential elements of modern post-Keynesian and institutionalist theory and because it is hoped that others will extend it in interesting ways.[20]

Inspection of Figure 1.1 reveals that the core model consists of seven interacting sectors, including Goods Producing, Capital Producing, Raw Materials, Household, Financial, Government, and Rest-of-the-World. Taken together, the first six of these sectors constitute the Domestic Economy, and each of these sectors interacts individually with the Rest-of-the-World sector. The Government sector is subdivided into a Fiscal Authority and Monetary Authority, although they share a consolidated set of financial statements, and the Household sector includes anthropogenic relationships such as alternative educational paths.

Figure 1.2 presents a very small portion of the Goods Producing sector of the core model—the markup pricing subsector. It is presented here to il-

Figure 1.2   **Circular and Cumulative Structure of the Markup Pricing Subsector of the Goods Producing Sector of the Post–Keynesian-Institutionalist System Dynamics Core Model**

lustrate how system dynamics can be used to model the sort of relationships presented by Eichner in *Macrodynamics.*

Inspection of Figure 1.2 reveals that the markup pricing subsector consists of three stock-flow structures and multiple feedback processes. This logic of this structure is fairly simple. The price set by the Goods Producing sector is determined by a traditional markup over unit labor costs, modified by pressures from its flow of profits relative to its desired flow of profits, the amount of pressure on its inventory, and the relationship between its price and the price put forth by its international competitor (taking into account any normal margin that exists between the prices). As these pressures change, the markup is adjusted and other factors within the model (not shown in Figure 1.2) react. These reactions, in turn, feed back and influence the original pressures on the markup.

Figure 1.3 **Reaction of the Core Model to a Price Increase by the International Competitor**

Figure 1.3a: Exogenous Increase in Competitor Price

Figure 1.3b: Goods Producing Sector Price

Figure 1.3c: Traditional Margin to International Competitor

Figure 1.3d: Inflation Expected by Household Sector

Figure 1.3e: Wage Rate in Goods Producing Sector

Figure 1.3f: Traditional Mark-Up in Goods Producing Sector

Figure 1.3g: Household Sector Demand Deposit Availability

Figure 1.3h: Unemployment in Goods Producing Sector

Comparative Dynamics

Figure 1.3 presents time series graphs of various variables from two comparative (test) simulations of the markup pricing subsector of the PKI-SD core model.[21] The first simulation is simply an equilibrium run that is shown for reference purposes only. The second is the subsector's reaction to a price increase by its international competitor.

The initial shock to the system by the international competitor is shown in Figure 1.3a. The Goods Producing sector responds by raising its price, but by a much smaller amount than the competitor due to other pressures on its markup (Figure 1.3b). Moreover, the Goods Producing sector's opinion of what constitutes the "traditional margin" to its competitor begins to change from –$10 to +$10 (Figure 1.3c), further dissipating pressure on the sector to raise its price.

Figure 1.3d shows that the Household sector initially responds to the price increase in the Goods Producing sector by increasing its expectations of inflation and hence its wage demands. The Goods Producing sector grants some of the wage increase (Figure 1.3e) and passes on some of the additional cost by raising the markup above what it would otherwise have been (Figure 1.3f). Later in the simulation, however, the Goods Producing sector's price actually begins to fall because higher prices have cut into the purchasing power of the Household sector (Figure 1.3g), which, in turn, causes it to reduce its orders to the Goods Producing sector. This, of course, results in layoffs in the sector and a rising rate of unemployment (Figure 1.3h). The system settles down after about twenty years, which is the amount of time necessary for the one-time exogenous shock to be fully absorbed by the system.

Completely Interdependent (Closed) Systems

Although, as discussed earlier, system dynamicists search for endogenous explanations for system behavior, this does not mean that system dynamics models are, in Eichner's words, "completely interdependent" or "closed" systems. Indeed, they are almost always "open" in the sense that they are dissipative (i.e., they exchange inputs and outputs with their environment) and are influenced by exogenous inputs (although the exogenous inputs typically do not drive or determine the system's behavior). An examination of Figures 1.2 and 1.3a shows this clearly. Figure 1.2 shows that the three stock-flow structures all contain "clouds," which are infinite sources that help to define the model's boundary. "Stuff" comes out of these clouds from the system's environment, which is not included in the feedback structure of the model, and into the system itself.[22] Figure 1.3a shows that an exogenous shock initiated by the International

Competitor sector (i.e., a price increase) knocks the system out of equilibrium and forces it to dynamically adjust to a new set of circumstances.

Extending the Macrodynamics of Advanced Market Economies

Eichner's masterpiece of post-Keynesian analysis is now twenty years old, which is long enough for the ideas it contains to be examined and digested by the economics profession. Viewed from the system dynamics perspective and through the lens of contemporary post-Keynesian and institutional economics, there are several ways to extend these ideas that have the potential to add significant value to what Eichner originally proposed.

The first and most obvious extension is to model the economy along the lines described by Eichner using system dynamics. This is, of course, already being done with the launching of the PKI-SD core modeling project. In *Macrodynamics*, Eichner used input-output analysis and econometrics to represent his ideas, but system dynamics has several advantages over these techniques that include the ability to create stock-flow consistent models, include important soft variables in the analysis, and include the institutional detail of the socioeconomic system without sacrificing any logical consistency.

The Cybernetics Thread Versus the Servomechanisms Thread

Taking the system dynamics perspective into account also can help to clarify the particular form of systems analysis that is appropriate for post-Keynesian and institutional analysis. In *Macrodynamics*, Eichner chose to adopt cybernetics, which began primarily with the work of Norbert Weiner and the Macy Foundation conferences of the 1940s, as his systems technique (Richardson 1991, 94–99; Weiner 1948). Unfortunately, the cybernetics approach to systems analysis has several drawbacks that make it less attractive for representing Eichner's ideas.

In an impressive study that traces the feedback concept from its earliest recorded appearances in ancient Greece to the present day, Richardson (1991) shows how feedback appears in the work of many of humankind's greatest thinkers and how it has become ubiquitous in the social and managerial sciences. However, as might be expected, Richardson describes how different thinkers and different disciplines have, over the years, chosen to emphasize and develop different aspects of the feedback concept. He classifies these differences in emphasis and development into two distinct "threads," the cybernetics thread and the servomechanisms thread.

According to Richardson, the cybernetics thread has the following tendencies (128):

- Feedback is defined in terms of input and output. It is seen as the influence of output back on input.
- The use of the feedback concept is limited to loops of negative polarity.
- Feedback is viewed as the mechanism of homeostasis and control.
- The negative feedback loop is not associated with the general concept of mutual or circular processes.
- The concept of feedback is used to address philosophical and theoretical questions relating to control.
- The stability of a feedback system, and the conditions producing instability, are a central concern.
- Feedback analyses are usually verbal rather than mathematical or pictorial.
- Feedback is viewed as information transmitted in messages. The concept is associated with communication networks and information theory.
- Feedback is associated with the creation of intelligent machines and the automation of human functions.

By contrast, the servomechanism thread has a very different set of characteristics (159–160):

- The patterns of behavior of a dynamic system are traced to its feedback structure.
- Formal dynamic models are employed.
- The dynamic behavior of a feedback system is considered to be difficult to discern without the aid of formal mathematical models.
- Feedback loops are seen as an intrinsic part of the real system, not merely as possible mechanisms of external control.
- Positive loops are present in the analysis, along with negative loops.
- Well-intentioned policies are seen to have the potential to create or exacerbate the problem behavior they were intended to cure.
- Nonlinearities are perceived to be a persistent characteristic of real socioeconomic feedback systems. Consequently, they are considered a necessary characteristic of reliable formal models of such systems.
- The work is directed toward policy analysis.

In light of Richardson's work and based on Eichner's arguments in *Macrodynamics*, the case can be made that methods originating in the servomechanism thread, such as system dynamics, are the most appropriate for representing Eichner's views on the economy. Although Eichner's systems intuition was good (e.g., despite his adoption of cybernetics he appeared to understand the importance of positive feedback processes), his analysis

would have been significantly improved by incorporating insights from the servomechanism thread into *Macrodynamics*. This is particularly true since his goal in the book was to explain the interactions between the trend (driven by positive feedback) and the cycle(s) (driven by negative feedback) in an advanced market economy.

Nonlinearities

A third area in which *Macrodynamics* can be profitably extended is in the explicit use of nonlinear relationships. When Eichner wrote of a system departing further and further from the conditions that need to be satisfied if a breakdown is to be avoided, his analysis would have been more complete if he had also identified and incorporated the nonlinearities that would eventually prevent the system from completely destroying itself or from evolving into completely ridiculous conditions. Eichner's analysis was certainly on the right track, and he clearly thought about issues that naturally lead to the explicit use of nonlinear relationships, but he never really emphasized their importance, nor extensively incorporated them into his analysis.[23]

The Aggregate Markup

A final area where *Macrodynamics* can be profitably extended is through the incorporation of Hyman Minsky's macro approach to markup pricing.[24] According to Minsky, in a multisector model of the sort conceived by Eichner, there are two types of prices: current output prices and asset prices. In the former case, at the macro level, the aggregate markup of price over labor costs determines the aggregate amount of profit to be distributed among firms, "which is realized only when spending on investment, plus capitalist consumption, plus the government deficit, plus the trade surplus and less worker saving is sufficient."[25] At the micro level, an individual firm's market power determines the markup on its current output and thus the share of the aggregate markup it can claim. Eichner devoted an enormous amount of effort during his professional life to describing the determination of an individual megacorp's markup, but he never incorporated the aggregate markup into his analysis. Merging his ideas with Minsky's would again result in a superior form of macroeconomic analysis.

Was Alfred Eichner a System Dynamicist?

So was Alfred Eichner a system dynamicist? The answer is technically no but spiritually yes. Had Eichner been aware of system dynamics and used it to represent his ideas, his contributions to economics might have been even

more outstanding than they already were. Of course, there is nothing that prevents his followers from extending his work in the directions suggested in this chapter. Indeed, that is precisely what the disciples of great masters do. Moreover, they end up being able to see a bit farther than their masters because they stand on the shoulders of giants.

Notes

1. As of this writing, the System Dynamics Society (www.systemdynamics.org) has over a thousand members spread over seventy-seven countries. Membership in the society is currently growing exponentially at about 8 percent per year. See Radzicki (2006) and the society's website for additional data.

2. For more on the history of system dynamics, see Radzicki (1997, 2006). It is worth noting that the first paper in the field of system dynamics was a critical assessment of traditional economic modeling (Forrester 1956).

3. In recent years, some post-Keynesian economists have argued that macro-dynamic models should be "stock-flow consistent." See, for example, Dos Santos (2006), Godley (2004), and Godley and Lavoie (2004).

4. Of course, mathematically this accumulation process is called integration. Forrester often notes that "nature integrates, it doesn't take derivatives."

5. The information is also used to control simple accounting and updating operations.

6. Forrester (1980, 14), however, likes to recount the story of a patent application for a servomechanism device he once submitted for approval. One of the main innovations in the design of the device was a positive feedback loop that stabilized the system. The application was initially rejected because the patent examiner did not believe that a positive loop could generate stabilizing behavior.

7. Of course, if the goal is constantly moving, keeping the system "at its current state" is not exactly what the negative loop is trying to accomplish.

8. However, sometimes an oscillating system is stable—for example, an EKG of a normal heartbeat.

9. Alfred Eichner's writings (e.g., 1979, 4, and 1985) reveal that he was not only a post-Keynesian, but also an institutionalist.

10. This is different from, say, traditional difference and differential equation modeling, in which solutions and thus explanations for system behavior are presented in terms of parameter values, initial values, and sometimes eigenvalues and eigenvectors.

11. See Sterman (1992, 13). The topic of endogenous explanations and how they relate to Eichner's concept of "completely interdependent (closed) systems" (1987, 22) will be discussed below.

12. Equilibrium in a system dynamics model occurs when all its net-flows are simultaneously zero. This happens when, for each stock, the sum of all its inflows exactly equals the sum of all its outflows or when all its inflows and outflows are simultaneously zero. The latter case can occur when all of a system's negative feedback loops reach their goals simultaneously, indicating that there is no pressure for change. Although system dynamicists do not believe that actual economic systems ever exist in a state of equilibrium, they will often initialize a model in this state during its testing phase and

then knock it out with an external shock to examine its response. Starting a model in equilibrium makes it much easier to determine its response to a shock than if the system were exhibiting some sort of disequilibrium behavior prior to the shock.

13. Actually, a few simple nonlinear systems can also be solved analytically (Sterman 2000, 297–298).

14. That is, they yield the exact amount of "stuff" in each stock over time.

15. That is, there is no need to compute the amount of "stuff" in a linear system's stocks at all time periods preceding the time period of interest in order to find out the amount of "stuff" in the system's stocks at the time period of interest.

16. That is, they yield the approximate amount of "stuff" in each stock over time.

17. That is, the amount of "stuff" in a nonlinear system's stocks at all time periods preceding the time period of interest must first be computed before the amount of "stuff" in the system's stocks at the time period of interest can be computed.

18. See Radzicki (2004). As will be discussed below, Eichner felt that a crucial characteristic of a scientific macrodynamic model was its ability to mimic actual macroeconomic behavior.

19. See also the argument in Radzicki (2003).

20. For more information on the core model and its intended uses and extensions, see Radzicki (2007) and Nichols, Pavlov, and Radzicki (2006).

21. In this version of the model, only the Goods Producing and Household sectors have been activated and the model is being run in a "testing mode"—that is, it is not yet mimicking actual data. For examples of how the latter task can be accomplished, see Radzicki (2004).

22. In the present case, the "stuff" coming out of the clouds is changes to the Goods Producing sector's price, traditional markup, and traditional margin to its international competitor. A more intuitive example would be something like an inflow of people to the economy (in-migration) from a cloud, which means that the place from which the people are coming (i.e., the system's environment) is outside the model's boundary or area of concern and thus exerts no constraint on its behavior.

23. This is also true of Sir Roy Harrod's work and the issue of the knife edge.

24. Eichner (1979, 8) was certainly familiar with Minsky's work.

25. Papadimitriou and Wray (1999, 9). This analysis uses the Levy-Kalecki equation and is being incorporated into the PKI-SD core model.

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2

Alfred Eichner's Missing "Complete Model"

A Heterodox Micro-Macro Model of a Monetary Production Economy

Frederic S. Lee

I believe that I was Alfred Eichner's first graduate student, and he was certainly the first economics professor I had to make an impact on me as an economics student. In September 1976, I entered Columbia University to complete my undergraduate education in economics in preparation for graduate school. For the first semester, I read Kalecki, Hall and Hitch, Andrews, and many studies on pricing, which enabled me to write a paper titled "Price Theory, the Firm and Manufacturing Business" for a class I was taking from John Eatwell. In the spring semester, my reading included Eichner's *Megacorp and Oligopoly* (1976). Thus, when I first met him in February 1977, I wanted to talk about the determination of the profit markup. However, Eichner had already left this kind of question behind him and was starting the macrodynamics project that would occupy him for the rest of his life, culminating in his manuscript *The Macrodynamics of Advanced Market Economies* (1987a). So when I wanted to talk about the profit markup, he gave me a copy of the page proofs of "The Geometry of Macrodynamic Balance" (1977) to read.

The next academic year (1977–1978) I spent at the University of Edinburgh where I continued my reading in microeconomic and industrial economics, became interested in Sraffian price equations, and outlined a paper called "Pricing, Investment, and Macrodynamics." In September 1978, I entered Rutgers University where I eventually obtained my PhD in 1983. When I entered the Rutgers economics program, I had just finished reading Pasinetti's *Lectures on the Theory of Production* and Roncaglia's *Sraffa and the Theory of Prices*, and I was working my way through Sraffa's *Production of*

Commodities by Means of Commodities. Thus, I started writing class papers based on cost-plus pricing and Sraffian price equations and titling them "A General Theory of Industrial Pricing" (fall 1978) and "Market Prices and Cost of Production Prices: The Prolegomenon to a General Theory of Industrial Prices" (spring 1980). Although I thought I was just engaged in developing a general post-Keynesian theory of prices, I was actually part of a larger discussion concerning the development a general micro-macro model of the economy. From at least the mid-1970s and extending into the 1980s, there existed among post-Keynesians a view that a general disaggregated model of the economy could be developed in such a way that there would not be a separate macroeconomics and a separate microeconomics—just a single overall model. By 1978, Eichner was deep into that discussion and so was I, along with many others; it so happened that my interests were in the area of the business enterprise and the theory of prices. When I went to Rutgers, I thought that all the graduate students were aware of these "frontier" developments. But when I gave my paper "A General Theory of Industrial Pricing" to a graduate theory seminar, the blank and confused faces indicated that was not the case. In commenting on the paper, Eichner noted the following:

> Economic models can be divided into general and partial analyses. They can also be divided into short-period and long-period analyses, giving rise to the following two-fold matrix:

	General	Partial
Short-Period		
Long-Period		

> Post-Keynesian theory, as it has developed so far, has generally been restricted to partial analysis. To some, the absence of a general analysis will appear to be a failing of post-Keynesian theory, and they may even be inclined to stick with Walrasian general equilibrium models as a result. . . . The Sraffian model is, however, a general one; and indeed it is the rival to the Walrasian general model. Moreover, since it is not incompatible with post-Keynesian theory, it can be regarded as the post-Keynesian general model.
> At the heart of the Sraffian model is the series of industry or sectoral equations which build on the Leontief model by making allowance for a surplus which is divided in some manner between wage and non-wage income. The Sraffian equations, however, are also price equations so that the Sraffian model can be viewed as a pricing [model]. Still, by deliberate design, the extent of the mark-up (the share of the surplus going to non-wage

recipients) is unexplained in the Sraffian system. The size of the mark-up is, however, explained in the partial post-Keynesian analysis, both for the short-period and, what is the equivalent time horizon of the Sraffian system, the long-period. It depends on the rate of investment and the rate of expansion determined by that rate of investment.

What I think you attempted to do in your seminar paper was to put these various pieces together, showing the interrelationship among them. (Eichner 1978)

For the next decade Eichner worked on developing a general model that would have a microfoundation for macrodynamics, first articulated in his 1983 article "The Micro Foundations of the Corporate Economy" and then in more detail in his 1987 *Macrodynamics* manuscript. The manuscript was viewed by Eichner as "a comprehensive treatment of the post-Keynesian (and institutionalist, post-Marxist and behavioralist) alternative to the conventional (neoclassical) theory" (Eichner 1987b). While it provided a detailed analytical description of the microfoundations, the complete model was not included in the manuscript nor apparently even written in draft form. For the next decade and more since 1978, I was engaged in developing a microeconomic theory that would form the foundation for macroeconomics, first as an ongoing set of post-Keynesian and later heterodox microeconomics lecture notes, and secondly delineating the historical foundations of post-Keynesian price theory (Lee 1998). But in the nearly thirty years since Eichner and I had first talked, the question of developing a general post-Keynesian, now heterodox, model of the economy was never absent in my mind. Thus, this chapter is aimed at producing a "complete model" that a heart attack on the squash court prevented from being written, albeit from a heterodox perspective (Eichner 1983, 1987a; Kregel 1990; Lee 2000, 2004.)

The intellectual roots of heterodox economics are located in the various heterodox traditions that emphasize the wealth of nations, accumulation, social relationships, full employment, and economic and social reproduction. Therefore the discipline of economics is, from the heterodox perspective, defined as concerned with explaining the process that provides the flow of goods and services required by society to meet the needs of those who participate in its activities; that is, economics is the science of the social provisioning process. Using empirically grounded concepts, the heterodox explanation involves human agency in a cultural context and social processes in historical time affecting resources, consumption patterns, production and reproduction, and the meaning (or ideology) of economic activities engaged in social provisioning. Thus *heterodox economics* has two interdependent parts: theory and policy. *Heterodox economic theory* is a theoretical explana-

tion of the historical process of social provisioning within the context of a capitalist economy. Therefore it is concerned with explaining those factors that are part of the process of social provisioning, including the structure and use of resources, the structure and change of social wants, the structure of production and the reproduction of the business enterprise and other relevant institutions, and distribution.[1] To articulate the theory in terms of a general disaggregated model of the economy, this chapter is divided into three parts. The first deals with the micro-macro structural organization of economic activity, while the second section delineates the micro social framework of the social provisioning process. The last part of the chapter delineates the micro-macro model of a monetary production economy and then utilizes it to deal with four micro-macro theoretical issues—the origin of profits; the role of the surplus in generating and coordinating economic activity; the role of prices, wage rates, and profit markups in the distribution of income and social provisioning process; and the existence and relevance of a heterodox theory of value. Together, these four issues make the model, to some degree, Eichner's "complete model" (Dugger 1996; Lee 2006; Lutz 1999; O'Boyle 1996; Power 2004).

Micro-Macro Structural Organization of Economic Activity

Structure of Production

As noted, the aim of heterodox economics is to provide a theoretical explanation of the social provisioning process under capitalism. The social provisioning process is founded on the social and interdependent production of goods and services; thus the core framework of economic activity of a capitalist economy consists of its schema of production and the income flows relative to goods and services for social provisioning.[2] The schema of production of the economy can be represented as a circular production input-output matrix of material goods combined with different types of labor power skills to produce an array of goods and services as outputs. Many of the outputs replace the goods and services used up in production, and the rest constitute a surplus to be used for consumption, private investment, and government usage. More specifically, the production schema of the economy is empirically represented in terms of a product-by-product input-output table (or matrix). The table shows that m goods and services are produced, and that n goods and services and z labor power skills are used in their production, where the former constitute the *intermediate capital inputs*[3] where $m > n$ and the latter constitute the labor power skills inputs where $z \geq m$. Thus, letting q_{ij} represent the amount of the jth product (good or service) and L_{iz} represent the amount of the zth

labor power skill to produce Q_i amount of the ith product,[4] the production of the ith good or service can be represented by

(1) $$[q_i,..., q_{in}, L_{il},..., L_{iz}] \to Q_i$$

or $$[G_i, L_i] \to Q_i$$

where $$G_i = (q_{il},..., q_{in})$$

and $$L_i = (L_{il},..., L_{iz})$$

Hence, the input-output table of the economy takes the following form:

(2)
$$[G_i, L_i] \to Q_1$$
$$[G_m, L_m] \to Q_n$$

Representing the array of $(G_1,..., G_m)$ as G, the array of $(L_1,..., L_m)$ as L, and the total quantity produced of each product as Q_d, the input-output table of (2) can be depicted as

(3) $$G + L \to Q_d$$

or

(4) $$\begin{bmatrix} G_{11} \\ G_{21} \end{bmatrix} + \begin{bmatrix} L_{11} \\ L_{21} \end{bmatrix} \to \begin{bmatrix} Q_{d1} \, 0 \\ 0 \, Q_{d2} \end{bmatrix}$$

where:

G is a $m \times n$ flow matrix of intermediate capital goods and services;

L is a $m \times z$ flow matrix of labor power skills;

Q_d is a diagonal $m \times m$ matrix of output;

G_{11} is a square $n \times n$ matrix of intermediate capital goods and services inputs used in the production of Q_{d1} a $n \times n$ diagonal matrix of intermediate capital goods and services;

G_{21} is a $m - n \times n$ matrix of intermediate capital goods and services inputs used in the production of Q_{d2} a $m - n \times m - n$ diagonal matrix of consumption, investment, and government goods and services;

L_{11} is a $n \times z$ matrix of labor power skills used in the production of Q_{d1} intermediate capital goods and services; and

L_{21} is a $m - n \times z$ matrix of labor power skills used in the production of Q_{d2}.

One feature of circular production is that in the case of $G_{11} \rightarrow Q_{d1}$, all the outputs also appear as inputs (either directly or indirectly) in their own production.[5] This implies that both inputs and outputs are tied to technically specified, differentiated uses, production is a circular flow, and all intermediate capital goods and services are produced inputs. Consequently, the production of intermediate capital goods is a differentiated, indecomposable, hence emergent schema or system of production that cannot be segmented, aggregated, disaggregated, reduced, or increased. Therefore, the removal of any one horizontal production schema from G_{11} means that no production can occur, while an ad hoc introduction of a production schema is not possible. Moreover, since the production of Q_i must directly involve at least one qij where $i \neq j$, it cannot be reduced entirely to a non-q_j input, such as a specific labor power skill, in $n - 1$ integrative steps.[6] Building on circular production, a second feature is that there are no scarce resources, which means that intermediate capital goods are not scarce factors of production and the surplus does not consist of "relatively scarce" goods and services[7] (Aspromourgos 2004; Eichner 1987a; Kurz and Salvadori 1995, 2006; Lee 1998; Lowe 1976; Sraffa 1960).

Monetary Structure of the Economy and the Linkage Between Incomes and the Surplus

The second component of the framework is the relation between the money wages of workers, profits of enterprises, and government "money income" and expenditures on consumption, investment, and government goods and services, and on financial assets. That is, the social surplus of the economy, which consists of the goods and services not used directly in production (Q_2),[8] has to be distributed across three classes of claimants: workers, capitalists and business enterprises, and the state; and it has to be done in money terms.[9] Hence letting $p = (p_1, ..., p_n)$ be a column vector of money prices of all m goods produced in the economy, $p_1 = (p_1, ..., p_n)$ be a column vector of money prices of intermediate capital goods, $p_2 = (p_{n+1}, ..., p_m)$ be a column vector of all surplus goods and services, and $w = (w_1, ..., w_z)$ be a column vector of money wage rates, then

(5a) $W = e(Lw)$ which is a scalar and is the total wage bill;

(5b) $p = (Q^T p) - e[Gp_1 + Lw]$ which is a scalar and is total profits; and

(5c) $VS = (Q_2^T p_2)$ which is a scalar and is the total monetary value of the surplus.

While the wage bill and profits are directly connected to economic activity, government "money income" is not. That is, following the Chartalist

argument, the government creates its own money income for spending by crediting bank accounts. So while taxes can exist, they are not relevant with regard to expenditure decisions by the government. The point of taxes is to create demand for money (government IOUs) and secondly to drain reserves out of the system, thereby affecting the expenditure decisions of enterprises and households. Complementing and reinforcing the Chartalist tax argument is the argument that the demand for government money arises through state and class power coupled with access to the social provisioning process. In this case, the state acquires the goods and services it needs by paying for them with government money, which is backed by the state's power of simply acquiring them without any compensation. Accepting the money, the capitalists in turn make access to the social provisioning process dependent on having it. Thus, capitalists demand money to obtain access to social provisioning and they use their class power over workers to impose on them the acquisition of it as their only way to gain access to the social provisioning process. Hence workers have to sell their labor power for government money to be able to purchase goods and services necessary for their survival. Irrespective of the particular argument used, both imply that government money income is not associated with or derived in some sense from economic activity.

To simplify the following analysis, taxes will be ignored and the second argument is utilized to underpin the acceptance and demand for government money; and it will be assumed that government money income (G_m) is spent only on goods and services.[10] Since the state does not actually produce the goods but the capitalists do, government income qua expenditures is transferred to the capitalists and shows up as an indistinguishable component of their profits. Therefore the national income directly associated with economic activity is equal to the sum of the wage bill and profits (which includes G_m):

(5d) $NI = W + P.$

Together, the production and monetary structures generate a monetary input-output structure of the economy:

(3) $G + L \rightarrow Q_d$ the productive structure of the economy;

(4') $(eG)^T + Q_2^T = Q^T$ which is the structure of the total output of the economy that equals the material inputs used in production plus the surplus;

(5b') $Gp_1 + Lw + P = Q_d p$ is the monetary structure of the economy where $P = P_1, ..., P_m$ is a column vector of the profits in each market; and

(5c') $Q_{d2}p_2 = Q_{d2C}p_2 + Q_{d2I}p_2 + Q_{d2G}p_2$ which is the monetary structure of the goods and services surplus in terms of consumption, investment, and government purchases.

Since workers spend all their wage income only on consumption goods, capitalists spend part of their profit income on consumption goods and the remaining part on investment goods and services and financial assets, and government income is spent on government goods and services, then

(5e) $Q_{2C}p_2 = e(Lw) + c_c p$ profits where $c_c =) (c_{c1}, ..., c_{cm})$ is a row vector of capitalist propensities to consume out of profits;

(5f) $Q_{2I}p_2 + Q_F = reP$ which is investment plus financial assets are equal to retained earnings where $re = (1 - c_{c1}, ..., 1 - c_{cm})$ is a row vector of capitalist propensities to retain earnings out of profits; and

(5g) $Q_{2G}p_2 = Q_F = G_m$ which is the value of government goods purchased is equal to the value of the financial assets purchased by business enterprises which is equal to government expenditures.

Therefore,

(6) $e(Q_{d2}p_2) = e(Lw) + c_c P + reP$ or the value of the goods and services surplus equals national income. (Bortis 1997, 2003; Kregel 1975; Lee 1998; Wray 1998;)

Social Framework of the Social Provisioning Process

Complementing the structure of the economy is the social framework of the social provisioning process in a capitalist economy. It consists of the organizations that generate and direct the social provisioning process—that is, the business enterprise and the state—and the social relationships that permit them to direct the process. Starting with the latter, there are two broad social classes with respect to economic activity: those who do not own or control and thus direct the means of production and hence do not have privileged access to incomes, and those that do own and do control and thus direct the

means of production and hence have privileged access to incomes. Hence the former have no choice but to work for the latter while the latter are able to control and direct the working lives of the workers for their own benefit and hence are the bosses or the capitalists. The latter's benefits include not just a superior material standard of living, but also the social power to maintain ownership and control so as to continue the directing of the social provisioning process for their benefit. Whether the two broad classes have anything in common is a complex question; however, what they do not have in common is who owns, controls, and directs the economic activity underpinning the social provisioning process. In particular the capitalist classes want to retain the power associated with ownership, control, and direction so as to make workers dependent upon them and therefore be able to direct workers' lives for the capitalists' own benefit.

Business Enterprise and Prices

The organizations through which the capitalist class directs the social provisioning process are the business enterprise and the state. The business enterprise is a specific social organization for coordinating and carrying out economic activities in a manner that mirrors the social relationships in capitalist society and, most importantly, reproduces the capitalist class itself. It consists of an organizational component, a production and cost component, a series of routines that transmit information (such as costs, sales, and prices) to enable workers and managers to coordinate and carry out their activities, and a management that makes strategic decisions about prices and investment. The organization of the business enterprise is essentially a particular social technique for the production of goods and services. Hierarchical in structure and authoritarian in terms of social control, the organization of the enterprise enables senior management to make decisions that, in turn, are carried out by lower management and workers. The enterprise has three tools by which to affect economic activity and hence the social provisioning process for its own interest: setting prices, undertaking investment, and making production and employment decisions. When making decisions, the management of an enterprise is motivated by different goals, the most fundamental being the survival and continuation of the enterprise, followed by various strategic goals, such as growth of sales, developing new products, entering new geographical regions or markets, generating dividends for shareholders, and attaining political power. Given that the enterprise has an unknown but potentially very long life span, the time period to achieve each of the goals is likely to differ, and management cannot be sure that it can achieve them. Thus the goals are not ends in themselves, but are established so as to direct the activities of the

enterprise in a radically uncertain environment. As a result, profits are not an end goal for management, but rather an intermediate objective that facilitates the directing of its desired activities (Campbell, Hollingsworth, and Lindberg 1991; Downward 1999; Dunn 2001; Eichner 1976, 1987a; Fligstein 1990, 2001; Lavoie 1992; Lee 1998).

Pricing and the Price Model

Management views price setting, the choosing of investment projects, and production and employment targets as strategic decisions designed to meet its goals. With regard to the former, management utilizes cost-plus pricing procedures that involve first calculating the costs of producing the product at normal output and then adding a profit markup to set the price. The resulting price remains fixed for a period of time (and many transactions) and does not change when sales increase or decrease. Its two most important properties are its potential, depending on the state of demand (sales), to generate a cash flow for the enterprise that will cover its costs of producing the product and to generate profits and its strategic capabilities, such as penetrating markets and altering market shares. Once set, the price is then administered to the market as the enterprise's market price. However, the business enterprise sells its goods and services in markets that include products from other competing enterprises; thus there needs to be a market arrangement by which the market price is set. For simplicity's sake, it will be assumed that the market price is set by a price leader or cartel. Hence the *price equation for a single market* is not significantly different from the enterprise pricing equation:

(7) $$[m_i p_1 + l_i^* w][1 + r_i] = p_i$$

where:

$m_i = (m_{i1}, ..., m_{in})$ is a row vector of average material pricing coefficients at normal output or capacity utilization;

$l_i^* = (l_{i1}^*, ..., l_{iz}^*)$ is a row vector of average labor pricing coefficients at normal output or capacity utilization;

r_i is the profit markup; and

p_i is the market price for the ith good.

Since market refers to all the transactions of a specific product, the economy consists of as many markets as there are products. Thus there are m markets that can be classified as consumer, investment, intermediate capital, or government goods markets.[11] Common to all the markets is that the relationship between the market price and market sales is nonexistent; thus a reduction in

the market price by itself will generate little if any increase in market sales.[12] Finally, the *price model of the economy* is:

(8) $$[R_d][Mp_1 + l^*w] = p$$

where:

R_d is a $m \times m$ matrix of profit mark and the *i*th element is $(1 + r_i)$;

M is a $m \times n$ matrix of normal average material pricing coefficients that are invariant with respect to short-term variations in output and the *i*th row in m_i; and

l^* is a $n \times z$ of normal average labor pricing coefficients that are invariant with respect to short terms variations in output and the *i*th row is l_i^*.

Business Enterprise, the State, Investment, and the Quantity Model

Management of the business enterprise distinguishes between investment projects that are designed to replace broken equipment or maintain the operations of an existing plant, to meet state-mandated environmental and safety standards, and to expand capacity, create new products, and expand the enterprise's marketing capabilities. Management generally funds all the investment projects in the first two categories on the grounds that, if they were not supported, the enterprise's capacity for current production would be severely reduced. Investment projects in the third category, on the other hand, are justified either in terms of their contribution to meeting the future demand of the enterprise's existing products or in terms of producing new products for current and novel future demands. In addition, such investments have to meet a range of financial guidelines ranging from generating a flow of profits that would cover their costs in a given number of years to a minimal rate of return (that is greater than the market interest rate). Given management's goals, however, the financial guidelines play a secondary role in investment decisions. Once the investment decision is made, management then determines whether it can be internally financed from profits or whether external funds will have to be obtained from financial institutions. From the above discussion, we find that investment is a demand for goods and services that are not used up in production and hence are part of the surplus. Therefore, for the economy as a whole, the total investment or total demand for the surplus in the form of investment goods and services can be represented by Q_{21}.

Both workers and capitalists demand consumer goods, but they do not command the direct production of those goods. That is, capitalists and workers do

not receive a predetermined inventory of goods derived from the surplus in the previous time period; nor do they directly order the production of the goods they consume. Rather, workers and capitalists partake in the surplus, but not of their own choosing. Drawing upon past consumption patterns, enterprises make production and employment decisions that result in consumption goods (Q_{2C}) being produced ahead of payments for them while the consumers simply choose among the already produced goods for them.[13] Finally, the state also demands goods not used up in production; that is, it demands surplus goods (Q_{2G}). Thus the output of the economy can be represented as:

$$(4) \qquad (eG)^T + Q_{21} + Q_{2C} + Q_{2G} = Q.$$

Letting $Q_d^{-1}G = \begin{bmatrix} Q_{d1}^{-1}G_{11} \\ Q_{d2}^{-1}G_{21} \end{bmatrix} = A = \begin{bmatrix} A_{11} \\ A_{21} \end{bmatrix}$ a $m \times n$ matrix of material production

coefficients that vary with output and $Q_d^{-1}L = \begin{bmatrix} Q_d^{-1}L_{11} \\ Q_d^{-1}L_{21} \end{bmatrix} = l$ a $m \times z$ matrix of labor production coefficients that vary with output, the *output-labor quantity model of the economy* is:

$$(9) \qquad A^T Q + Q_{21} + Q_{2C} + Q_{2G} = Q$$
$$l^T Q = L$$

Micro-Macro Model of the Monetary Production Economy

The micro-macro model of the economy can be represented as follows:

(3') $Q_d A + Q_d l \rightarrow Q_d$ productive structure of the economy;

(9) $A^T Q + Q_{21} + Q_{2C} + Q_{2G} = Q$ quantity model of the economy–output;
$\quad\quad l^T Q = L$ quantity model of the economy–labor;

(8) $[R_d][Mp_1 + l^*w] = p$ price model of the economy;

(10) $Q_d A p_1 + Q_{d2} p_2 = Q_d p$ price-output model of the economy as a whole;

(6') $e(Lw) + c_c P + reP = e(Q_{d2}p_2)$ national income equals the value of the
$\quad\quad G_M = Q_F$ goods and services surplus and government expenditures equals the value of the financial assets purchased by the business enterprise.

As the model stands, the economy operates in terms of the decisions concerning prices and the production of the goods and services surplus; and these

decisions are made by the business enterprise and the state.[14] More specifically, the decisions concerning the production of the surplus determine output and employment. This can be seen in the following way:

$$(9') \qquad\qquad (I - A^T)^{-1}[Q_{21} + Q_{2C} + Q_{2G}] = Q_d.$$

Hence, enterprise investment and production decisions and government purchases decisions determine the composition and amount of the surplus (Q_2); and given Q_2 (or $Q_{21} + Q_{2C} + Q_{2G}$), the composition and the amount of output (Q) and employment (L) are determined.[15] Thus, the material basis of the social provisioning process is determined by one class or segment of society—the capitalist class and the dependent capitalist state—for society as a whole. Since the composition and amount of the surplus is determined by the capitalist class and the state, they have the dominant influence qua control over the economy and society. In other words, since workers as a class cannot directly command the production of their consumption goods, they cannot control their own social provisioning process.[16]

This argument has two theoretical implications. The first and most significant is that while workers must be employed to have access to the social provisioning process in a capitalist economy, the employment process is controlled by the capitalists and the state. Therefore the composition of the workforce and how many workers are employed are determined by them. Thus, while workers may choose the particular jobs they do, they cannot as a class choose not to work or be employed by capitalists. In short, workers are, to use an old Marxian phrase, government money wage-slaves. Secondly, workers as a whole are employed to produce what the capitalists and the state want and in the process, as a by-product, produce their own material reproduction—that is, the goods and services they buy with their wages: Wage bill = $e(Lw)$ = $Q_{2c}p_2 - c_cP$. In contrast, by being employed to produce consumption, investment, and government goods and services for capitalists and the state, workers have also produced the profits for the capitalists:[17] Profits = $Q_{21}p_2 + [Q_{2c}p_2 - e(Lw)] + Q_{2G}p_2$ since $Q_F = Q_{2G}p_2$. Thus, the origins of profits are found in the possibility and capability of capitalists and the state to force workers to produce surplus goods and services for them; and since profits consist of non-scarce reproducible goods, they are not based on scarcity and hence are not technologically constrained. Hence the only limit to profits is how many goods and services the capitalists and the state want.

The second implication is that since workers are compelled to work to get government money as a way to gain access to the social provisioning process, the state can also employ (or command) workers to produce state goods and services; however, in this case, workers do not produce state income as the

state can "create" its own "income." Rather, by producing state goods, workers are "producing" profits for capitalists as a form of transfer payment. In any case, the state is in a powerful position to direct the economy through commanding labor power to produce its goods and services. In spite of its role in generating capitalist profits, the capitalist state is constrained by the capitalist class in its ability to command labor and direct the economy. But that should not obscure the fact that capitalists and the state are able, in the same way, to command labor power in pursuit of their own objectives.[18] Finally, if the capitalist and the state command workers to produce surplus goods and services, then workers are not made to provide surplus labor; rather it is the command for "surplus labor" to produce surplus goods for capitalists and the state that has as its by-product the production of wage goods for workers. Thus, the causal structure runs from surplus goods to surplus labor to wage goods, or, more bluntly, it is the production of profits that produces the wage goods.[19] This inverts the traditional Marxian argument that underpins its theory of exploitation and the origin of profits. Yet, while the use of surplus labor as an entry point into the analysis of exploitation and profits is misleading, the outcome is more or less the same: capitalists and the state direct the economy and hence the social provisioning process for their own interests, with the material reproduction of workers as a nagging afterthought.[20]

Turning to the price model, $[R_d][Mp_1 + l^*w] = p$, in a monetary production economy, for any given values of the profit markup and money wage rates, prices are "structurally" determined.[21] Since M_{11} (like A_{11}) represents circular production, it is not possible to reduce the material pricing coefficients to zero.[22] In addition, since L is an irreducible matrix of labor power skills, it is not possible to reduce it to a single homogeneous amount of labor power. This implies that prices cannot be reduced to a homogeneous quantity of labor power and consequently are not proportional to embodied homogeneous quantities of labor power. More significantly, because prices can exist as long as the profit markups, the wage rates, or both are positive, then it is the price system as a whole that determines prices. However, since the price system reflects and is embedded in the social system of production, it is the latter that determines prices or, more accurately, provides the material and social basis for their existence.

This argument also has two interesting theoretical implications. The first is that price changes can occur only when enterprises decide to vary money wage rates or profit markups or by altering the pricing coefficients (which is predicated on changing the underlying technology or an alteration in the capital-labor relationship within the enterprise). Thus, prices in the economy reflect agency, the costing-pricing structures of the business enterprise, and the structures of the social system of production. The second implication is that since

the price model and prices are embedded in a monetary production economy where government money is the *numeraire* and wages are denoted in terms of it, wage rates and profit markups can vary independently of each other. Thus an increase in wage rates does not require a structural reduction in profit markups and vice versa. Consequently, an equal percentage increase in wage rates will not alter the price-wage ratio, whereas an equal percentage increase in the profit markup will do so. This asymmetrical outcome occurs because money wages do not equal real wages, whereas the profit markup appropriates real goods and services and thus is equivalent to the real wage but for capitalists.[23] Hence, as will be argued below in the context of distribution, the profit markup has a more significant impact on the economy relative to the money wage rate.

Finally, the quantity and price models together produce a price-quantity model of the economy as a whole:

$$(10) \qquad\qquad Q_d A p_1 + Q_{d2} p_2 = Q_d p$$
$$Q_d l w = L w$$

with the principle characteristic that output and prices are determined independently of each other. Hence the "coordination of economic activity" and the "allocation of scarce resources" are not only not done via prices, but both concepts also have no meaning. That is, economic activity does not exist because of coordination and hence does not break down because of the lack of coordination; rather, economic activity is generated and its structure is organized through the creation of the surplus. Moreover, with markets defined in terms of the transactions of a specific good or service and market price and market sales separately determined, market prices cannot clear markets and markets are conceptually non-clearable in that there will always be market transactions as long as the social provisioning process and the desired surplus require the production and utilization of the good or service. Therefore, it is the variations in the desire for surplus goods and services by the capitalist class and the state and not variation in prices and money wage rates that generate variations in output, market transactions, and employment of workers.[24] Lastly, as noted above, in a social system of production where all goods and services are producible and reproducible, there are no scarce resources and prices are not scarcity indexes. Hence the concept of allocating scarce resources by the price mechanism has no meaning.

If prices are not required for the coordination of economic activity or the allocation of scarce resources, then what does the price system do? The answer rests not so much with prices per se but with their two principle determinants: the profit markup and the money wage rate. As noted above, wages and profits

are spent on consumption and investment goods and services and on financial assets: $e(Lw) + c_c P + reP = Q_{2c}p_2 + Q_{2l}p_2 + Q_F$. Since consumption goods are for the reproduction of workers and their households, money wage rates are the agency qua institutional qua distributional mechanism through which this is achieved. However, variations in money wage rates mean that there are variations in workers' participation in the social provisioning process. In particular, under capitalism with its ethos of individualism and a capitalist class strategy of preventing the emergence of a unified working class, a hierarchy of money wage rates is established through the interaction of capitalists, trade unions, and workers that results in some workers having not just more goods and services than others but also having different ones.[25] The profit markup is designed to capture a portion of the global surplus of consumption and investment goods and services and financial assets to enable the enterprise and the capitalists to reproduce themselves and to have financial claims on future goods and services. That is, like wage rates, profit markups are the agency qua institutional qua distributional mechanism that enable capitalists to have current and future access to the social provisioning process and enterprises are able to reproduce themselves. Therefore, as with wage rates, variations in profit markups generate among capitalists differential access to social provisioning and differential capabilities among enterprises to reproduce and grow.

Considering the relationship between wage rates and profit markups, as noted above, increasing money wage rates cannot encroach upon the portion of consumption goods that is acquired by the capitalist class. However, increasing profit markups reduces the purchasing power of wage rates, which results in changing the composition of the production of consumption goods so that less are produced for workers and more are produced for capitalists. Thus, the profit markup and the "wage share" of the value of consumption goods ($Q_{2c}p_2$) are inversely related.[26] While the profit markup is independent of the wage rate, it is quite different for the capitalist propensity to consume (or the capitalist wage rate). That is, if the latter increases, the profit markups must increase in order to obtain the amount of profits to purchase the same amount of investment goods while at the same time driving down the wage share. So the answer to the question of what does the price system do is that under the existing capitalist social relationships it ensures the reproduction of capitalists and business enterprises, but not necessarily all the workers.

As already noted, the objective of heterodox theory is to identify, describe, and develop a narrative—that is, a theoretical explanation—utilizing structures and causal mechanisms that contribute to the overall understanding of the social provisioning process in a capitalist economy. If this objective is at least partially achieved in the above discussion, then embedded in the

micro-macro model above is an emerging heterodox theory of value—that is, a qualitative-quantitative analytical explanation of the origin of profits and money wages, of prices, of profit markups and money wage rates, of the composition and amount of the surplus and overall output and employment, and of distribution—all of which provide the foundation for understanding and explaining the social provisioning process (Dobb 1945). Central to the theory of value is the role of capitalist social relationships that produces, within the context of a monetary production economy, an individual qua household alienated social provisioning process. Hence, the analytical need for agency by capitalists, the state, and workers and for the structural existence of the distribution variables of profit markups, wage rates, and capitalist propensity to consume converts the alienated process into one that serves the needs of the three claimants. Thus the heterodox theory of value is not just about the origins of profits or how prices and distribution are determined; it also explains the class access to the social provisioning process.

The micro-macro model delineated above in equations (3'), (9), (8), (10), and (6') is an emergent model with an embedded theory of value that can be used to explore from a heterodox perspective both micro and macro events that affect the social provisioning process. More specifically, the model makes it clear that macro events that affect the overall social provisioning process emerge from the disaggregated actions of workers, capitalists, and the state. Hence, exploring macro issues and their impact on class access to the social provisioning process, such as an expansion of state expenditures on regional and national employment, on the expansion of financial markets, or on inflation, is done with a clear understanding of how the micro units of the economy actually work to produce the macro outcomes. Thus macro events have a micro grounding, heterodox macroeconomics has a heterodox microeconomics foundation, and after twenty years Eichner has his "complete model."

Notes

1. In addition, heterodox economists extend their theory to examining issues associated with the process of social provisioning, such as racism, gender, and ideologies and myths. Because heterodox economics involves issues that are inseparable from ethical values, social philosophy, and the historical aspects of human existence, heterodox economists feel that it is also their duty to make *heterodox economic policy* recommendations to improve human dignity—that is, to recommend ameliorative and/or radical, social, and economic policies to improve the social provisioning for all members of society and especially the disadvantaged members. Moreover, they adopt the view that their economic policy recommendations must be based on an accurate historical and theoretical picture of how the economy actually works—a picture that includes class and hierarchical domination, inequalities, and social-economic discontent.

2. There is also a third component—the flow of funds that ensures that monetary production and monetary social provisioning are taking place. To simplify the analysis, it will not be dealt with.

3. A capital good is a produced means of production; thus intermediate inputs and investment goods are capital goods.

4. Joint production is ignored in the chapter.

5. In Sraffian nomenclature, all intermediate capital goods and services are *basics.*

6. This point can be stated as follows: $Q_{d1}^{-1}G_{11} = A_{11}$ where A_{11} is a matrix of material production coefficients $[a_{ij} = q_{ij} / Q_j]$. Thus $A_{11}^{n-1} \neq 0$ where n is the number of intermediate capital goods and $A_{11}^{v} \neq 0$ as long as v is finite, which means that a *commodity residual* exists. This result has the interesting but perhaps obscure implication of dismissing the concept of relative scarcity.

7. This further implies that non-produced "naturally-given" input such as "land" does not exist. That is, while "neutral stuff" in the form of attributes of nature exists, they are not resources for production until they have been shaped by technology and culture. To be an input in a technologically specialized production process requires prior technological development in terms of converting the neutral stuff into resources that have capabilities to work with other goods or services and labor skills to produce an output that meets existing technological and/or cultural needs. Hence, "neutral stuff"-based resources are produced, reproduced, augmented, eliminated, or even cyclically produced and eliminated by the system of production and therefore are not naturally fixed or finite in amount or quantity because they are not natural. In short, "resources *are* not, they *become;* they are not static but expand and contract in response to human wants and human actions" (Zimmermann 1951, 15). Consequently, resources are an expression of human appraisal of the "neutral stuff" and hence cannot be viewed as a non-produced input externally injected into a social system of production. Rather resources are, without qualification, produced means of production or intermediate capital goods (De Gregori 1987).

8. The surplus could also consist of intermediate capital goods, but this will not be dealt with here so as to reduce somewhat the complexity of the following analysis and modeling.

9. More specifically, $(eQ_{d1})^T - (eG_{11})^T = 0$ means that all the intermediate capital goods are used up in production; and $Q_2 = (eQ_{d2})^T$ is a column vector of goods and services not used directly in production and hence can be used for (that is, purchased for) consumption, investment and/or government purposes. Thus, in Sraffian nomenclature, the surplus goods and services are *non-basics.*

10. It is possible for the government to directly credit, for example, an individual's bank account without purchasing any goods and services, as in old-age pensions, social security, and aid for dependent children. However, this will not be dealt with in the chapter.

11. Financial markets also exist but for simplicity's sake they are not dealt with in the chapter.

12. This implies that the m markets are not neoclassical markets or markets in the sense that variations in the amount of goods and services demanded and sold in the market are not due to variations in the market price.

13. Given radical uncertainty, enterprises will make incorrect production decisions, hence the need for inventories.

14. The purchase of financial assets by business enterprises as a whole is simply a necessary by-product of government expenditures.

15. Because decisions to produce Q_{21} and Q_{2C} may be in part based on financial considerations, such as interest rates and liquidity qua existing financial assets, the economy delineated in this chapter meets Keynes's criteria for being a monetary production economy.

16. Of course they may indirectly through the state affect a command of the goods they consume and hence affect their own social provisioning process. However, the capitalist state limits this possibility so the only question is whether the actual government goods made available are those actually wanted by workers as opposed to imposed upon them by capitalists.

17. It must be noted that production is a complex process in which capitalists qua managers engage; thus within the context of the capitalist system they contribute to production. Withdrawal of either workers or capitalists from the production process under capitalism means that production would cease. However, the point being made is that workers have no control over producing capitalist profits because it is only when production for profit occurs that workers gain the money income needed for access to their material reproduction. In an alternative economic system, the class of capitalists qua managers need not exist and production can be carried on solely by workers who would also produce a surplus income that does not come back to them in the form of consumption goods.

18. Stated in this way, capitalism and the capitalist state are not that different from a feudal economy except that the former has rejected any social responsibility for ensuring that all workers have a right to a place in the social provisioning process.

19. If capitalists cannot produce capitalist consumption or state goods and services, they must produce goods and services for workers as a way to gain access to the social provisioning in the capitalist class. Thus, product innovation and development in wage goods and services are little more than a way to gain access to the capitalist social provisioning process; as a by-product, workers might get something useful.

20. This suggests that full employment—that is, access to the social provisioning process for all members of society—is not an inherent component of capitalism and hence not a real concern of capitalists or the capitalist state. Thus, arguments that promote full employment as a national economic policy obscure the "true" interests of the capitalist state.

21. Specifically, we have the following:
$(I - R_{d1}M_{11})^{-1} R_{d1}l_1^*w = p_1$ and $R_{d2}M_{21}[(I - R_{d1}M_{11})^{-1} R_{d1}l_1^*w] + R_{d2}l_2^*w = p_2$. Thus, as long as the structures and agency are given, then p_1 and p_2 exist as solutions, which means that the price model in internally coherent.

22. $M_{11}^m \neq 0$ as long as m is finite, which means that a commodity residual exists. This result means that prices, wage rates, and profit markups are not based on relative scarcity and hence are not scarcity indexes.

23. From note 21, we find that each price is equal to a row vector of non-price coefficients (which include profit markups) times the wage rates. Hence an equal percentage increase in wage rates will generate the same percentage increase in prices, leaving the coefficients unchanged. On the other hand, if profit markups increase, the coefficients and hence prices increase, resulting in an increase of the price-wage rate ratio.

24. The argument here is an extension of the argument by Keynes in which he dismissed the neoclassical notion that the labor market determines employment. If effective demand eliminates the neoclassical labor market, it also eliminates the neoclassical product market.

25. This point implies that in a capitalist society, differential access to the social provisioning process necessarily means a differentiation of consumption goods (as opposed to a single homogeneous consumption good). If culture, age, gender, climate, and topography are also taken into account, then it is clearly impossible to aggregate across consumption goods to generate a single homogeneous consumption good. Only by having a differentiated set of consumption goods is it possible to explore the relationship of class, gender, family, race, and culture to the social provisioning process.

26. It is possible to explore the same issue through varying the capitalist propensity to consume out of profits. But since this propensity is tied to the reproduction of the capitalist class, the analysis will be more complex.

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3

Macro Effects of Investment Decisions, Debt Management, and the Corporate Levy

Elettra Agliardi

In Eichner's micro-macro synthetic model, the critical variable is planned investment. Business enterprise and its investment decisions play a key role in the determination of aggregate demand, which is the driving force of the economic systems in post-Keynesian economics. In Eichner's view, firm-level investment and hence effective demand are strictly correlated with a firm's pricing decision (Kregel 1978; Lee 1998). Within the post-Keynesian tradition, which stresses the primacy of retained profits as a means of financing investment, Eichner's new idea is the proposed refinement of the markup: it depends on the demand for and supply of additional investment funds by the firm (or group of firms) that possesses the price-setting power—that is, the megacorp—which is the representative agent of the dominant oligopolistic industry in the "technically more advanced sectors of the economy, those in which just a few large firms dominate the market" (Eichner 1991, 6). In this context, price is a variable to alter intertemporal flows, and, because of its degree of market power, the megacorp can increase price above costs in order to obtain more internally generated expenditures. Indeed, prices are set to provide enough retained earnings that, along with external financing, will enable large corporations to implement their planned investment. The extent to which planned investment takes place depends on long-term expectations regarding product markets and on short-run expectations that relate to the prices of financial assets (Arestis 1996). This represents a first crucial result in Eichner's model. Holding costs constant and ignoring changes in the supply

conditions of investment, planned investments determine the industry price level, but planned investments are also the key element in the Keynesian system which, for given monetary conditions and ignoring both the public sector and the rest-of-the-world sector, determine aggregate demand. This idea of relating the variable to be explained at the industry level to the same variable that is the key determinant at the aggregate level provides microfoundations of macrodynamics within a framework that is genuinely post-Keynesian.

While recognizing the fundamental role of investment in Eichner's model, the post-Keynesian economics debate on investment expenditure, which has focused on two issues mainly, the role of uncertainty and the role of internal finance (Stockhammer 2004), has stressed that his analysis remains incomplete as far as a grounded theory of investment is concerned. In Eichner's analysis, both uncertainty and the timing of investment are lacking. Yet both issues are crucial for a correct understanding of the evolution of economic systems.

Actually, in his work *Macrodynamics of Advanced Market Economies*, Eichner emphasized that there are characteristics of business investment that make this type of expenditure especially important insofar as the macroeconomic behavior and the cyclical movements of the economic system are concerned and that cannot be missed in a theory of investment. In particular, a crucial characteristic is

> the postponability of investment expenditures. A firm can decide either to add new plant and equipment immediately or else wait for a more propitious moment. It can even postpone the purchase indefinitely. Whatever the firm decides, however, it will not be prevented from continuing to operate at its present level—for it will still have its existing capacity. The postponability of business investment without impairing the firm's current ability to operate is, in turn, what marks this type of spending as discretionary and thus a problematical factor insofar as maintaining the circular flow of funds is concerned. (Eichner 1991, 104)

Still, such a characteristic of business investment becomes "a critical one to explaining the cyclical movements of the economy" (104). Unfortunately, in Eichner's model of pricing and investment decision, the postponability of investment expenditures and, more generally, the discretionary choice about the timing of investment are not incorporated.

Post-Keynesian economists recognize that the economic decision process is characterized by fundamental uncertainty about an unknowable, transmutable reality (Fontana and Gerrard 2004). Uncertainty is an inherent aspect of events viewed in historical time (Arestis 1996). Uncertainty is the inevitable outcome of the sequential decisions and actions of individuals and organiza-

tions, the actual consequences of which are known only in the future (Hicks 1982; Shackle 1955). Keynes himself sought to move beyond the orthodox theory of economic behavior by encompassing the theory of decision-making under conditions of risk within a more general theory that allowed for a broader conception of uncertainty to include fuzzy probability distributions and a more general framework that focuses on degrees of belief, state of confidence, imaginations, and expectations.

The model of pricing offered by Eichner (1973, 1976, 1991) to provide a microfoundation of macroeconomics is determinate and deterministic. Downward claims that Eichner—together with those economists who offer determinate accounts of pricing, such as Asimakopulos, Cowling, and Waterson—presents a closed-system view of pricing. As a result, through his assumptions, "the model does not present the pricing decision in an uncertain context; the impact of expectations on pricing decisions is not emphasized; and the rationale for the pricing formula used by firms does not rest in this state of affairs" (Downward 2000, 214). By contrast, the essence of uncertainty in post-Keynesian economics is grounded in a nonergodic, nondeterministic world understood as an open system.

In this contribution we propose a direction of research to justify price-setting according to the markup that extends Eichner's results on pricing theory to the case of uncertainty and that derives markup as part of the investment decisions. We analyze investment as discretionary expenditures, incorporating uncertainty, timing, and the role of internal finance. Moreover, we extend our analysis to investigate how debt policy affects the pricing rule in an uncertain environment, in view of the fact that, although debt is a relevant means of financing, post-Keynesian models have offered only little insight into this question.

The rest of this chapter is organized as follows. The second section discusses investment and pricing decisions; the third section extends the analysis to study debt management; the fourth section contains a few macro implications and concluding remarks; and finally, the fifth section summarizes.

The purpose of this contribution is to present an analysis that extends Eichner's results and that is based on a grounded theory methodology that provides "a more complex analytical explanation or interpretation of the actual economic events represented in the data" (Lee 2002, 796).

Investment and Pricing Decisions

Following Eichner's notation, let us specify the main elements that we will show are the determinants of the price level. Let *FC* denote the fixed costs, *VC* the variable costs, and *CL* the "corporate levy." The cost of production includes

both direct, or *VC*, and indirect, or *FC*. The megacorp's *VC* are assumed to be constant up to capacity (or, at least, they do not vary significantly within the relevant limits of engineer-rated capacity). Thus, over the likely range of output levels, average variable costs (*AVC*) are constant. The "corporate levy" is a key element in Eichner's analysis. It is defined as the amount of funds available to the firm from internal sources to finance investment expenditures. It includes cash flows, but also what is spent on research and development, advertising, and other sunk costs to enhance the megacorp's long-run position. Basically, it can be defined as the difference between the total revenue and the payments the megacorp is obliged to make. It is an amount deliberately decided upon by the firm so that it will have sufficient internal funds to achieve its long-run investment objectives.

The first problem we are going to study concerns the timing of investment; that is, at what point it is optimal for the firm to incur the discretionary expenditures out of internal funds (*CL*) to finance investment. The framework we consider is a dynamic and stochastic setting, which characterizes the planning period of the firm. In Eichner's model, with the pricing decision inextricably linked to the investment decision, the planning period—that is, the time horizon for capital expenditures—corresponds to the long run. "In deciding what price should prevail, the megacorp cannot avoid peering at least that far into the future" (Eichner 1976, 65). Our model is a continuous time one with infinite horizon.

At each instant we can specify the cash flows net of the corporate levy of the megacorp as follows:

$$V - (FC + VC + CL)$$

where, *FC*, *VC*, *CL* denote fixed costs, variable costs, and the corporate levy measured in unit time and the revenues *V* are supposed to follow the geometric Brownian motion:

$$\frac{dV}{V} = \alpha dt + \sigma dW$$

where dW is the increment of a standard Wiener process, $\alpha \geq 0$, and $\sigma \geq 0$ measures the volatility. Expression (1) is clearly an abstraction from real economic processes. However, it is in keeping with most empirical evidence and consistent with long-run growth, in that α is the expected rate of growth of *V* and σ measures the size of the stochastic disturbances. Expression (1) implies that the current value of *V* is known, but future values are lognormally distributed with a variance that grows linearly with the time horizon. Although the choice of a determinate probability distribution may be subject to criticisms, especially by

post-Keynesian theorists asserting that critical realism provides the philosophical framework for post-Keynesian methodology (see, for example, Arestis 1992; Dow 1992; Downward 2000; Lawson 1994), it will be shown later, in Remark 5, that our results may be obtained in a fuzzy environment as well.

Since we are mainly interested in determining how the level of V affects investment and V evolves stochastically, our investment rule will not specify a time, but will take the form of a critical value V^* such that it will be optimal to invest once $V > V^*$.

Denoting by $F(V)$ the value of the megacorp, from standard techniques (see Dixit 1993) we get the following differential equation:

$$\frac{1}{2}\sigma^2 V^2 \frac{d^2 F(V)}{dV^2} + \alpha V \frac{d F(V)}{dV} - r F(V) + (V - (FC + VC + CL)) = 0$$

where r denotes the interest rate at which external funds are available.

A general solution of the homogeneous equation related to (2) can be written as $F(V) = MV^\lambda + HV^{\hat{\lambda}}$, λ], where M and H are constants to be determined and λ and $\hat{\lambda}$ are the solutions to $\sigma^2\lambda^2 + (2\alpha - \sigma^2)\lambda - 2r = 0$, $\lambda > 1$, $\hat{\lambda} < 0$. Since $F(V) \to 0$ as $V \to 0$, we get $H = 0$. Indeed, as revenues are zero, so that there are no prospects of cash flows, the asset should have zero value. Since $\hat{\lambda} < 01$, the power of V would go to infinity as $V \to 0$, and hence we must set $H = 0$. Therefore, the general solution to (2) becomes:

$$F(V) = MV^\lambda + \frac{V}{r - \alpha} - \frac{FC + VC + CL}{r}$$

provided that $\alpha < r$. Analogously, we can find the option to invest as a function of V, denoted by $O(V)$, employing the same techniques as above:

$$\frac{1}{2}\sigma^2 V^2 \frac{d^2 O(V)}{dV_2} + \alpha V \frac{dO(V)}{dV} - r O(V) = 0$$

which is like expression (2), but of course without the last term. Its solution is:

$$O(V) = NV^\lambda$$

where N is a constant to be determined.

In order to obtain the threshold value V^* at which it is optimal for the

firm to incur the discretionary expenditures out of internal funds to finance investment—that is, it is optimal to exercise the option to invest—we need to put the condition $O(V^*) = F(V^*)$: the value of the option must equal the net value obtained from exercising it. Moreover, V^* has to satisfy the optimality condition (or smooth-pasting condition). $O'(V^*) = F'(V^*)$.

In view of (3) and (5) they imply:

$$MV^{*\lambda} + \frac{V^*}{r-\alpha} - \frac{FC+VC+CL}{r} = NV^{*\lambda}$$

and

$$\lambda MV^{*\lambda} + \frac{1}{r-\alpha} = \lambda NV^{*\lambda}$$

and hence

$$V^* = \frac{\lambda}{\lambda-1} \frac{r-\alpha}{r} (FC+VC+CL)$$

Expression (6) gives a rule for implementing planned investment: it will be optimal to invest once $V > V^*$. We can rewrite expression (6) assuming, like Eichner, that the firm operates at normal capacity. Normal capacity is defined as the standard operating ratio multiplied by the engineer-rated capacity ($SOR.$ ERC). While the per unit fixed cost will fall as output increases, an average expected figure can be obtained by relying on the SOR, which is the percent of ERC at which, based on the industry's past history of cyclical movements in output, the megacorp can normally expect to operate. The SOR, when applied to the megacorp ERC, gives an estimate of the firm's expected level of output, and this estimate allows the megacorp to determine the likely cost of production ex-ante; that is, in advance of any actual production. Under the assumption of normal capacity, we can specify fixed costs and corporate levy in terms of the expected output level. Let us denote by AVC, AFC, and ACL the ex-ante per unit or average variable cost, fixed cost, and corporate levy, respectively. Expression (6) can be rewritten as follows:

$$P^* = \frac{\lambda}{\lambda-1} \frac{r-\alpha}{r} (AVC+AFC+ACL) \text{ where } \frac{\lambda}{\lambda-1} > 1 \text{ and } \alpha < r$$

Expression (7) is the fundamental result. It can be interpreted both as a pricing rule and as an investment rule. Notice that $\frac{r-\alpha}{r}(AFC + AVC + ACL)$ represents the equivalent initial cash flow necessary such that the subsequent expected value is to cover the cost of production and investment. Such value is multiplied by $\frac{\lambda}{\lambda-1} > 1$. Expression (7) transforms the option value of waiting

(that is lost if the investment is performed) into an equivalent markup over the direct cost of production and investment.

Remark 1. In a static and deterministic case ($\sigma = 0$ and $\alpha = 0$), expression (7) boils down to $P^* = AVC + AFC + ACL$, which is Eichner's pricing formula.

Remark 2. Since $\dfrac{\partial \lambda}{\partial \sigma^2} < 0$, we get $\dfrac{\partial \frac{\lambda}{\lambda - 1}}{\partial \sigma^2} > 0$: as volatility increases, price P^* has to be increased. In the extreme case of $\sigma 2 \to \infty$, we have $l \to 1$ and $P^* \to \infty$, implying that the firm never invests. Because of uncertainty, there is an additional coefficient $\frac{\lambda}{\lambda - 1} > 1$, which enlarges the size of the markup. On one side, it implies that as the degree of uncertainty increases, the option value of waiting to invest increases as well, delaying investment or requiring an action threshold at which the expected value from investing exceeds the cost. On the other side, it implies that under uncertainty, if the firm will finance investment via internal funds, it has to set a price at a higher level than in a nonstochastic model; that is, the markup increases with the degree of uncertainty.

Remark 3. If AVC and AFC are constant, then from expression (7), we get $\Delta P^* = \dfrac{\lambda}{\lambda - 1} \dfrac{r - \alpha}{r} (\Delta ACL)$; that is, a change in price must reflect a change in the corporate levy. On the other hand, the greater the percentage increase in price, the greater will be the new ACL, and thus the greater will be the additional investment funds generated.

However, the ability to increase the size of the markup in proportion to the increased need for additional investment funds depends on the degree of pricing power. As stressed in Remark 2, the increase in the size of the markup has to be even larger under uncertainty. Yet the markup cannot be increased without any adverse effect. Eichner indicates three major adverse effects from increasing the size of the markup that the firm has to take into account: the substitution effect (that is, the loss of market shares because of competing products); the entry factor (that is, the potential loss due to new entry following price changes); and the possibility of government intervention (in the forms of price controls, special taxes, and so on). Because of these effects, firms are limited in their capacity to set prices at any level, or, alternatively, the increase in the markup is bounded above. The probable loss of future cash flows resulting from these adverse factors is even larger under uncertainty, since the increase in the markup is to be larger in an uncertain environment.

In a regulated industry, a ceiling is placed on the industry price, limiting in fact the corporate levy to little more than a depreciation allowance. Such restriction on generating funds internally is likely to create a problem of finance for regulated megacorps. As Eichner has emphasized, these factors determine a rate of investment below what it would be in the absence of regulation. The regulatory policy implications of our result are even stronger.

Figure 3.1   **Investment Funds**
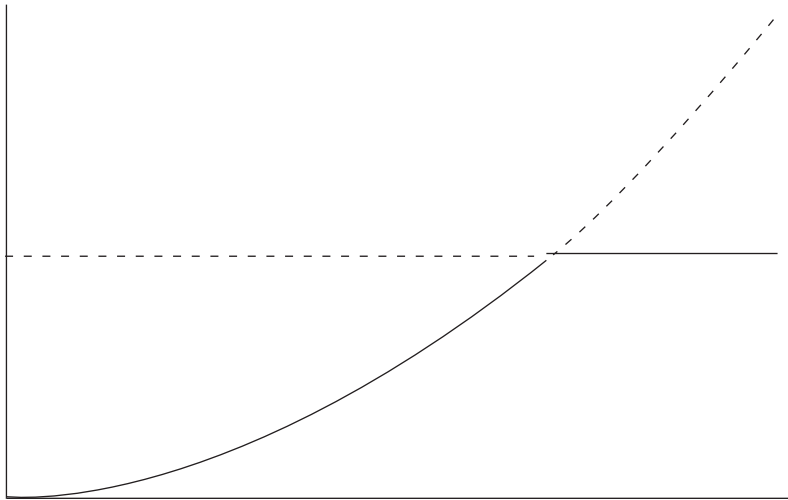
Under uncertainty, the full cost of investment is greater than the direct one that is typically considered by antitrust and regulatory policies and depends on the volatility of market conditions. Analysis based only on direct costs may greatly underestimate the necessary investment funds. Furthermore, the extent of volatility is a basic structural feature of a market that plays an important role in determining the markup, the price level, and the degree of pricing power. Especially in markets that evolve rapidly and unpredictably, ignoring this fact can lead to substantial errors in estimation and thus incorrect conclusions affecting regulatory policies.

Remark 4. Expression (7) holds for $\alpha < r$—that is, provided that the expected return on additional internal funds is not greater than the cost of external funds. The megacorp has the choice of financing any additional investment outlays either internally, by increasing the markup, or externally, by arranging a loan or, more generally, through other financial instruments of the capital market. The first of the two options can be performed as from expression (7) only if $\alpha < r$. Otherwise, if $\alpha > r$, the megacorp can be expected to resort to outside financing for any additional investment funds it may need. This corresponds to an upward sloping curve of internally generated funds up to the interest rate r, and then, if $\alpha > r$, the supply curve of additional investment funds becomes parallel to the horizontal axis at a height equal to r (see Figure 3.1, which can be compared with Eichner's graph [1976, p. 87]).

Remark 5. By using possibility distributions, we can extend the pure

probabilistic decision rule for the optimal investment strategy (7) to a possibilistic context. We need to introduce fuzzy numbers and fuzzy sets (Zadeh 1978). If A is a fuzzy number and $\chi \in R$, then $A(\chi)$ can be interpreted as the degree of possibility of the statement "χ is in A." In particular, in a possibilistic environment, $A(t)$, $t \in R$ can be interpreted as the degree of possibility of the statement "the value of the real variable t is approximately in the interval $[a,b]$, if $A = (a, b, \eta, \varepsilon)$ denotes that the support of A is $supp (A) = (\alpha - \eta,\ b + \varepsilon)$, with $a - \eta$ being the downward potential and $b + \varepsilon$ the upward potential."

We can extend our analysis supposing, for example, that σ is fuzzy number. Let us assume that the most possible values of σ lie in the interval $[\sigma_L, \sigma_H]$—that is, $\sigma_L - \eta$ is the downward potential and $\sigma_H + \varepsilon$ is the upward potential. Then, it can be proved that expression (7) transforms into:

$$\frac{\lambda(\sigma_L)}{\lambda(\sigma_L)-1}\frac{r-\alpha}{r}(AVC+AFC+ACL) < P^* << \frac{\lambda(\sigma_H)}{\lambda(\sigma_H)-1}\frac{r-\alpha}{r}(AVC+AFC+ACL)$$

Thus, we end up not with a determinate pricing formula, but with a fuzzy one.

Debt Management

In the previous section it was shown how the markup is to be set so as to enable the firm to finance all its capital outlays from internal sources. In the real world, however, expansion will be financed by some combination of bank borrowing, direct borrowing from households, and retained profits. Using Eichner's notation, if discretionary funds F are not sufficient to cover the amount of discretionary expenditures E, then the firm has to obtain additional funds by increasing its external debt (D) or issuing equity (Eq) or bonds (B); that is, $E = F + \Delta D + \Delta Eq - \Delta B$. This may especially occur "if the economy is temporary displaced from its secular growth path, thereby creating a short period gap between desired capital outlays on the one hand and the cash flow, or discretionary funds, being generated on the other hand" (Eichner 1991, 472).

While we believe that the role of bank credit to expand production has been analyzed in sufficient detail within post-Keynesian economics [see the recent contributions by Rochon (1999) and Lavoie and Seccareccia (2004)] by contrast, little insight has been given for the case of direct finance (equity and bonds). "Somewhat surprising is the fact that, although post-Keynesian monetary economics has been researched quite substantially, finance theory remains considerably underdeveloped" (Arestis 1996). Therefore, in what follows we will examine this latter case in depth; in particular, we

will study the interesting case, when the problem of finance may take on the character of a crisis, threatening the viability of the megacorp, if the cyclical downturn is unusually sharp or prolonged. Should the megacorp be unable to make the required payment on its obligations, it is likely to face bankruptcy or, falling short of that, to face reorganization or closure. Our objective is to study the debt policy together with the pricing policy that will avoid such risk.

For this purpose, let us elaborate on the setting we used in the previous section. As before, the revenues V are supposed to follow a geometric Brownian motion:

$$\frac{dV}{V} = (\alpha - \delta)dt + \sigma dW$$

where we introduce constant dividends δ that have to be paid to shareholders; for a justification of constant dividends, we refer to Eichner (1976) and Lavoie (1992). The introduction of the dividend will allow us to offer insight into the question of what effects an increase in the shareholders' power may produce (see Remark 7). As V falls because of the cyclical downturn, the firm will at some point close down.

The firm is financed by issuing debt. For simplicity's sake, let us suppose that debt promises a perpetual coupon payment C, whose level is constant unless the firm defaults on the coupon payment and declares bankruptcy. Let V denote the level of asset value at which bankruptcy is declared. In this case, the debt holders receive the value of the unlevered asset net of bankruptcy costs. Bankruptcy costs are assumed to be proportional to the unlevered asset value, with known proportion β, where $0 \leq \beta \leq 1$. The firm is run by a manager who sets the debt policy and the closure policy.

We can now specify the payout policy when debt is risky. The payout policy to debt holders is the following:

$$
\begin{array}{ll}
C & \text{if } V > \overline{V} \\
(1-b)V & \text{if } V \leq \overline{V}
\end{array}
$$

while the megacorp's value is the residual value:

$$
\begin{array}{ll}
V - (FC + VC + CL) - C & \text{if } V > \overline{V} \\
0 & \text{if } V \leq \overline{V}
\end{array}
$$

where $\overline{V}$ denotes the firm's liquidation trigger value. Notice that debt issuance affects the value of the firm because of possible bankruptcy: if bankruptcy occurs, a fraction $0 \leq \beta \geq 1$ of value is lost because of bankruptcy costs,

leaving debt holders with the value $(1 - \beta)\ \bar{V}$. Debt holders are senior claimants: thus, in the case of bankruptcy, the firm is left with nothing as a residual claim.

It is easy to prove that, under our assumptions, the value of the debt holders' claim $D(V)$ satisfies the following differential equation for $V > \bar{V}$:

$$\frac{1}{2}\sigma^2 V^2 \frac{d^2 D}{dV^2} + (\alpha - \delta)V\frac{dD}{dV} + C = rD$$

whose general solution is $\frac{C}{r} + \tilde{K}V^\eta$, if we take the no-bubble condition into account, and with η being the negative root of the characteristic equation $\sigma^2\eta^2 + (2(\alpha - \delta) - \sigma^2)\eta - 2r = 0$. Then we determine K employing the boundary condition $D(\bar{V}) = (1 - \beta)\ \bar{V}$. Thus, we end up with $D(V) = \frac{C}{r}(1-\pi)+(1-\beta)\bar{V}$, and $\pi = \left(\frac{V}{\bar{V}}\right)^\eta$. Notice that π has the interpretation of the present value of one unit of account contingent on future bankruptcy; that is, it is a measure of the probability of bankruptcy (see Leland 1994). Then, the value of the debt is the sum of the face value of the debt multiplied by the probability that the firm is solvent and the expected value of the firm's asset value at bankruptcy, reduced by bankruptcy costs.

Denoting by $F(V)$ the value of the megacorp, we get the following differential equation for $V > \bar{V}$:

$$\frac{1}{2}\sigma^2 V^2 \frac{d^2 F(V)}{dV^2} + (\alpha - \delta)V\frac{dF(V)}{d(V)} - rF(V) + (V\text{-}(FC + VC + CL)\text{-}C) = 0$$

whose general solution is $F(V) = \frac{V}{r-\alpha+\delta} + \left(\frac{-C}{r}\right) - \left(\frac{FC+VC+CL}{r}\right) + HV^\eta$. From $F(\bar{V}) = 0$ we determine the constant H. Finally, we get the optimal closure threshold by solving $\frac{d}{dV}F(\bar{V}) = 0$ for $\bar{V}$, thus obtaining:

$$\bar{V} = \frac{-\eta}{1-\eta}\frac{r-\alpha+\delta}{r}(C + (FC + VC + CL))$$

Since $\eta < 0$, we get a liquidation threshold $\bar{V} \geq 0$. Notice that, since $\delta_\sigma \bar{V} < 0$, an increase in the volatility decreases the liquidation threshold. The economic intuition is that, as volatility increases, so does the value of the firm; therefore, closure is delayed.

As in the previous section, we can rewrite expression (12) under the assumption that the firm operates at normal capacity. Now expression (12) becomes:

$$\overline{P} = \frac{-\eta}{1-\eta}\frac{r-\alpha-\delta}{r}(C\text{'}+(AFC+AVC+ACL))$$

where C' denotes the normalized.

Remark 6. In the presence of debt service ($C > 0$) the optimal closure point is greater than without debt service ($C = 0$); that is, a levered firm closes early. Put another way, debt speeds up closure. Alternatively, the megacorp has to set price at a higher level in order to avoid closure if it has issued debt. As the cost of debt service increases, so should price increase $\left(\frac{\partial \overline{P}}{\partial C'} > 0\right)$; alternatively, if price cannot be increased, an increase in the cost of debt service will, in turn, reduce the amount of funds available for capital outlays.

Remark 7. Since $\frac{\partial \overline{P}}{\partial \delta} > 0$, an increase in the shareholders' power (measured by an increase in the dividends) will speed up closure; alternatively, the megacorp has to set price at a higher level in order to avoid closure. If price cannot be increased, an increase in the shareholder power leads to a reduction in the amounts of funds available for capital outlays, hence a decrease in investment. Such result is also obtained by Stockhammer (2004) in a different framework. In the aggregate, this implies that, for given prices, an increase in shareholder power is consistent with a decrease in the investment/profit ratio, a stylized fact that is widely documented by Stockhammer (2004).

A Few Macroeconomic Implications

Eichner extends his analysis to explore the determinants of growth. The dynamics of his model derives from the substantial market power that the megacorp possesses. As in most post-Keynesian economics literature concerned with growth and dynamics, his method consists of modeling the economy in historical time and in disequilibrium to represent "an economy that is growing over time in the context of history" (Arestis 1996).

The megacorp and the oligopolistic subsectors play an all-important role in the determination of aggregate investment demand and hence aggregate demand. Aggregate investments depend on the secular (and thus the expected) rate of growth of output. Assuming that households savings are more or less constant, the critical savings decisions are made by the megacorp. In the previous sections it was argued that, as planned by the megacorp, savings should equal investment, for the price level is set so as to provide enough funds for whatever investment expenditures are contemplated during the planning period. Yet the amount of funds actually realized depends on the current level of aggregate demand and on the current rate of growth of aggregate output, which may diverge from the expected one. Therefore, savings and investment may actually diverge.

Put another way, in terms of economic dynamics ex-ante discretionary expenditures and discretionary funds are determined with regard to the secular growth rate, and "the society, through its political system, can choose the secular growth rate it wishes, provided that it is not in excess of the potential growth rate of the economy" (Eichner 1976, 222). However, in some circumstances, it is possible for savings and investment to diverge ex post in the short run. For instance, in periods of extremely tight money the megacorp might be forced to defer investment outlays; moreover, as we showed in the second section, deferral becomes more likely in an uncertain environment, a case not contemplated by Eichner himself. In these cases, there will be a discrepancy between the secular and the actual growth rate.

Investment and savings, though apt to diverge in the short run, give rise to a self-correcting economic adjustment. The adjustment process works through the markup, which acts as an automatic stabilizer. In the expansionary phase of the cycle (when the actual growth rate is larger than the expected one), savings are likely to be greater than the current level of investment: the markup is reduced with a dampening effect on the level of sales. In the contractionary phase of the cycle (when the actual growth rate is smaller than the expected one), the reverse will be the case, the excess of investment over savings giving rise to an increase in the markup in order to eliminate the deficiency of savings.

The dynamic adjustment of investment and savings can be represented in the diagram in Figure 3.2, where we put the rate of growth of output on the horizontal axis and the investment and savings curves on the vertical axis. The thick line represents savings, while the normal line represents investment. Notice that the stability of the resulting growth process depends on the relative sensitivities of investment and savings to changes in the rate of growth: in Figure 3.2 savings are more sensitive that investment. On the contrary, if investment were more sensitive than savings decisions (that is, in the geometry of macrodynamic balance, if investment is steeper than savings), then the process of growth would be unstable. Obviously, the question about the relative slope of both investment and savings curves remains a relevant one, which has to be solved on empirical grounds mainly.

Thus, we end up with a fundamental result in Eichner's analysis, concerning the two functions of the markup. On the one hand, the markup provides the necessary internally generated funds to finance current capital spending plans according to the desired expected growth rate. On the other hand, the markup has an automatic stabilizer function in the dynamic adjustment of investment and savings; that is, it is the key variable that makes it possible to approach the secular growth rate and, eventually, to maintain it indefinitely.

In essence, the markup plays the role of the source and the motive for ac-

Figure 3.2   **Dynamic Adjustment of Investment and Savings**
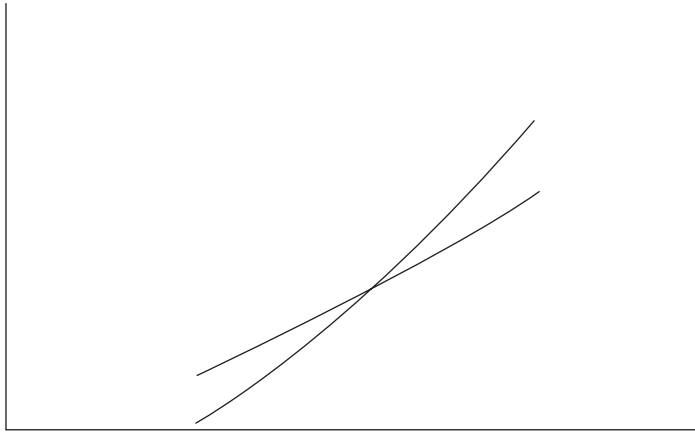
cumulation. Such an observation is at the basis of the following most relevant self-reinforcing mechanism in economic systems.

The expansion of the firm depends on its accumulation of capital. Large, wealthy firms can finance new investment projects by retained earnings and/ or external resources, having access to a great deal of cheap finance. The internal accumulation of capital provides resources that can be put back into the business enterprises. As a consequence, they perform a larger growth rate of sales and output, hence a larger degree of monopolization. Thus, monopoly and the dominant position of the megacorp are the resulting outcome of a self-reinforcing mechanism. Such an evolutionary viewpoint, with its emphasis on the role of institutions—the megacorp, in particular—provides a more realistic analysis of business enterprise and its consequences for the overall economy. It is in keeping with the post-Keynesian economics view that emphasizes the nonergodic nature of economic processes; that is, the idea that *history matters* in the sense that the equilibrium outcomes are path-dependent and the economy never returns to its original state. Path-dependency characterizes economic processes, so that the long period becomes a sequence of short periods, its eventual outcome dependent in part on the initial conditions; furthermore, the irreversibility of past decisions and the uncertainty of the future affect the choice of the size and the composition of capital.

The above theory of pricing and investment is consistent with a realistic representation of the economic system as a world of evolution rather than equilibrium, of process and pattern change. Finally, it suggests that the economic analysis of effective demand should be centered on the firms' strategies to

understand how capitalist economy works. Neglecting the micro level would prevent us from grasping their implications and significance for macroeconomics and for policy interventions.

Conclusion

This chapter revisits Eichner's pricing theory and discusses his main findings about investment and financing decisions in a more general and complex framework. We build on and extend Eichner's model to an environment characterized by uncertainty over the future rewards from economic activity. By means of an elaboration of Eichner's model we study the timing of investment, namely the ability to postpone action to get more information about the future, the financeability of business investment, and the implications of risky debt on the viability of the firms. Remarks 1 to 7 summarize our main results. We show that Eichner's analysis can be reinterpreted in our more general setting with a robust methodology both on a micro level and on a macro level.

Although our analysis does not lend itself to straightforward policy conclusions, it suggests that the insights offered by Eichner's contribution and its developments are still fruitful to explain modern capitalist economies and still have much to offer for antitrust and policy interventions.

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4

Pricing and Financing of Investment

Is There a Macroeconomic Basis for Eichnerian Microeconomic Analysis?

Mario Seccareccia

I first met Alfred Eichner when I was still a McGill University doctoral student attending a conference on post-Keynesian inflation and employment theory, organized by Paul Davidson at Rutgers University in April 1977. That initial contact with him seeded in my mind the proposition that inflation had to do neither with the quantity of money (in accordance with the ubiquitous monetarist credo of the time) nor with labor market phenomena per se (as depicted in the original Phillips curve analysis of the labor market). Our subsequent meetings cemented a relation that continued from the late 1970s, when he was still teaching at the State University of New York (in Purchase, New York), through the 1980s, when he was at Rutgers University (in New Brunswick, New Jersey), until his untimely death (in Closter, New Jersey) on February 10, 1988. During that memorable decade, we met several times, including at three conferences held at the University of Ottawa in March 1981, November 1983, and October 1984.

On the basis of his epistemological rule of correspondence with real-world phenomena to which he had always subscribed (see Eichner 1983), Eichner insisted that the price-setting behavior of business firms, primarily megacorps, was of critical importance in aggregate price formation. For this reason, not only did he reject mainstream monetarist views popularized by Milton Friedman during the 1970s but also he felt somewhat uncomfortable with the writings of certain post-Keynesian writers, such as Sidney Weintraub, whose questionable assumption of a constant macroeconomic markup brought the latter to favor an explanation of inflation based exclusively on the behavior of wages. For Eichner, what was needed was a theory of macroeconomic price

formation that could reconcile the microeconomic fact that, while labor costs do matter in price setting, firms do vary their markups over time to achieve desired goals and microeconomic decisions have macroeconomic outcomes relating to the inflationary process.

This chapter purports to explore this Eichnerian theory of price formation within an explicit monetary theory of analysis in which money supply determination is demand-led and an outcome of credit advances to business enterprises. This conception of the money supply process to which Eichner explicitly subscribed is of critical importance to an understanding of the role of the markup as an instrument of internal financing of investment. In this chapter we shall see that, while Eichner understood very well the nature of credit money resulting from the endogenous interaction between the banking sector and business enterprises, he did not always derive the full consequences of his analysis in explaining the implications of the internal financing of investment via markup pricing and the so-called corporate levy. Because of this, Eichner understood very well the post-Keynesian and circulationist approach to money, but, because of his espousal of classically based microeconomic theories of pricing, the latter prevented him from fully exploring the macroeconomic nature of internal financing in an advanced monetary economy.

Conceptualizing Internal Financing Within an Endogenous Money Perspective

In his *Macrodynamics of Advanced Market Economies* (1987a), Eichner declares clearly that all modern monetary economies are credit-based systems of money. Unlike quasi-barter or "commodity money" systems in which a numéraire money circulates because of its physical characteristics in facilitating exchange (as in the famous Mengerian nineteenth-century fable on the origin of money), in a modern credit money system money appears simply as the result of a balance sheet operation in which buyers and sellers engage in economic transactions via the liability of a third agent, a commercial bank, and with payment normally being made by check or bank draft (Eichner 1987a, 806). Every transaction is thus simultaneously a balance sheet process leading to a creation or destruction of money. In such a system, the amount of money in circulation depends neither on the physical scarcity of precious metals that could serve as circulating media nor on the exogenous action of the central bank to issue fiat money. By its very essence, this bank debt is endogenous since it has no prior existence and is the result of demand for credit. Indeed, the amount of funds circulating in an economic system depends primarily on the need by business enterprises to finance their short-term credit or working capital requirements (810). Naturally, Eichner did recognize that, as long

as there is a residual stock demand for currency by the public, whether it is in the form of commodity money, as in earlier times, or fiat money in more modern times, banks may also hold reserves for both precautionary or legal reasons, but this "base money" can be neither the basis for nor a constraint on money creation.

The modern payment system ensures that all economic units must ultimately transit through the financial sector, whether it is households, firms, or government. An economic unit desiring to engage in a transaction has two options. It can drain its own stock of liquid holdings (say, bank deposits) or it can borrow funds and go into debt. If the economic agent uses some of its accumulated deposits to purchase a good or pay taxes, the effect is to reduce the net debt of the receiver of the funds (say, a firm or the government), which would entail the destruction of credit money in the system. Alternatively, the agent can borrow, in which case other economic units would be accumulating assets as the accounting counterpart of the agent's increased indebtedness and credit-money creation.

The borrowing and lending relation was of critical importance to Eichner's conceptualization of the macroeconomic system and in the late 1970s this brought him to see the work of the new Cambridge economists (see Cuthberston 1979) as a positive contribution to monetary macroeconomics. This was especially true of the analysis of Godley and Cripps (1983), which he not only cited approvingly but also made great use of in his own *Macrodynamics of Advanced Market Economies* and elsewhere. For instance, Arestis and Eichner (1988) describe an aggregate balance sheet relation in which changes in the stock of total deposits (ΔTD) are mirrored by changes in bank lending to the public (ΔBLP), changes in bank lending to the government (ΔBLG), and changes in bank lending to the overseas sector ($\Delta BLOS$). Any variation in the volume of loans would instantaneously be reflected in variations in the volume of deposits, and, conversely, any changes in the volume of deposits would have as accounting counterpart a change in the amount of indebtedness in an economy. Assuming that bank lending to the public (ΔBLP) is simply the sum of bank lending to industry (ΔBLI) and bank lending to consumers or households (ΔBLC), it follows that net monetary creation (ΔTD) is:

(1) $$(\Delta TD) = (\Delta BLI) + (\Delta BLC) + (\Delta BLG) + (\Delta BLOS)$$

Abstracting from the complication of lending overseas (and related exchange rate issues that could necessitate more extensive qualifications), we get:

(2) $$(\Delta TD) - (\Delta BLI) = (\Delta BLC) + (\Delta BLG) \, (\Delta TD)$$

From this it ensues that an increase in business saving—that is to say, a reduction in a firm's indebtedness (– ΔBLI)—would merely be reflected in a concomitant decline of total credit. Indeed, as Eichner himself makes clear: "The only way the amount of funds circulating as checkable deposits can be increased is if some nonfinancial sector is prepared to increase, not its net savings but rather, its net debt" (1987a, 824).

This simple framework, adapted from Arestis and Eichner (1988) as well as from Eichner (1987a), shows that, at the macroeconomic level, the flow of business saving can never be a source of financing but is merely the accounting counterpart of the net spending of some other sector in the economy that has gone into debt in relation to the banking sector. While recognizing this obvious accounting relation, Eichner argued that ΔBLI was itself a function of a number of variables, including the ratio of industry's discretionary expenditures (investment) over industry's discretionary funds (or business savings/retained earnings) (Arestis and Eichner 1988, 1010). It is the role of the latter in the determination of ΔBLI that raises a number of conceptual issues within the monetary context previously discussed. This is because Eichner saw business firms' markups as the instrument to achieve a certain cash flow needed to finance discretionary expenditures via retained earnings. This connection, whereby Eichner seems to establish formally that business saving is a mechanism to achieve a certain level of business capital expenditures, is highly controversial. In what sense is business saving necessary for the "financing" of business investment? While the higher cash flow may encourage firms to engage in greater future investment spending, as was pointed out by Deprez (1992), business saving can be no more a macroeconomic source of financing than can household saving. Indeed, as Eichner himself well understood from his flow of funds analysis, a higher cash flow merely extinguishes debt of the corporate sector at the expense of other sectors, whose levels of indebtedness would be rising in relation to the business sector. However, before exploring further this issue, let us first analyze Eichner's theory of internal financing of investment.

Pricing, Internal Financing, and Investment

In 1937, Michal Kalecki had already suggested that, because of the problem of increasing risk, large corporations had a net preference for the internal financing of their capital spending—a phenomenon of internal financing first considered by Kalecki and well recognized by Eichner (1987a, 436). This link between pricing and growth was further explored by one of Kalecki's students, Josef Steindl, in the 1950s. However, it was not until the 1970s that these ideas were most rigorously examined and theorized by a

number of post-Keynesian writers, namely Eichner (1973, 1976), Adrian Wood (1975), and Geoff Harcourt and Peter Kenyon (1976). Pursuant to his early work on business concentration and on the emergence of oligopoly in the U.S. sugar refining industry—where he had first introduced the concept of the megacorp and studied its actual historical behavior (Eichner 1969)—it was Eichner who is most directly associated with the theory of the determination of a variable markup as a function of desired investment. As he put it so succinctly at the very beginning of his book *The Megacorp and Oligopoly*:

> In the oligopolistic pricing model that follows, a change in the industry price level is held to be a function, costs remaining constant, of a change in the rate of growth of investment relative to the rate of growth of internal funds generation. . . . It is this crucial link between the pricing decision and the investment decision which, among other things, sets this oligopolistic model apart from others. (1976, 2–3)

Based on a model of oligopoly cum price leadership, he had developed what seemed to him the elemental post-Keynesian foundations of the macrodynamics of investment and prices.

His solution was to endogenize the megacorp's profit margin (its target return or, to use Eichner's terminology, its "corporate levy") and tie it to its business long-term goal of achieving a desired rate of capital accumulation and growth. Such a goal could properly be achieved only by devising an appropriate mechanism (or decision rule) that would ensure a suitable proportion of internal and external financing of investment desired by the megacorp.

Eichner did this by essentially modifying and extending Keynes's well-known analysis of investment laid out in Chapter 11 of the *General Theory*. Given the firm's demand for additional investment funds (a demand relation reflecting the familiar schedule of the marginal efficiency of investment which indicates the future additions to the firm's cash flow expected from additional investment), the megacorp faces a kinked, albeit upward-sloping, supply curve for additional funds, represented in Figure 4.1. More precisely, instead of using the traditional textbook opportunity cost analysis that pits a given external cost of borrowing (*i* in Figure 4.1) to the demand for added investment funds, Eichner developed an approach that included the possibility of generating additional funds by means of internal financing via a greater markup.

According to Eichner, the upward-sloping segment of this internally generated supply of funds curve in Figure 4.1 reflects the fact that there are three constraints faced by a megacorp that could prevent it from continuing

Figure 4.1   **Eichner's Graphical Analysis of the Demand for and Supply of Additional Discretionary Funds**
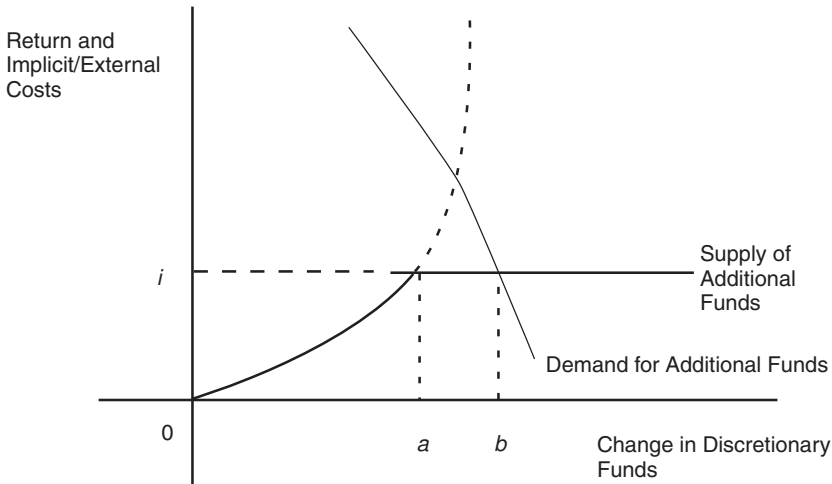
to raise the markup: (1) the substitution effect; that is, the assumption that, given the cross elasticity of demand, customers may increasingly opt for substitute products as prices are increased; (2) the entry factor; that is, the fear of attracting new firms into the industry as prices and cash flows rise; and (3) government intervention in the form of antitrust prosecution as the higher prices attract more public scrutiny (Eichner 1987b, 1577). This growing implicit cost could at some point reach a crucial level at which the firm would find it more advantageous to borrow externally from the banking sector, at the interest rate i in Figure 4.1, than to continue to raise funds internally through a higher markup (represented by the broken upward-sloping extension). Hence, as we can see in the figure above, the effective supply curve for additional funds is the continuous line going upward from the origin and then becoming horizontal at the interest rate i, with its upward-sloping portion representing the firm's degree of pricing power (Eichner 1987a, 486–487). The steeper the slope of the upward portion of the supply curve, the lower would be its pricing power and the more quickly the megacorp would exhaust its ability to finance internally its investment and resort to borrowing from the financial sector. For a given demand for funds, Eichner's framework offers a simple decision rule regarding the amount of internal versus external financing of investment. Given the rate of interest, the total financing of investment measured as $0b$ on the abscissa would be divided so that $0a$ is internally financed via a higher markup, while ab defines the additional funds borrowed externally at the interest rate i to achieve the desired investment $0b$.

Eichner's novel analytical structure was celebrated by numerous post-Keynesian writers (see, for instance, Reynolds 1987) for having offered a realistic and coherent structure of price formation that could explain the apparent empirical fact that price-cost spreads seem to vary somewhat pro-cyclically. However, there was some underlying uneasiness with his analysis since it posed a serious analytical problem of how to go from the micro behavior of the megacorp to that of the corporate sector as a whole.

Micro-Macro Link

Eichnerian analysis seems to rest on a fairly simple and powerful idea. Firms target a specific cash flow, or corporate levy, that is then used to "finance" a certain level of desired investment. Financial conditions, reflected in the level of interest rates, can affect merely the proportion of total planned investment that is financed either internally or externally; the level of investment demand is itself largely autonomous and affected by entrepreneurial animal spirits and/or accelerator effects. At this level, Eichner's microanalysis is quite solid and highly appealing theoretically, especially since the phenomenon of internal financing is also an important reality of large enterprises. It is when this microeconomic analysis is extended to the macroeconomy that conceptual ambiguities appear.

Eichner was undoubtedly aware that he was part of a post-Keynesian movement in the 1970s, which included such famous post-Keynesian economists as Sidney Weintraub (1978), who were offering an alternative explanation of the high inflation of the period based on an unconventional cost and/or "profit push" hypothesis—an approach that was in direct conflict with the neoclassical monetarist view (Eichner 1980a, 129). While many of these other post-Keynesian economists emphasized the evolution of costs (whether prime or overhead costs) in explaining aggregate price formation, Eichner pointed primarily to the behavior of the markup of the megacorp in impacting overall price formation.

However, there was perhaps an even more important motivating factor for Eichner in bringing forth an analysis that served to bridge the tenuous micro-macro gap in post-Keynesian theory. He believed that he had discovered the "common bond" that unified post-Keynesian micro- and macroeconomic analysis via the role played by investment. This commonality of investment as a causal variable was an important characteristic of post-Keynesian theory. He summarizes:

> A common bond between the micro model set forth above and post-Keynesian macroeconomic theory . . . is the emphasis which they both

place on *ex ante* investment as the critical factor. In the Keynesian system
it is the variable which, holding monetary conditions constant and ignoring
both the government and rest-of-the-world sectors, determines aggregate
demand and, hence, the level of national income. In the micro model de-
veloped above it is the same variable which, holding costs constant and
ignoring changes in the supply conditions of investment funds, determines
the industry price level and, hence, the price level in the oligopolistic sector
of the economy. (1976, 190)

Hence, for the emerging post-Keynesian paradigm that he himself was seeking
to better delineate (see Eichner and Kregel 1975), autonomous investment
was now conceived as the *causa causens* behind both income growth and
price formation.

Being conscious of the dangers of suggesting that saving can be either a
cause or a constraint on investment, Eichner was very careful to emphasize
the primacy of investment over saving in opposition to classical and neoclas-
sical analysis. In fact, Chapter 6 of his *Megacorp and Oligopoly* (1976) is a
clear testimony to his strong defense of this critical pillar of post-Keynesian
macroeconomics. Since investment is the causal factor determining the flow
of saving at the macroeconomic level, the role played by corporate pricing is
merely to determine the distribution of aggregate saving among the various
sectors of the economy: firms, households, and even government. Conse-
quently, with investment being predetermined, a higher markup cannot *in
esse* entail a higher flow of investment but merely higher corporate saving
or retained earnings, with the higher business saving being achieved at the
expense of, for instance, lower household real income and personal saving.

Yet this is not always so clear in his writings. There are times when his
vocabulary is laden with a certain ambiguity. For instance, he writes:

As post-Keynesian macrodynamic theory points, there can be no increase
in the aggregate growth rate unless there is an increase in the relative pro-
portion of national income that is saved (and simultaneously invested). . . .
When the aggregate growth rate increases, business firms may therefore
have good reason to raise their prices, for the higher prices will enable the
business sector to finance from its own increased cash flow the higher rate
of investment which the higher growth rate necessitates. (1980a, 129)

Similar statements relating to the need to finance investment via corporate
retained earnings can be found in his analysis of the corporate economy at the
macro level, especially with regard to the distinction between the "internal"
and "external" financing of investment outlays (Eichner 1985, 47 et seq.).

While recognizing the simultaneity of saving and investment, his frequent assertions that it is corporate saving that is needed to "finance" investment do raise some alarm bells. In fact, a great deal of the discussion in Chapter 7 of his *Macrodynamics of Advanced Market Economies* on the need to generate discretionary funds in the corporate sector to "finance" investment expenditures could mislead the reader to think that Eichner was defending the traditional classical causality. Since his monetary analysis categorically rejects the classical saving-investment causality, it would be difficult to conclude, at least at the monetary macroeconomic level, that Eichner was ever seriously confusing the Keynesian vis-à-vis classical structure of causality.

However, his analysis would clearly have benefited from a more careful explanation of what he meant by "finance," possibly by distinguishing between "initial" and "final" finance as, for instance, was done in the late 1980s by Augusto Graziani (1987, 1990) within the framework of the monetary circuit. Hence, while initial finance is necessary to meet firms' working capital requirements during the production process, final finance—what Davidson (1986) identifies as long-term "funding"—has to do with how savings are captured by firms so as to extinguish the "initial" or short-term debt vis-à-vis the banking sector. The initial finance represents the primary infusion or creation of credit money within the productive process, whereas the final finance represents simply the reflux phase or the extinguishing of this credit money as it is returned to the banking system (Parguez and Seccareccia 2000; Seccareccia 2003). Indeed, within the circuitist perspective, the problem is not so much the financing of investment as it is, foremost, the financing of production, whether it is the production of investment goods or consumption goods. Firms' pricing margins within such a general macroeconomic framework take on a less vital role than that articulated by Eichner.

This distinction is fundamental to an understanding of the financing process. Unlike the initial credit advances, final finance is associated with the destruction of the initial injection of credit money in the economic system, with saving appearing as the mere accountancy of investment. In this sense, it can be argued that saving, say, in the form of business retained earnings, can never "finance" investment since it is the result of the initial financing. Hence, in terms of Eichner's previous monetary analysis crystallized in equations (1) and (2), the savings (on the left side of each equation) are merely the accounting counterparts of the net lending position of the various sectors (on the right side of the equation). Recognizing this and understanding that saving is the result of spending and not the cause along Keynesian lines, why then did Eichner fall into such semantic ambiguities?

Eichner had been strongly influenced by the post-Keynesian growth models with differential saving propensities, as developed by Nicholas Kaldor, Joan

Robinson, and Luigi Pasinetti in the late 1950s and early 1960s. Of particular significance was the well-known Robinsonian model that related the rate of accumulation to differential propensities to save out of the incomes of households and firms. On the basis of the famous Cambridge profit equation, a higher rate of capital accumulation would be associated with a higher rate of profit that the greater growth process would generate. For instance, in the Robinsonian growth model, given the entrepreneurial animal spirits of investors determining the exogenous rate of investment, any parameter change in the saving rate of business enterprises, say, through a higher markup, would bring about a change in the distribution of savings between households and firms. From this, Eichner went a step further. While preserving the Cambridge equation in the context of an oligopolistic market structure, he sought to endogenize the rate of business saving to the rate of accumulation. However, the problem faced by Eichner was that business retained earnings, which depend on the flow of business profits, are themselves determined by investment and, therefore, cannot also be the discretionary funds financing that same investment simultaneously. While Eichner was aware of the problem and understood the conceptual monetary conundrum that this generated, in his writings these ambiguities, especially to be found in his earlier writings, were never completely sorted out.

Had he been exposed to the circuitist distinction between initial and final financing, he probably would have been able to find a clearer analytical monetary framework to sort out this dilemma. What he needed was a more coherent macro foundation to his microanalysis of corporate pricing than the stark Cambridge models of growth that tended to have insufficient grounding at the monetary level. Moreover, in those early postwar Cambridge growth models elaborated by Kaldor and Robinson to which Eichner subscribed, the underlying assumption that an economy returned to a "normal" rate of capacity utilization often led to a reversal of the causal relation that would be applicable in a world in which output would remain well below normal capacity. Hence, for given savings propensities of households, an increase in the rate of accumulation must necessarily entail an increase in the rate of profit, which, in the long run, must be associated with a fall in the real wage (Lavoie 1995, 154). The problem is that, in an oligopolistic environment analyzed by Eichner, businesses would have to increase simultaneously their markup (or business retained earnings) to ensure sufficient savings for the economy to come to rest and return to its normal rate of capacity utilization. Unfortunately, an economy's traverse toward its "normal" or secular growth path was never fully explained by Robinson in her writings (Lavoie 1996, 134), and the Eichnerian model of investment financing that was patterned on this Robinsonian long-run growth model shed no further light on this problem of how the economy would return to its normal rate.
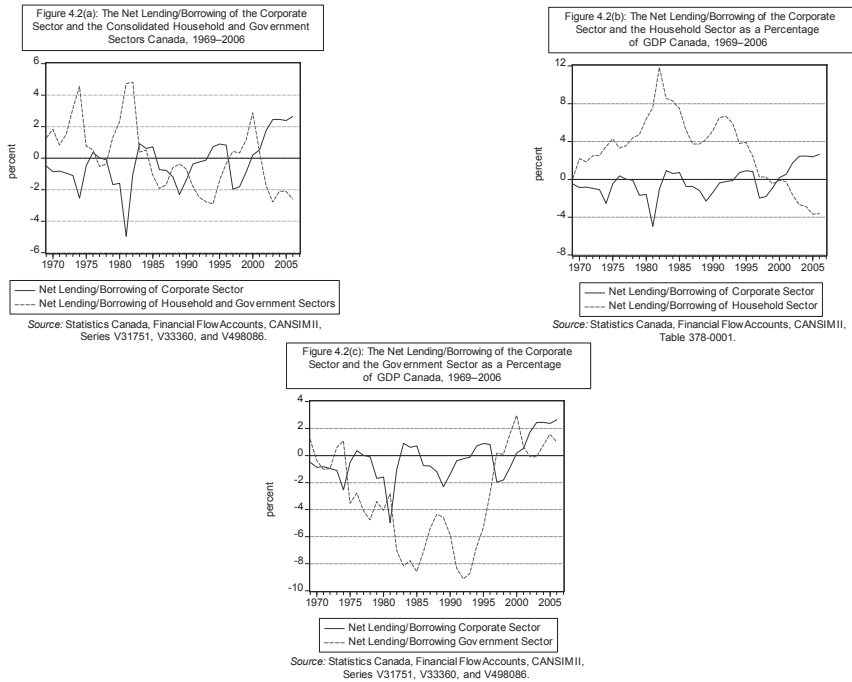
Is There an Empirical Basis for Eichner's Analysis of Pricing and Investment? Some Evidence From Canada

We shall first begin our exploratory empirical analysis by looking at some stylized facts about the corporate sector, focusing on the Canadian experience for the period from 1969 to 2007. We have chosen this sample period simply because measures of business credit are not readily available prior to 1969.

As was pointed out earlier in this chapter, Eichner's monetary analysis brought him to consider the borrowing position of the nonfinancial sector in relation to the financial sector and, more precisely, the net lending/borrowing position of the various subsectors of the nonfinancial sector interacting with one another. The following flow-of-funds charts depict the net lending/borrowing position among three important sectors of the Canadian economy: the corporate, the household, and the government sectors; continuing our simplification as discussed with regard to equation (2), we have excluded the foreign sector balance. Figure 4.2a describes the evolution of the consolidated household and government sector balance in relation to that of the corporate sector. Even by abstracting from the evolution of the Canadian current account balance, it can readily be seen that changes in the net lending/borrowing position of the corporate sector are a mere mirror of the consolidated household and government balance. This chart highlights the simple fact that in a monetary economy, in which the nonfinancial sector must transit through the financial sector for the financing of its activities, transactions among the various subsectors of the nonfinancial sector would necessarily offset one another, such that what would be a deficit for one subsector would necessarily materialize as a financial surplus for the other.

Figures 4.2b and 4.2c describe the financial relations between the corporate sector and the household and government sectors separately. Figure 4.2b is particularly revealing. Traditionally, the position of the household sector would have been that of a net lender while the corporate sector would have been that of net borrower. Over the last decade, however, this traditional relation has seen a major reversal, with households becoming chronic net borrowers (a situation not seen hitherto except for very short historical periods in Canada) and corporations becoming awash with liquidity and themselves becoming net lenders. Figure 4.2c instead shows how the positive public sector balance since the mid-1990s seems to have compounded further the negative balance of the household sector. Interestingly, the corporate sector's persistent surplus position vis-à-vis the household sector in Figure 4.2b shows that, unlike households, nonfinancial corporations have been investing progressively less in relation to their flow of undistributed corporate profits than at any other time since the 1960s, and yet this growing importance of corporate savings
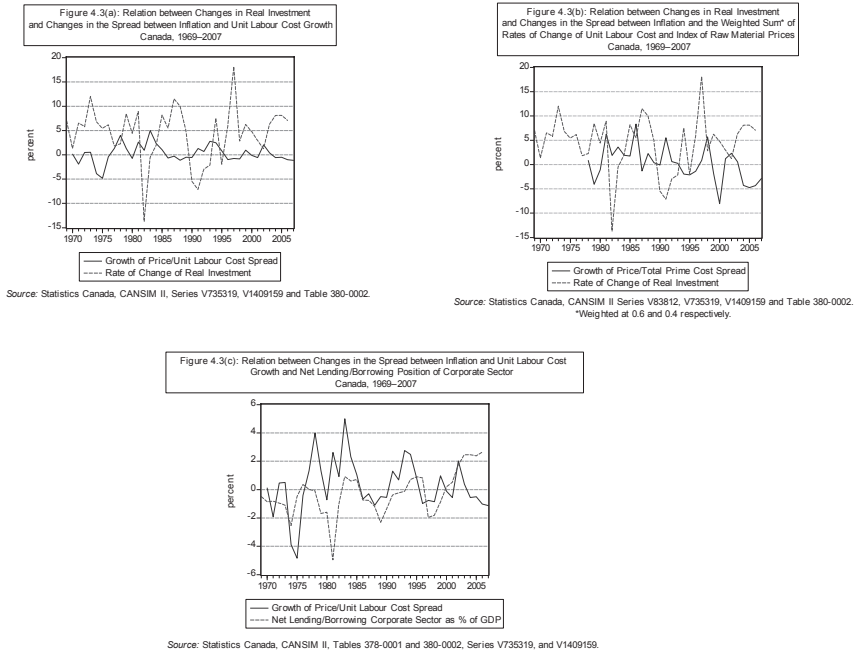
Figure 4.2   **The Net Lending/Borrowing Position by Major Sectors, Canada, 1969–2006**

Figure 4.2(a): The Net Lending/Borrowing of the Corporate Sector and the Consolidated Household and Government Sectors Canada, 1969–2006

Net Lending/Borrowing of Corporate Sector
Net Lending/Borrowing of Household and Government Sectors

Source: Statistics Canada, Financial Flow Accounts, CANSIM II, Series V31751, V33360, and V498086.

Figure 4.2(b): The Net Lending/Borrowing of the Corporate Sector and the Household Sector as a Percentage of GDP Canada, 1969–2006

Net Lending/Borrowing of Corporate Sector
Net Lending/Borrowing of Household Sector

Source: Statistics Canada, Financial Flow Accounts, CANSIM II, Table 378-0001.

Figure 4.2(c): The Net Lending/Borrowing of the Corporate Sector and the Government Sector as a Percentage of GDP Canada, 1969–2006

Net Lending/Borrowing Corporate Sector
Net Lending/Borrowing Government Sector

Source: Statistics Canada, Financial Flow Accounts, CANSIM II, Series V31751, V33360, and V498086.

since the late 1990s has certainly not entailed any strong accelerated rate of expansion of investment over that same period. However, before commenting on the implications of all this, let us first consider some other facts about corporate behavior in the Canadian economy.

Instead of looking at it from the angle of business savings (as reflected in the net lending/borrowing position of firms), an obvious testable hypothesis arising from Eichner's theory of the internal financing of investment is the possible connection between the price/unit cost relation and the rate of investment. Accordingly, the higher the rate of intended investment, the higher ought to be the markup and, therefore, ultimately the greater should be the rate of growth of the price/cost spread of business enterprises. Two distinct series were obtained on the evolution of costs in the corporate sector. The first, displayed in Figure 4.3a in relation to the rate of growth of real investment, measures the spread between the rate of change of prices of consumer goods and services and the rate of change of unit labor costs in industry, while the second indicator, traced in Figure 4.3b, measures the gap between the rate of change of consumer prices and the weighted sum of two input costs: the rate

Figure 4.3 **Various Indicators of Price/Cost Spreads and Investment, Canada, 1969–2007**

Figure 4.3(a): Relation between Changes in Real Investment and Changes in the Spread between Inflation and Unit Labour Cost Growth Canada, 1969–2007

——— Growth of Price/Unit Labour Cost Spread
- - - - Rate of Change of Real Investment

Source: Statistics Canada, CANSIM II, Series V735319, V1409159 and Table 380-0002.

Figure 4.3(b): Relation between Changes in Real Investment and Changes in the Spread between Inflation and the Weighted Sum* of Rates of Change of Unit Labour Cost and Index of Raw Material Prices Canada, 1969–2007

——— Growth of Price/Total Prime Cost Spread
- - - - Rate of Change of Real Investment

Source: Statistics Canada, CANSIM II Series V83812, V735319, V1409159 and Table 380-0002.
*Weighted at 0.6 and 0.4 respectively.

Figure 4.3(c): Relation between Changes in the Spread between Inflation and Unit Labour Cost Growth and Net Lending/Borrowing Position of Corporate Sector Canada, 1969–2007

——— Growth of Price/Unit Labour Cost Spread
- - - - Net Lending/Borrowing Corporate Sector as % of GDP

Source: Statistics Canada, CANSIM II, Tables 378-0001 and 380-0002, Series V735319, and V1409159.

of change of both unit labor cost and the index of raw material prices. While the unit labor cost series measures labor compensation in relation to average labor productivity for all industries, according to Statistics Canada, the raw material prices series, which unfortunately only begins in 1977, reflects the prices paid by Canadian manufacturers for key raw materials, many of which are set in world commodity markets. This evidence is not especially favorable to the Eichnerian hypothesis that the rate of investment ought to be positively correlated with the markup. From the limited graphical evidence presented below, no such positive relation appears. Of course, one may legitimately question whether the price/cost margins are appropriate series representing corporation markups and whether they are actually picking up corporate saving. To evaluate whether they are sufficiently related, the price/unit labor cost series and the net lending/borrowing position are depicted in Figure 4.3c. While the series do bifurcate somewhat (particularly in recent years), there is substantial overlap between the percentage growth rate of the price/cost margin and the measure of corporate net lending/borrowing as a percentage of the gross domestic product (GDP).

Although the evidence based on the relation between investment and the

markup is weak or nonexistent, still some related hypotheses ensuing from Eichner's pricing model can be further evaluated graphically. The first of these has to do with his basic theory that the higher the level of intended investment, the greater would be the markup associated with the desire for internal financing. More precisely, as the level of investment rises, the proportion of internally financed investment is presumed to decline vis-à-vis the externally borrowed funds. As a corollary, demand for bank credit from business enterprises would rise with investment and would do so at an increasing rate; conversely, for a given level of investment expenditures, credit demand would fall as firms' cash flow rises (i.e., for a given demand for funds, this would represent a rightward shift of the supply of funds curve in Figure 4.1). Thirdly, as the rate of interest rises and the horizontal portion of the supply of funds curve shifts upward, one would expect the demand for credit to fall and the demand for internally financed investment to rise, thus entailing a higher markup.

The first of these hypotheses on the positive relation between business credit and investment appears to be supported visually by the evidence in Figures 4.4a and 4.4b. For instance, measured as the percentage deviation from its trend (derived using a standard Hodrick-Prescott filter), the series depicted in Figure 4.4a show that variations in short-term business credit are highly correlated with investment as a percent of GDP. The same can also be said when measured differently, as in Figure 4.4b, where the change in the first-difference of the credit variable appears to be significantly correlated with the first-difference of the ratio of investment to GDP. On the other hand, for a given rate of investment, it would appear that a higher flow of undistributed corporate profit or retained earnings would result in a decline in credit demand, as the different measures in Figures 4.4c and 4.4d indicate. If overall investment expenditures are treated as an exogenous variable along the lines of what Eichner argued at the macroeconomic level, then the inverse relation between credit demand and business profit is quite consistent with his pricing hypothesis illustrated in Figure 4.1 and it is certainly compatible with the endogenous money or circulationist perspective discussed earlier in this chapter. On the other hand, when various investment measures are connected with the proportion of financing done internally (via undistributed corporate profit) versus externally (short-term business credit), the relation is either nonexistent, as seems to be the evidence in Figure 4.4f, or seemingly in the opposite direction to what Eichner's model would predict. Indeed, the series in Figure 4.4e trace the evolution of the growth of investment and the ratio of undistributed corporate profit to business credit in Canada. According to Eichner's pricing model, we should have expected that, as aggregate investment demand shifts out, more and more firms will be relying on external financing.

Figure 4.4   **Business Credit, Investment, and Undistributed Corporate Profit, Canada, 1969–2007**

Figure 4.4(a) Cyclical Variation of Investment and Business Credit as a Percentage of GDP Canada, 1969–2007

Gap between Business Credit and Its HP Trend as % of GDP
Gap between Investment and Its HP Trend as % of GDP
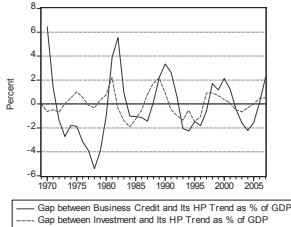
Source: Statistics Canada, CANSIM II Series V122639 and Table Number 380-0017.

Figure 4.4(b): Relation between the Change in the First-Difference of Short-Term Business Credit as a Percentage of GDP and the Change in Investment to GDP Canada, 1969–2007

Changes in First-Difference in Bank Credit as % of GDP
Changes in Investment/GDP Ratio
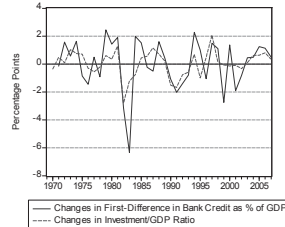
Source: Statistics Canada, CANSIM II Series V122639 and Table Number 380-0017.

Figure 4.4(c) Cyclical Variation of Business Credit and Undistributed Corporate Profits as a Percentage of GDP Canada, 1969–2007

Gap between Business Credit and Its HP Trend as % of GDP
Gap between Undistributed Corporate Profits and Its HP Trend as % of GDP

Source: Statistics Canada, CANSIM II Series V122639 and V499036.

Figure 4.4(d): Relation between the Change in the First-Difference of Short-Term Business Credit as a Percentage of GDP and the Change in Undistributed Corporate Profits to GDP Canada, 1969–2007

Changes in First-Difference in Bank Credit as % of GDP
Change in Undistributed Corporate Profits as % of GDP
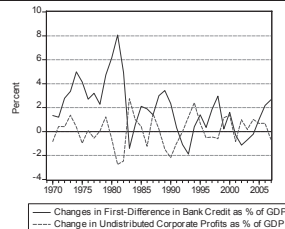
Source: Statistics Canada, CANSIM II Series V122639 and V499036.

Figure 4.4(e): Relation between Real Investment Growth and the Ratio of Undistributed Corporate Profit to Short-Term Business Credit Canada, 1969–2007

Ratio of Undistributed Corporate Profit to Short-Term Business Credit
Growth Rate of Real Investment
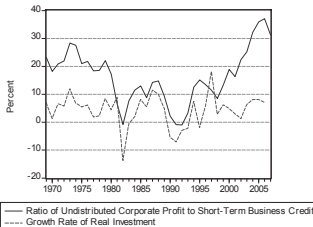
Source: Statistics Canada, CANSIM II Table 380-0002, Series V122639 and V499036.

Figure 4.4(f): Cyclical Variation of Investment to GDP and Undistributed Corporate Profits to Short-Term Business Credit Canada, 1969–2007

Gap between Investment/GDP and Its HP Trend (%)
Gap between Undistributed Corporate Profit and Business Credit and Its HP Trend (%)
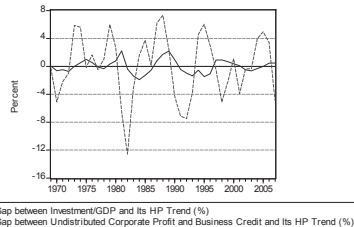
Source: Statistics Canada, CANSIM II Series V122639, V499036, and Table Number 380-0017.

This would suggest that the ratio of undistributed profit to short-term business credit ought to vary contra-cyclically with the rate of investment. Instead, the evidence from Figure 4.4e seems to indicate the opposite!

A more rigorous testing of Eichner's hypothesis was also undertaken using standard regression analysis (shown in the appendix). Since a few of the time series were not trend stationary, all the regressions were run by also using first- and second-differenced variables, and, in some cases, the estimated equation was further corrected for first-order autocorrelation because of a low DW statistic. The estimated price-adjustment relations and the profit-margin equations all point to the lack of statistical significance of various indicators

of the investment variable. Indeed, the only variable holding strong explanatory power is unit labor cost; investment out of GDP was both insignificant and, in one case, even held the wrong sign.

The same would apply to the simple "markup equations" when measured as the spread between price inflation and the rate of change of unit labor cost alone (since the results using markups calculated with joint weighted unit labor costs and raw materials prices fared no better statistically). As can be seen from the table in the appendix, the coefficient of investment was both insignificant and/or had the opposite sign to what Eichner's hypothesis would predict.

On the other hand, depending on the precise specification, the set of "credit equations" that were estimated do generally substantiate the Eichnerian analytics that firms may be borrowing to finance investment. At the same time, the evidence also supports the circulationist hypothesis that, as corporate cash flow rises, firms would be reducing their indebtedness vis-à-vis the banking system. Finally, as revealed by the "internal/external financing" estimated equations displayed below, there is little evidence to suggest that, as the rate of investment increases, the ratio of internal to external finance falls. In contrast to what was previously inferred from our analysis of Figure 4.1, the evidence either shows no statistical relation or, depending on the investment variable selected, indicates that when the rate of accumulation goes up, the ratio of internal/external finance *rises* via a quicker pace of growth of business retained earnings. One may explain this by arguing that, before borrowing externally, corporations will first seek to intensify their internal financing of investment, as business demand moves along the upward-sloping portion of the supply of additional funds curve. However, as the tempo of capital accumulation strengthens, one should expect proportionally more firms to be relying on external financing by raising their external borrowing and, therefore, their gearing or leverage ratios in accordance with the Eichnerian hypothesis. However, the empirical evidence shows the reverse phenomenon, thereby posing further questions about the macroeconomic applicability of the original microeconomic model developed by Eichner in the 1970s to the overall corporate economy.

Concluding Remarks

Eichner's important contributions to post-Keynesian monetary economics have withstood the test of time. However, from its inception, the pricing model for which he was most celebrated and that was specifically developed to provide a realistic explanation of the behavior of the megacorp raised conceptual problems that prevented the model's easy applicability at the macroeconomic level. Despite my own earlier attempt at explaining ag-

gregate price formation partly based on the Eichnerian precepts about the significance of internal financing (Seccareccia 1984), the statistical evidence remains weak and, as Eichner himself would have undoubtedly recognized, does not seem to find adequate empirical grounding. Perhaps this could be because the above empirical specifications are not sufficiently appropriate to test Eichner's pricing model to the macro economy. For instance, there might be other peculiarities of the Canadian economy to which insufficient attention has been paid that may have distorted the empirical results, such as the presence of large multinational megacorps whose price-setting concerns may, for instance, be guided by foreign financing requirements. While one cannot exclude these considerations, until further work is undertaken, the current evidence in support of an explanation on the basis of the original Eichnerian model of pricing is either weak or simply not there.

Appendix: Regression Analysis

List of Variables for the Regressions

Credit	=	measure of short-term business credit, from Statistics Canada, CANSIM II Series V122639
I/GDP	=	percentage share of investment to gross domestic product, from Statistics Canada, CANSIM Table Number 380–0017
$\Delta I/I$	=	percentage rate of growth of business gross fixed capital formation (in 2002 constant dollars), from Statistics Canada, CANSIM II Table 380–0002
INT	=	Interest rate indicator, the prime business loan rate of chartered banks, from Statistics Canada, CANSIM II, Series V122495
ΔMARK/MARK	=	rate of change of the markup, measured as the difference between the rate of inflation (CPI) and the rate of change of per unit labor costs (ULC) alone
Π	=	undistributed corporation profits, from Statistics Canada, CANSIM II, Series V499036
P	=	consumer price index, from Statistics Canada, CANSIM II, Series V735319
RMP	=	index of raw material prices, from Statistics Canada, CANSIM II, Series V83812
ULC	=	unit labor cost, ratio of total labor compensation divided by output per hour of the total business sector, from Statistics Canada, CANSIM, Series V1409159

Table A4.1

Estimated Equations

INFLATION EQUATIONS

Dependent variable	Constant term	I/GDP	D(I/GDP)	DULC/ULC	$\Delta(\Delta ULC/ULC)$	$\Delta RMP/RMP$	$\Delta(\Delta RMP/RMP)$	Adj. R^2	DW
$\Delta P/P$	-3.3896 (-0.76)	0.2833 (1.07)		0.6676 (6.32)				0.7617	0.73
$\Delta(\Delta P/P)$	-0.0462 (-0.24)		0.2380 (1.08)		0.4007 (5.58)			0.5113	2.32
$\Delta P/P$	1.9307 (0.38)	-0.0647 (-0.21)		0.9142 (5.83)		0.0306 (0.84)		0.7285	1.03
$\Delta(\Delta P/P)$	-0.2122 (-1.01)		0.2436 (1.11)		0.4135 (4.48)		-0.0007 (-0.03)	0.4417	2.58

PROFIT MARGINS (MARKUP) EQUATIONS

Dependent variable	Constant term	I/GDP	$\Delta(I/GDP)$	Adj. R2	DW	AR(1)
$\Delta MARK/MARK$	6.5679 (1.87)	-0.3488 (-1.80)		0.0573	1.19	
$\Delta MARK/MARK*$	6.6512 (1.37)	-0.3532 (-1.33)		0.1874	1.94	0.4037 (2.48)
$\Delta(\Delta MARK/-MARK)$	-0.0140 (-0.04)		-0.3222 (-0.89)	-0.0057	2.52	
$\Delta(\Delta MARK/MARK*)$	0.3598 (0.61)		-0.0002 (-0.39)	0.1471	1.86	0.4150 (2.64)

CREDIT EQUATIONS

Dependent variables	Constant term	I	ΔI	Δ²I	Π	ΔΠ	Δ²Π	INT	ΔINT	Δ²INT	Adj.R²	DW	AR(1)
Credit*	143133.1 (1.16)	1.0507 (5.53)			-0.8446 (-4.03)						0.9903	1.50	0.9619 (23.21)
Credit*	763683.4 (0.24)	0.8002 (3.55)			-0.7715 (-3.87)			1761.98 (2.14)			0.9912	1.46	0.9931 (23.15)
ΔCredit*	5152.80 (1.80)		0.7544 (3.27)			-0.6579 (-2.89)					0.4417	1.88	0.3521 (1.75)
ΔCredit*	7031.2 (2.39)		0.5052 (2.19)			-0.5432 (-2.58)		1749.52 (2.43)			0.5149	1.90	0.4163 (0.05)
Δ²Credit*	738.02 (0.51)			0.5513 (2.18)			-0.5234 (-2.44)				0.0966	2.02	-0.2084 (-1.01)
Δ²Credit*	767.07 (0.61)			0.3102 (1.31)			-0.4792 (-2.50)		1967.52 (3.00)		0.2613	1.96	-0.2613 (-1.33)

Dependent variable	Constant term	I/GDP	Δ I/GDP	Δ² I/GDP	Π/GDP	ΔΠ/GDP	Δ²Π/GDP	INT	ΔINT	Δ²INT	Adj.R2	DW	AR(I)
Credit/GDP*	24.846 (6.28)	0.1751 (0.77)			-0.9791 (-6.60)			0.3588 (3.63)			0.9571	1.78	0.8881 (18.03)
ΔCredit/GDP*	0.2554 (0.98)		0.1386 (0.60)			-0.9169 (-5.78)			0.2525 (2.62)		0.6481	2.06	0.3101 (1.77)
Δ²Credit/GDP*	0.0245 (0.18)			0.1063 (0.49)			-0.9032 (-6.94)			0.2738 (3.16)	0.5911	2.23	-0.4453 (-2.79)

(continued)

Table A4.1 (*continued*)

INTERNAL/EXTERNAL FINANCING EQUATIONS

Dependent variable	Constant term	Δl/l	I/GDP	Adj.R²	DW	AR(1)
Π Credit	12.0959 (7.36)	0.9150 (3.97)		0.2852	0.51	
Π Credit	−18.1146 (−1.00)		1.9107 (1.91)	0.0654	0.29	
Π Credit*	20.9349 (1.20)	0.3603 (3.53)		0.8033	1.49	0.9463 (10.65)
ΠCredit*	4.1622 (0.19)		0.7421 (0.68)	0.7490	1.33	0.8837 (8.49)

Dependent variable	Constant term	Δ(Δl/l)	Δ (l/GDP)	Adj.R²	DW	AR(1)
Δl/Credit	0.3744 (0.54)	0.3580 (3.64)		0.2539	1.55	
Δ/Credit	0.1814 (0.23)		0.5993 (0.68)	0.0000	1.42	
Δl/Credit*	0.5259 (0.56)	0.2928 (3.29)		0.2661	1.84	0.2608 (1.53)
Δl/Credit*	0.2976 (0.27)		0.6938 (0.72)	0.0238	1.73	0.2685 (1.50)

Dependent variable	Constant term	Δ²(Δl/l)	Δ²l/GDP	Adj.R²	DW	AR(1)
Δ²(l/Credit)	0.1391 (0.16)	0.2559 (3.53)		0.2472	2.32	
Δ²(l/Credit)	−0.0409 (−0.04)		0.9875 (1.10)	0.0056	2.17	
Δ²(l/Credit)*	0.0354 (0.05)	0.2674 (3.14)		0.2324	2.11	−0.1864 (−1.05)
Δ²(l/Credit)*	−0.1859 (−0.21)		0.6173 (0.65)	0.0000	2.04	−0.1460 (−0.84)

Notes: * Estimated equation corrected for first-order autocorrelation. The symbols Δ and Δ²denote first and second order differencing respectively and the *t*-ratios are in parentheses just below the estimated coefficient, and the terms in parentheses below the estimated coefficients are *t*-ratios.

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PART II

Competition and the
Globalized World

5

The Macroeconomics of Competition

Stability and Growth Questions

Malcolm Sawyer and Nina Shapiro

The structure of markets and how firms compete have important implications for the macroeconomy in terms of the level of economic activity and its stability. This is not to say that the occurrence of unemployment can be traced to a particular market structure, as Weitzman (1982) and others have argued. Unemployment, as Keynes emphasized, can occur under any market structure, for the demand for labor depends on the demand for its products, and that aggregate demand can be less than is needed for full employment. The full employment output need not be the "profit-maximizing" output or even a profitable output. It depends on the expenditure on products.

However, the fact that employment and output depend on the demand for products does not make the operations of firms unimportant. Indeed, quite the contrary. The investment decisions of firms matter precisely because aggregate demand does. Thus, in neoclassical economics, where employment is always full (or labor markets always and everywhere "cleared"), changes in investment affect the composition of output only. They change the allocation of resources, but not the degree of their utilization. There is no particular level of investment needed for full employment: whatever output is not purchased by firms will be purchased by households.[1] Output increases at its "natural," supply-determined growth rate, and it increases at this rate regardless of the rate of investment (this affects the capital/labor ratio and thus the per capita output but not the growth rate). Investment affects neither the level nor the growth of output so that both can be analyzed in abstraction from the investment decisions of firms (as is the case in the Solow neoclassical growth model).

The firm has little importance in the Say's Law world of neoclassical economics. Its black-box treatment of the firm is as evident in its macroeconomics as it is in its microeconomics, and the firm as an organization makes no appearance. But for macroeconomic analysis, firms are making important decisions on prices and investment, through which the distribution of income between wages and profits, the level of aggregate demand, and the growth of the economy are all influenced. The ways in which the organization of the firm and the structure of the industry in which it operates affect prices and investment are clearly highly relevant for macroeconomic analysis.

These questions about firm and industry organization are at the center of Eichner's macroeconomics. Here, not only do the investment decisions of firms matter, affecting the growth rate of productivity as well as the level and growth of output,[2] but also the size and structure of firms affect their investment. The investment of firms depends on their management and market power, and sustained expansion is possible only in a world of professionally managed, oligopolistic firms. These "megacorps" are critical to the investment that employment and growth depend on, and they are critical precisely because they are large, managerial concerns. Small, owner-operated firms have neither the investment finances nor investment incentives of the megacorp, and contrary to what is assumed in neoclassical economics, neither the owner-control of firms nor their "perfect" competition is ideal.[3]

In this chapter we review Eichner's conception of the firm—the megacorp—and discuss some of its macroeconomic implications, comparing the stability and growth of a megacorp economy with that of a neoclassical economy, one where the representative firm is what Eichner called a "neoclassical proprietorship." We also speculate on changes in the last three decades and how they have affected the megacorp.

The Megacorp

Eichner (1969) introduced the term *megacorp* to reflect the dominance of large, corporate enterprises in the American economy. These enterprises were radically different from the firms that populated the economy in the nineteenth century. Eichner's new coinage emphasized the distinctiveness of the modern business firm, especially the importance of both its size and its organizational structure. Neither had been incorporated into the typical textbook treatment of the firm or given the attention it deserved in economics. The corporate revolution had been recognized and the concentration of industry discussed, yet the representative firm was still the small, owner-operated enterprise of Marshallian and Walrasian economics (Eichner's "neoclassical proprietorship").

Eichner (1973, 1976) developed the analysis of the nature and role of the

megacorp. Eichner's analysis had many interesting features, and we highlight two here. First, the megacorp is analyzed as an enduring organization with survival and growth as key objectives. In contrast, the "firms of the economic treatises and textbooks were not economic organizations but economic agents" (Shapiro 1992, 19). Eichner was not, of course, the first to treat the firm as an organization but did make his own contribution to the analysis of its operation. Although a great deal of attention has been paid to the organizational dimensions of the firm, and the Coasian perspective on the enterprise is now dominant, at least in the mainstream literature, the representation of the firm in macroeconomic texts (and often in microeconomics texts) is still the firm as a profit-maximizing agent. Second, as to some degree reflected in the subtitle "The Microfoundations of Macrodynamics" of Eichner's 1976 work, there is an intimate set of linkages between the microeconomics and macroeconomics (cf. Chapter 6 of Eichner 1976), and this readily relates to a consideration of the micro-macro linkages.

The growth of the large corporation had, for Eichner, far-ranging consequences; it affected not only the competitive conditions of industries, but also the growth and stability of the economy. The macrodynamics of the economy had been transformed, and his work on the megacorp centered on these macroeconomic consequences. They were highlighted in Eichner's early work on the firm, in his doctoral dissertation on *The Emergence of Oligopoly* (1969), as well as in his classic work *The Megacorp and Oligopoly* (1976), and while that macroeconomic perspective on the corporation is found in the work of others also—Galbraith's work (1967) comes particularly to mind— most of the work on the corporate revolution centered on its microeconomic implications. Eichner's was one of the few macroeconomic treatments, and that macroeconomic analysis of the enterprise is arguably his most important contribution.[4]

The megacorp derives its importance from its investment, for it is not only a much larger enterprise than its nineteenth-century counterpart, it is also much more expansive. Its corporate organization separates its operation from the life circumstances of its owners, freeing its expansion from the "human limitations" of limited interest and life, while the competitive strength of the enterprise all but assures its continued existence (Eichner 1969). Together they give the megacorp the life expectancy needed for long-term investment, and the profit of the firm provides the finance.

The megacorp is an ongoing organization. It does not have the limited life span of the individually owned proprietorship, nor is its management dependent on the personal interests or capabilities of its owners. Its managers are professionals; enterprise management is their vocation. They are interested in management, trained in its principles, and experienced in its practices. Some

might leave the enterprise, seeking positions elsewhere, and others will re-
tire. Yet their positions can be filled through promotions or new hires, so that
while managers (and other employees) of the corporation come and go, and
its shares change hands, the organization and its operations remain.

The megacorp can operate indefinitely, and its managers have every reason
to expect its continuation. It has a dominant position in one or more markets,
a skilled and experienced workforce, and ready access to finance (Eichner
1976). It is not likely to be brought under in an economic downturn—its
finances are too sizable for that—nor is it likely to lose its markets to others.
Capital requirements protect its markets from the competition of new entrants,
as do its experience in the industry and its product advertisement, and while
its markets are not impregnable—there is a "risk of entry"—only firms with
the resources of a megacorp can hope to penetrate them.

Just as the entry barriers of the megacorp's industry restrict the competi-
tion, the "price coordination" practices temper it. They restrain the price
competition of the industry, averting the price wars that deplete the finances
and "expropriated the capital" of firms.[5] The megacorp is not subject to that
ruinous competition, and while the oligopolistic conditions of its industry do
not free its prices from the constraints of competitors, they do give the firm
"some control over prices," which is essential for survival (Eichner 1976, xi).
Indeed, it is precisely because firms cannot function without that measure of
price control that they form cartels and "trusts" and undertake the mergers
and acquisitions that concentrate industries (Eichner 1969).[6]

The pricing power of the megacorp is used in the interests of growth.
Markups on products are set with the requisites of growth in mind,[7] and these
requirements decide all the operations of the enterprise, including profit dis-
tributions. Growth is the overriding objective, with the firm growing at the
highest rate possible and its growth rate "maximized" through diversification
into new, higher-growth industries (Eichner 1976, 1987).

That growth maximization is in no way inconsistent with the pursuit of
profit. Not only does the growth of the firm require profit—investment cannot
be financed, internally or externally, without it—but also the growth of the
firm *is* the growth of its profit. Growth is measured in terms of profit, by the
growth rate of the megacorp's "cash flow" (Eichner 1976). The operations of
the megacorp are as profit-directed as those of the owner-operated, neoclassi-
cal firm. The enterprises are distinguished not by the importance of profit in
their operations, but by the amount they seek. Whereas the neoclassical firm
maximizes the level of its profit, the megacorp maximizes profit growth. It
seeks an ever-increasing profit rather than a "maximum" one.[8]

The neoclassical proprietorship has a limited profit objective; the profit
that decides its operations is not the unlimited profit of the long run, but the

profit that can be made in the short run. That short-run profit maximization reflects the interests of its management, for the firm is owner-operated. Its owner-managers live off the earnings of the firm, deriving their income from its profit. Their personal fortunes fluctuate with that profit, so they are naturally interested in the amount made at any point of time. Although that interest in the short-term profit of the firm does not preclude an interest in the long-term profit, any increase in the latter that requires a decrease in the former, such as a product improvement that increases costs, would come at the expense of the owners' income, as would any reinvestment of profits. Owners are thus reluctant to sacrifice the short-term profit of the firm for the more uncertain long-term profit or to reinvest profits for the purposes of future growth, and given the financial frailty of the enterprise—it is a small, "perfectly" competitive firm—such short-run profit maximization is not "irrational" (Eichner 1976, 21).

The interests of the megacorp's management are quite different. Since the megacorp is an "enduring institution," investment in its future is rational; also, since its managers are not its owners, the reinvestment of its profits does not come at the expense of their income. Indeed, quite the contrary, for their salaries depend on the performance of the enterprise, and insofar as investment improves its performance, increasing its profits and/or growth prospects, it increases the salaries of its managers along with their job security and promotion possibilities. The managers of the megacorp are in the employ of the enterprise—they are its agents—and as far as their personal fortunes are concerned, they have every reason to be concerned with the long-term expansion and profitability of the firm.

This is not to say that the managers of a megacorp are always diligent in their duties or that the interests of an individual manager cannot conflict with those of the corporation. Managers can shirk also, and corporate fraud and other abuses of power are possible. Yet their professional identity mitigates that opportunistic behavior, for their professional reputation and self-respect depend on their job performance, while the promotion policies of the company promote their identification with the organization. They cannot move up the corporate hierarchy without demonstrating loyalty to the company, and this necessity, along with the corporate culture, aligns their interests with those of the organization. Individual interests "tend to be subordinated to what is felt to be the more general interests of the organization itself," and the "goals of the executive group" can be assumed to be "coextensive with those of the megacorp" (Eichner 1976, 22–23).

The megacorp is thus managed in its own best interests, and while these might not be the same as its owners', the owners are not in control. They are owners in name only, "passive rentiers," with no active involvement in

the affairs of the megacorp or real knowledge of them. They could not run the enterprise even if they wanted to, for they do not have the specialized knowledge that its management requires, and their interest in its operations is as limited as their knowledge of them. Their shares are liquid and investments diverse, so that while they are keenly interested in the dividends of the corporation and the market price of its shares, they have little interest in its long-term growth or survival.

While the megacorp is privately owned and its stockholders have property rights in it, they are just one of the megacorp's "several constituencies" (its "equity debt holders"). They are no more important to the enterprise than its other constituencies (such as its fixed-interest debt holders or workforce), and the megacorp's interests cannot be identified with those of any one of them. The megacorp has to be "viewed as having a life—and interests—entirely of its own, separate and distinct from that of any individual or group of individuals" (Eichner 1976, 22). It is not a mere "property"—an asset or production facility—but an organization, and organizations have purposes, those for which they are formed. They have ends of their own, and the end of the megacorp is, for Eichner, the most important fact about it.[9]

The megacorp behaves rather differently from the small, owner-operated firm of Marshallian economics. It is the latter that (implicitly) appears in the orthodox macroeconomics literature, and it is useful to draw out some of the macroeconomic differences. The Marshallian firm can hope to earn normal profits but no more (over any sustained period of time). There is little incentive for the firm to expand since expansion brings only a normal rate of return (which could be earned from putting money on deposit). Additional capacity comes not from the expansion of firms, but from the entry of new firms into the industry, and capacity can be lost through exit of firms and firm bankruptcies. An upswing in economic activity, leading to supernormal profits, draws new firms into an industry; a downswing in economic activity leads to withdrawal of firms and/or their bankruptcy. Since the profits of firms are too low for financial reserves or open credit lines, an economic downturn would more likely lead to the bankruptcy of firms than their withdrawal, and as Eichner (1969) emphasized, competitive industries are subject to the price wars that "expropriate the capital" of firms.[10]

The megacorp is focused on the long run and has established a sustainable position in terms of the relationship between profits and investment. An upturn in demand does not change the prices charged by the firm nor does it change its investment plans, as they are geared toward the long-run growth. Total profits rise with the upturn in demand, but this rise does not draw new firms into the industry or increase the investment. Conversely, a downturn in demand reduces profits but does not lead to a diminution in investment.

An economy with Marshallian firms would appear to be highly volatile, as fluctuations in demand are amplified by firms' entry and exit and the consequent investment and disinvestments and bankruptcies. Industries are subject to boom-and-bust cycles, with the excessive investment of the boom increasing the severity of the downturn. In contrast, an economy dominated by megacorps appears less volatile. The downturns would be less pronounced, and investment and growth steadier.[11]

Investment in a megacorp economy could be steadier (and higher) for another reason: the greater availability of finance. The profits of the megacorp are not only more certain than those of the Marshallian firm, so it has greater access to external finance, but also higher. They are large enough for the internal financing of investment; as Eichner emphasizes, the megacorp has the pricing power needed for increases in investment finance: "because of the market power which it possesses in conjunction with the other members of the industry, a megacorp can increase the margin above costs in order to obtain more internally generated investment funds, that is, a larger corporate levy" (Eichner 1976, 56). That generation of investment funds is, for Eichner, an essential requisite of investment, and only firms with the market power of a megacorp can generate the finance needed for sustained investment. Thus, it is in oligopolistic industries only that the profit margin would be high enough to satisfy the "value condition for continuous growth" (Eichner 1987, 415).

Although investment generates savings and is in this sense "self-financing," it does require finance. The ability of firms to finance investment depends on their own sources of funds and the willingness of banks to make loans. In the outcome, investment $I = S_f + S_h$ (savings by firms plus savings by households). The intentions by households to save can influence the outcome in a number of ways, including the division of savings between firms and households and hence the extent to which funding of investment appears to come from internal sources and from external sources. As firms may prefer internal sources to external sources (for reasons of costs and of reducing external intervention), this preference can impact on their intentions to invest (Steindl 1979).

Financialization and Objectives of the Firm

The nature of the megacorp relies on the "separation of management from ownership," which is the first of the three major characteristics of the megacorp listed and discussed by Eichner in Chapter 2 of *The Megacorp and Oligopoly*. This "separation of management from ownership . . . reflects two historical trends: first the proliferation of stockholders in large corporations over time . . . and second, the indispensability of professional, technically trained managers for the successful operations of a large company" (1976, 20). The

megacorp is a "permanent institution" whose "strategic position . . . assures against outright demise in all except the most unusual of circumstances." The executives of the megacorp make decisions based on long-run considerations "that would be unthinkable to those in charge of a firm with a less certain life expectancy." The executive group "has only an indirect personal stake in whatever net income the megacorp may earn in any one year," and stock options, bonuses, and other rewards are structured to give "the members of the executive group even greater incentive to avoid short-run gains at the expense of the megacorp's long-run position" (21).

The relationship between the financial sector and the industrial sector has always been one of intense controversy: whether finance was being supplied to the "right" firms and in sufficient quantities, whether financial interests were dominant or subservient to industrial interests. In recent years, many have argued that alongside the rise of neoliberalism there has been a process of financialization—this "recent term, still ill-defined, . . . summarizes a broad range of phenomena including the globalization of financial markets, the shareholder value revolution and the rise of incomes from financial invest-ment" (Stockhammer 2004, 720). Epstein in his edited book on financializa-tion similarly views it as "the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies" (2005, 3). Financialization would have effects on every aspect of economic life and policy. Here we limit ourselves to a few remarks on the possible effects of financialization on the operation of the megacorp, and specifically the objectives pursued.

In the literature on the "managerial firm" it is generally assumed that man-agers' interests lie with size and growth of the firm, whereas owners' interests lie with profits and stock market price. The managers' interests (and even more so those of the firm as an organization) relate to the long-term prospects of the company, whereas shareholders are interested in the financial returns (dividends plus capital gains) from the company with an emphasis on the short-term returns. Lazonick and O'Sullivan have argued that there have been significant changes in the relative power and control of managers and owners that have led to major changes in the objectives of firms. They write that

> increasingly during the 1980s, and even more so in the 1990s, support for corporate governance on the principle of creating shareholder value came from an even more powerful and enduring source than the takeover market. In the name of "creating shareholder value," the past two decades have witnessed a marked shift in the strategic orientation of top corporate managers in the allocation of corporate resources and returns away from "retain and reinvest" and towards "downsize and distribute." Under the

new regime, top managers downsize the corporations they control, with a particular emphasis on cutting the size of the labour forces they employ, in an attempt to increase the return on equity. (2000, 18)

In a similar vein, Stockhammer "argues that the process of financialisation is linked to changes in the internal power structure of the firm. We base our analysis on a post-Keynesian theory of the firm, distinguishing between workers, management and rentiers (shareholders)" (2004, 720). But it can also be argued that through a variety of channels shareholders seek to ensure that managers act in the interests of shareholders, whereas much of the managerial firm literature appears to suggest that while there are some mutual interests between managers and shareholders there are also conflicts. "In the course of the 1970s, two institutional changes occurred which helped to align management's interests with shareholders' interests: the development of new financial instruments that allowed hostile take-overs and changes in the pay structure of managers. Among the former were tender offers and junk bonds" (Baker and Smith 1998); among the latter were performance-related pay schemes and stock options (Lazonick and O'Sullivan 2000). The former play the role of the stick; the latter are the carrot. Both have proved fairly effective in making management adopt shareholders' priorities and have "profoundly altered patterns of managerial power and behavior" (Baker and Smith 1998, 3; Stockhammer 2004, 726). Thus, this argument goes, in contrast to Eichner's suggestions quoted above, the executive group of the megacorp has a much more direct stake in its annual earnings.

The priorities of shareholders, particularly when not directly involved in the management of the company, lie with the financial returns that they receive from the company. The increased power of shareholders is likely to lead to much less emphasis on growth (as compared with the megacorp). This can arise from "short-termism," whereby more weight is placed on immediate financial returns over more distant returns. In situations where short-term profits can be raised at the expense of future profits, there is a strong (perhaps irresistible) temptation to pursue the short-term profits. There will also be incentives to use accounting practices that report high levels of profits in the short run. The managers of nonfinancial corporations (NFCs) who hold "huge stock options were aided and abetted in their efforts to deceive investors by all the giant accounting firms, who signed off on virtually any financial statement management wanted, no matter how deceptive, because consulting contracts with these firms earned them more money than they got for audits" (Crotty 2005, 28). Pressure from shareholders for higher dividend payout reduces the internal funds available for investment, changing the balance between the use of internal funds and of external funds.

These types of arguments suggest that the objectives of the megacorp may swing away from growth toward greater emphasis on short-term financial returns with consequent lower rates of investment. Stockhammer, for example, argues that "management [has] adopted the preferences of rentiers in the process of institutional changes of financialisation. The consequence of this is that management and thus non-financial business should become more rentier-like, which among other things, means that they have fewer growth-oriented priorities and invest in financial markets" (2004, 728). His empirical work provides some support for this view that financialization has led to lower investment and growth in a range of industrialized countries. Crotty (2005) sees major implications of financialization when he says that there are

> two key dimensions of the changing relation of financial markets to large NFCs in the neoliberal era. The first is a shift in the beliefs and behavior of financial agents, from an implicit acceptance of the Chandlerian view of the large NFC as an integrated, coherent combination of relatively illiquid real assets assembled to pursue long-term growth and innovation, to a "financial" conception in which the NFC is seen as a "portfolio" of liquid subunits that home-office management must continually restructure to maximize the stock price at every point in time. The second is a fundamental change in the incentives that guide the decisions of top managers, from one that linked long-term managerial pay to the long-term success of the firm, to one that links their pay to short-term stock price movements. This created an alignment of the interests of management with those of institutional financial investors and wealthy households and against the interests of other firm stakeholders. Both changes drastically shortened the planning horizons in large NFCs and led management to adopt strategies that undermined general economic performance. (14)

In an economy dominated by large firms, the ways in which those firms set prices and make investment decisions are crucial for the macroeconomic performance. Price decisions feed into the determination of the distribution of income between profits and wages, and the investment decisions are key for the expansion of the economy's capital stock and for volatility of the economy. Eichner's analysis of the megacorp suggests that its investment behavior reduces the volatility of the economy and sustained expansion.

The much-increased economic and political influence of finance over the past three decades seems readily apparent. Privatization of many former public utilities is merely one example. The buying and selling of companies through takeover and through the operation of private equity companies are another. The macroeconomic implications of these and other changes may

be investigated through Eichnerian eyes. Large corporations still dominate the industrial landscape, though with changes in their nationality and identity. The ways in which those corporations operate have major impacts on the distribution of income, investment, and economic growth. The ability of the megacorp to extract a corporate levy remains and indeed may have been enhanced in the past two to three decades. But the uses to which the corporate levy is put may have shifted toward dividends and payments to executives and away from investment.

Concluding Comment

Macroeconomic theory is often based, at least implicitly, on a rather Marshallian view of the firm: at best the firm in macroeconomic analysis retains the black-box format of mainstream economics. A major achievement of Eichner's analysis was to bring the notion of the firm as an organization into macroeconomic analysis and to show that the governance of the large corporation had major macroeconomic implications. How aggregate demand varies and how variations of aggregate demand are played out in terms of output and employment depend on the ways in which these large corporations behave. The changes in corporate governance and the objectives of the megacorp that have been discussed under the heading of financialization have changed the ways in which the large corporation operates, but have not diminished the basic insights of Eichner's analysis.

Notes

The authors are grateful to Richard Garrett for assistance and comments in the writing of this chapter.
    1. This, of course, is possible only in the one-commodity world of neoclassical growth theory, where the output of industry is a multipurpose commodity that can be either consumed or invested, depending on intertemporal consumption preferences.
    2. For Eichner (1987), as for Kaldor (1957), process innovations are "embodied" in the product innovations of the capital goods industries so that the pace of technical progress depends on the growth rate of investment.
    3. Eichner's view of owner-control is very much in keeping with the recent work of Lazonick and O'Sullivan (1996 and 2002) and others in the Chandlerian school. They also view managerial capitalism as more dynamic and expansive than "personal capitalism" and attribute the decline in the performance of American firms to the increase in owner-control.
    4. Steindl (1952) perhaps provides the only comparable macroeconomic analysis of the firm and its market power.
    5. That "capital expropriating" effect of price competition is emphasized throughout Eichner's work. See the preface to *The Megacorp and Oligopoly* (1976) and the first chapter of *The Emergence of Oligopoly* (1969).

6. The late nineteenth- and early twentieth-century merger movement in American industry was the product of the competition that preceded it, as firms tried to stem the losses that resulted from that competition through the consolidation of their industries, and as Eichner recounts in the preface to *The Megacorp and Oligopoly*, his work on that industrial concentration shows "how limited in time was the existence of competitive conditions in the American economy's manufacturing sector and . . . how unstable and unviable those conditions were even for the brief period they lasted" (1976, xi).

7. For an extended discussion of Eichner's oligopolistic pricing model and its relation to the other markup price theories of post-Keynesian economics, see Shapiro and Mott (1995).

8. In this respect, the megacorp resembles the capitalist firms of classical political economy, especially those of Marx (1965), for these also "accumulated, accumulated," seeking an ever-greater profit.

9. That emphasis on the purpose of the megacorp distinguishes Eichner's organizational perspective on the firm from the modern Coasian one, for in the case of Coase (1937) and his followers, the firm has no purpose of its own separate and distinct from the individuals that form it or contract through it. Here, the firm is not in fact an organization, but an organizational form, a "contracting mode" or "governance structure."

10. This is especially true in the case of a "perfectly" competitive industry, as its products are homogeneous; this not only increases the competitive pressure on prices, it also saddles firms with the fixed costs of machine technology. As Eichner put it, the "same" technology that "made it possible to turn out goods of uniform quality in large numbers also required a substantial investment in fixed assets"; this meant that whenever sales fell, firms would be "under considerable economic pressure" to expand sales through price cuts and "in this way spread overhead costs over a larger volume" (Eichner 1969, 13).

11. For Eichner's own discussion of the differences in the cyclical behavior of competitive and oligopolistic industries, see Chapter 6 of Eichner's *Megacorp and Oligopoly* (1976).

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6

The Megacorp in a Global Economy

Matthew Fung

The year 2007 marked the twentieth anniversary of the publication of Alfred Eichner's *The Macrodynamics of Advanced Market Economies.* I was introduced to the book before its publication when Eichner used its manuscript in his graduate course on macrodynamics. I remember that he told his students that the book should be continuously revised as he learned about its subject through teaching and further research. A critical assessment of the book in light of both the structural changes that have taken place and the new theoretical work that has appeared since its publication is something that he would have undertaken himself if he were alive today.

Many changes have occurred since his untimely death in February 1988. In the United States and many other advanced industrial economies, there was a shift from manufacturing to knowledge-based services. Former planned economies such as those in Russia and the Czech Republic embarked on a transition to a market economy. Trade liberalization took giant steps forward in 1994 when the North American Free Trade Agreement (NAFTA) took effect at the beginning of the year and President Clinton approved the tariff-reduction provisions of the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) at the end of the year. By the end of 2001 China, with one of the biggest economies in the world, became a member of the World Trade Organization (WTO). Advances in computer and communications technology made business transactions across countries much easier, and the globalization of goods and financial markets became more pronounced. Markets became more interdependent, and crises such as those in Asia in 1997 and in Russia in 1998 showed that problems in one part of the world could very quickly spread to other parts.

If Eichner were alive today, he would have looked into these structural changes to see how they affect the operations of the megacorps that were the

focus of his work. We are unfortunate that he is not alive to pursue this task. But as a great teacher he had a great faith that significant work in economics would be done by his students. Without presuming that I merit that great faith, I consider it a tribute to him to examine in this chapter how the globalization of markets and the other structural changes that have occurred since the publication of his book in 1987 have affected the investment and financing behavior of megacorps in advanced market economies.

The remainder of this chapter is organized as follows: After a survey of Eichner's views on the pricing, financing, and growth of megacorps, I will discuss capital investment decisions of U.S. firms in the 1990s and beyond. I will close with some remarks on the continuing relevance of *The Macrodynamics of Advanced Market Economies.*

Eichner's Views on the Pricing, Financing, and Growth of Megacorps

Drawing on the work of Berle and Means (1933), Marris (1964), and Baumol (1967), Eichner argued that the separation of management and control in large corporations makes selfish managers more inclined to maximize the growth of the companies under their management than to maximize the wealth of the shareholders. To ensure that there will be enough finance to maximization growth, megacorps use their market power to charge a price that is higher than the marginal costs of their products. The size of the markup over costs is determinate because it is constrained by three factors: consumers' substitution of other goods that are cheaper, entry by other firms, and the threat of government intervention (Eichner 1987, 376).

Eichner's emphasis on internally generated equity finance contrasts sharply with the mainstream view of corporate capital structure. Modigliani and Miller (1958) argued that capital structure is irrelevant under the assumptions of no taxation and capital markets in which individuals and corporations can borrow and lend at the same interest rate. By developing their homemade leverage argument, they showed that when individual shareholders can borrow at the same interest rate as the corporations whose stock they have purchased, it makes no difference to their cash flows whether they themselves or their corporations borrow. Because corporate borrowing is not increasing the cash flows to them as shareholders, they will not value a levered firm any more or less highly than an unlevered one. When Modigliani and Miller modified their model in 1961 to include corporate taxes, they found that debt finance is cheaper than equity finance because of the tax shield it provides. The unrealistic implication of that model is that corporations should be 100 percent debt financed if they want to minimize their cost of capital.

This dilemma spurred financial theorists to look into possible costs of debt finance that might offset its tax shield advantage. By including agency costs and the costs of financial distress or bankruptcy, many financial theorists have come to the position that there is an optimal capital structure in which the corporation uses positive amounts of both equity and debt finance. But when they talk about equity finance, they have in mind mostly new issues of stock rather than the internal equity that Eichner emphasized.

If a corporation's investment opportunities, cash flows, and capital market conditions can be anticipated with certainty, the corporation should probably use more debt finance than Eichner would recommend. But in the real world these variables cannot be forecasted with certainty. Eichner, who discussed anthropogenic slack in Chapter 13 of *The Macrodynamics of Advanced Market Economies*, would argue that because of uncertainty the corporation would prefer to preserve some financial slack in the form of excess debt capacity. If the corporation has already tapped its external sources of finance to the optimal extent, any unexpected need for more external finance will force it to operate in a range where the amount of external finance employed is too much to be optimal.

While arguing that most of the time megacorps can rely on internal funds to finance their investment expenditures, Eichner was too interested in studying changes over time to ignore factors that might upset the typical financing behavior of megacorps. He thought that megacorps will seek external finance when there is a shift in their investment demand function. Such a shift can be brought about by "some unexpected development, such as a government-induced change in the composition of final demand or a technological breakthrough" (1987, 485).

Of these two potential causes of modification in financial behavior, Eichner was more interested in technical change. In discussing the goals that guide firm behavior, he wrote that the megacorp "will attempt at the very least to maintain, if not actually to increase, its current market share while simultaneously acting to minimize its costs of production" (1987, 362). While arguing that megacorps in oligopolistic industries have enough monopoly power to maintain their market share by retaliatory price-cutting if competing firms in the industry do not follow their price leadership, he was aware that technological change can bring about a new price leader. "The establishment of a new price leader is especially likely if the maverick firm, even if it has not yet succeeded in capturing the largest share of the market, is nonetheless the least-cost producer as a result of having invested in the newest, technologically most advanced plant and equipment" (366).

This brief survey of Eichner's ideas on the pricing, financing, and growth of megacorps has shown that Eichner was able to anticipate some of the structural

changes, such as the increasing importance of technology, that have taken place in the advanced market economies he was studying. Of course, there have been changes he could not anticipate. If he were alive to study these changes, I think he would have focused his attention on how these changes affect the investment behavior of megacorps, for it is through investment that megacorps are able to grow over time. I will therefore proceed to a discussion of the capital expenditures of corporations in the United States in the decades after the publication of *The Macrodynamics of Advanced Market Economies.*

The Capital Investment Expenditures of Megacorps in the 1990s and Beyond

In his 1987 book, Eichner argued that the pricing power that megacorps had because of their large market share enabled them to charge prices that would earn profits large enough to ensure that they have sufficient internally generated funds to finance growth. With the liberalization of trade comes competition from foreign producers, so that sales of domestic firms can be eroded. But while foreign competition reduces their domestic sales, megacorps that have become international can gain sales in foreign markets. To see the net impact of globalization on the ability of megacorps to generate internal funds, we have to determine whether it has enhanced or reduced the monopoly power of megacorps.

In a 1998 paper Gordon provided evidence that monopoly power increased between 1949 and 1994. To measure monopoly power, Gordon used the degree of monopoly power (DMP), calculated as the ratio of value added to the wages of production workers. In the 50 years between 1899 and 1949, that statistic rose from 2.42 to only 2.49 (a 0.1 percent growth). But between 1949 and 1994, it rose from 2.49 to 5.25 (a 1.7 percent growth), with most of its growth coming between 1979 and 1994 (from 3.88 to 5.25). Given that the degree of monopoly power measures the market price of the final product per dollar spent on labor costs, Gordon maintained that the increase in that statistic is evidence that the markup over costs had increased.

The growth in monopoly power is, according to Gordon, the result of a change in the operations of manufacturing corporations. At the beginning of the twentieth century, manufacturing corporations were focusing their activities on production of goods. Toward the end of the twentieth century, they were "engaged primarily in a wide range of nonproduction activities devoted to the pursuit of monopoly power" (Gordon 1998, 323). These activities included research and development (to improve existing products, develop new prod-ucts, or reduce production costs), advertising (to increase the markup over costs), labor relations ("to persuade or intimidate workers to produce more or

Table 6.1

Wages of Production Workers Value Added and Degree of Monopoly Power in the United States Manufacturing Sector, 1967–2002

Year or period	Wages of production workers (billion $)	Value added (billion $)	Degree of monopoly power
2002	336.4	1,888.1	5.61
1997	338.3	1,825.7	5.40
1992	281.5	1,424.7	5.06
1987	251.4	1,165.7	4.64
1982	204.8	824.1	4.02
1977	157.2	585.2	3.72
1972	105.5	354.0	3.36
1967	81.4	262.0	3.22
Growth rate over the period (percent)			
1987–2002	2.0	3.3	1.3
1997–2002	−0.1	0.7	0.8
1992–1997	3.7	5.1	1.3
1987–1992	2.3	4.1	1.8
1982–1987	4.2	7.2	2.9
1977–1982	5.4	7.1	1.6
1972–1977	8.3	10.6	2.1
1967–1972	5.3	6.2	0.8

Source: Annual Survey of Manufactures, 2004 (for data from 1977 to 2002) and 1995 (for data from 1967 to 1972).

accept lower wages"), political contributions and lobbying (to obtain favors from government), and employment of lawyers, accountants, and financiers (to evade taxes or influence tax legislation). The goal of all these activities was "the pursuit of the profits to be gained from monopoly power" (327).

How has monopoly power changed since 1994? Gordon used data from the Annual Survey of Manufacturers compiled by the U.S. Bureau of the Census. Since the publication of his paper, more recent data through 2004 have been compiled. Instead of simply extending Gordon's calculations, I have decided to make a slight change. Gordon's focus was on the big historical picture, and in calculating the growth of DMP between 1949 and 1994 he used fifteen-year periods. Fifteen years given today's pace of structural change is a long period of time; changes can be detected more accurately if we measure the growth of DMP every five years, the time it takes for a new census of manufacturing establishments to be completed. Using only data for five-year periods for consistency, I have calculated in Table 6.1 the DMP for 1967 to 2002 and the growth rate of that variable between every five-year period in that interval of time.

If we compare the results shown in Table 6.1 with Gordon's Table 1 (1998, 326), we will find that the DMP has increased over time. My update confirms that the DMP continued to increase after 1994, to 5.61 in 2002. But unlike Gordon, who found an upward trend in the DMP growth rate over the three fifteen-year periods between 1949 and 1994, I have found an uninterrupted decreasing DMP growth rate for the twenty-year period between 1982 and 2002, from 2.9 percent for 1982–1987 to 0.8 percent for 1997–2002. More-over, there was also a decline from 2.1 percent in 1972–1977 to 1.6 percent in 1977–1982. The slowing of the DMP growth rate may be interpreted as evidence that technical change and globalization combined have an adverse effect on monopoly power. This in turn suggests that the ability of mega-corps to generate adequate internal funds for investment may have also been negatively affected.

But has the ability of corporations to generate internally most of the invest-ment funds they need actually diminished? If we take a look at Flow of Funds Accounts (FOFA) data, we find evidence that the ability of U.S. companies to generate enough internal funds has weakened over time. In the FOFA, the total internal funds that corporations can draw upon consist of two data series, the book value of internal funds (= profits before tax – corporate taxes – divi-dends + capital consumption allowance) and inventory valuation adjustment. If we subtract the sum of these two sources of internal funds from the capital expenditures of corporations, we get what is called the financing gap in the FOFA. A negative financing gap for a particular year indicates that corporations have more than enough internal funds to finance their capital expenditures that year. A positive financing gap implies that corporations as a whole will need external sources of finance to supplement their internal funds.

Figure 6.1 depicts the financing gap as a percentage of capital expenditures for the period 1946–2005. In examining the chart it is helpful to divide period into two subperiods, 1946–1975 and 1976–2005. The first subperiod represents what Eichner was able to observe when he wrote *The Megacorp and Oligopoly* (1976), in which he first argued that megacorps were able to generate enough internal funds to finance their investment expenditures. Within the 1946–1975 subperiod, there were ten years (1949, 1954, 1958, 1959, 1961, 1962, 1963, 1964, 1965, and 1975) in which the financing gap was negative (corporations had more than enough internal funds to finance their capital expenditures). By contrast, within the 1976–2005 subperiod, there were only three years (1988, 2003, and 2005) in which the financing gap was negative.

But the financing gap as a percentage of capital expenditures cannot answer the question of whether the structural changes that have taken place since the publication of Eichner's 1987 book have affected the ability of megacorps to finance their investment expenditures mostly out of internal

Figure 6.1   **Financing Gap as Percentage of Capital Expenditures, U.S. Nonfarm Nonfinancial Sector, 1946–2005**
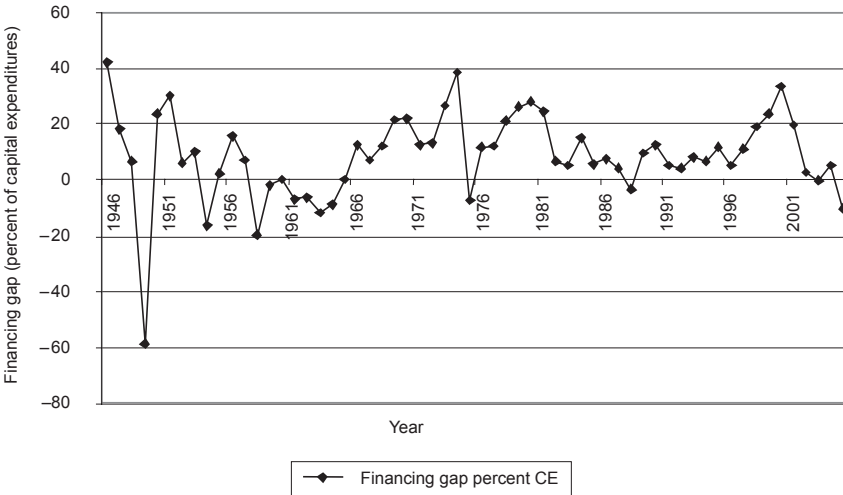
Source: All data are taken from the historical data for the FOFA, available at the website of the Board of Governors of the Federal Reserve System. The historical data are available in five Adobe format files covering the years 1945–1954, 1955–1964, 1965–1974, 1975–1984, 1985–1994, and 1995–2005. For the table, I used data from Table F.102, for the nonfarm nonfinancial corporate business sector. The URLs for these data files are given below:

    www.federalreserve.gov/releases/z1/Current/annuals/a1945–1954.pdf
    www.federalreserve.gov/releases/z1/Current/annuals/a1955–1964.pdf
    www.federalreserve.gov/releases/z1/Current/annuals/a1965–1974.pdf
    www.federalreserve.gov/releases/z1/Current/annuals/a1975–1984.pdf
    www.federalreserve.gov/releases/z1/Current/annuals/a1985–1994.pdf
    www.federalreserve.gov/releases/z1/Current/annuals/a1995–2005.pdf

funds. To answer that question, we need not the actual capital expenditures of corporations, which may reflect the effect of inadequate internal funds, but the capital expenditures that would enable them to grow at a rate that is consistent with long-period equilibrium in Eichner's post-Keynesian model of the U.S. economy. But obviously no data on such capital expenditures are available.

After studying FOFA data through the 1980s, Wolfson argued that although during the 1980s corporations were able to finance most of their investment expenditures with internal funds, investment expenditures were not as high as they could be because a lot of corporations used their borrowed funds for leveraged buyouts, mergers and acquisitions, and share repurchases rather than for investment. Wolfson noted that "corporations, burdened by huge debt

loads and under pressure to cut costs and show a short-term profit, have cut expenses, including research and development and investment spending." He added that "the pressure to maintain short-term profits to keep up the price of the company's stock has encouraged a short-term focus which has hurt investment" (1993, 512–513).

Wolfson should have added foreign direct investment as another competing use of corporate funds in addition to leveraged buyouts, mergers and acquisitions, and share repurchases. Undoubtedly some of the direct investment projects that U.S. companies have increasingly undertaken in foreign countries beginning in the late 1980s were substitutes for domestic capital expenditures. This implies that when we find domestic capital expenditures not as high as they could be, we cannot immediately conclude that companies have underinvested. In a global economy, companies just have more options in finding suitable projects to invest in.

We should also note that a low or even negative financing gap does not necessarily mean that investment is not being constrained. Although the sources of funds have not changed much since 1987, there have been new and important competing uses of funds.

It is also interesting to examine the raw financing gap in addition to the financing gap as a percentage of capital expenditures. Figure 6.2 shows the raw financing gap for the 1946–2005 period. What strikes us at once is the great increase in the gap during the bull market of the 1996–2000 period. Has the inflation of stock prices in the 1996–2000 period negatively affected the financing of investment expenditures?

In a 2005 study Weller and Helppie arrived at the following conclusions:

> The rapid rise in the stock market may have given lenders an incentive to invest primarily in companies that have seen large increases in their stock prices, thereby possibly raising financial constraints for firms located in sectors where stock prices did not rise as fast, especially in manufacturing. Further, possible large capital gains in the stock market may have made investments in fixed assets less attractive, thereby offering corporate decision-makers—managers and shareholders—incentives to use corporate resources to support share prices through dividend payouts and share repurchases. (376)

To support their conclusions, Weller and Helppie showed that for 1991–2000 net investment as a share of gross domestic product (GDP) averaged only 2.9 percent, the lowest level since the late 1950s (362, Table 1). As evidence that stock price appreciation may have made managers use their corporation's funds for dividend payments rather than investment in fixed assets, they con-

Figure 6.2.   **Financing Gap for U.S. Nonfarm Nonfinancial Sector, 1946–2005**
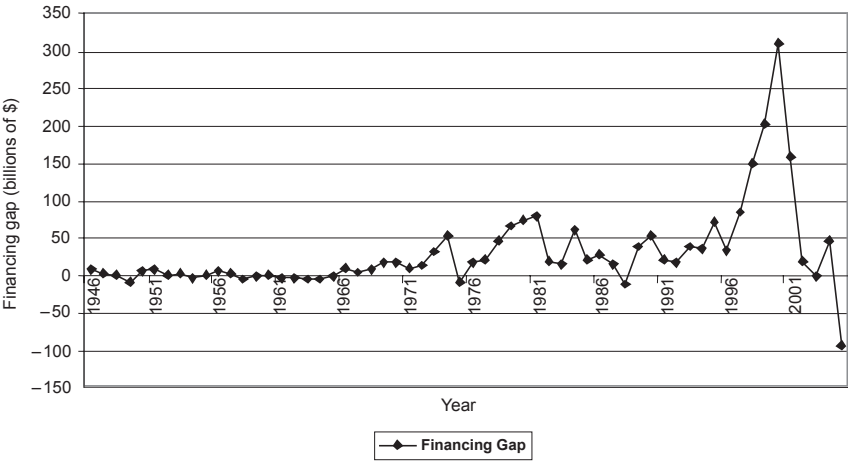
Source: See Figure 6.1.

structed a table showing that, for the business cycle from the first quarter of 1996 through the first quarter of 2001, the ratio of dividends to profits before taxes rose to a historical high of 50.0 percent (364, Table 2).

Aware that multiple factors can impact on investment expenditures, Weller and Helppie probed the influence of these factors in a regression model with total investment expenditures as the dependent variable. The explanatory variables are (a) the difference between expected sales and inventory in the previous period, (b) the commercial paper interest rate, (c) the coverage ratio (the ratio of cash flows to total interest payments), (d) a stock market bubble variable, and (e) the changes in investment expenditures, sales, coverage ratio, and the bubble variable in the previous period. They estimated the model using quarterly data from 1990 to 2001.

For the entire sample period of 1990–2001, they found that all explanatory variables had either the expected sign or are insignificant. Although the raw stock market bubble variable (B_{t-1} in their notation) is insignificant, the change in that variable (ΔB_{t-1} in their notation) is negative as expected and statistically significant. Commenting on the coefficient of that variable estimated from the full sample period of 1990–2001, they wrote: "If the bubble rises 1 percent faster, investment in manufacturing is reduced by 0.06 percent" (371).

Because they expected that some of the explanatory variables might have a stronger impact in the second half of the 1990s, they split the full sample into two subperiods covering the years 1990–1995 and 1995–2001. Although the coverage ratio variable was insignificant for the full sample and for the

first subperiod, it was positive as expected and statistically significant in the second subperiod (Table 7, 373). This finding is consistent with their speculation that in the second subperiod external financial constraints might have grown so that manufacturing firms paid more attention to the coverage ratio as they made investment funding decisions.

The inflation of stock prices that has a negative impact on investment by U.S. corporations is, according to Gordon, largely the result of two developments in the globalization of markets—the demand for U.S. equity securities by foreigners and the success of the foreign operations of American companies. According to Gordon's calculations, the market value of U.S. stocks rose 292 percent between the end of 1987 and the end of 1997, but only 94 percent of that increase could be justified by output and productivity increases. The rest of the increase can be partially accounted for by a fall in taxes and in interest rates and by an increase in portfolio allocations toward equities by American investors, but they are not the major factors. Gordon wrote: "Far more important has been the flow of funds from abroad. . . . Perhaps even more important has been the increasing optimism about the profitability of American corporations in high-technology industries in formerly not-for-profit industries, and in foreign operations" (1999, 556).

It should be pointed out that although Figure 6.2 shows a pronounced hike in the financing gap for the second half of the 1990s, Figure 6.1, which depicts not the raw financing gap but the financing gap as a percentage of domestic capital expenditures, shows a much more modest upward movement during the same period. This is because domestic capital expenditures have also increased a lot during the same time. To understand what drove the increase in domestic capital expenditures despite the huge financing gap of the second half of the 1990s, we have to look at the types of capital expenditures undertaken by American companies.

The Bureau of Economic Analysis (BEA) has included in its National Income and Product Accounts (NIPA) detailed data series on the kinds of investment that American companies undertake. Gross private domestic investment consists of fixed investment and change in private inventories. The major component is fixed investment, which is further subdivided into residential and nonresidential fixed investment. Because we are interested in the behavior of megacorps, we focus on nonresidential fixed investment, which consists of investment in structures and investment in equipment and software. The equipment and software category is further subdivided into four data series: (1) information processing equipment and software, (2) industrial equipment, (3) transportation equipment, and (4) other equipment.

Examination of NIPA data indicates that from 1946 through 1982 structures investment was the most dominant component of nonresidential fixed

investment, accounting for, with the exception of 1977, a third or more of total nonresidential fixed investment. But it declined between 1982 and the mid-1990s. Though the other three kinds of investment in equipment and software also had downward trends since the 1950s, the investment in information processing equipment and software had a pronounced upward trend throughout the period. From 2000 to 2005 it accounted for about half of nonresidential fixed investment.

Thus a major reason for the increase in capital expenditures by U.S. nonfinancial companies in the second half of the 1990s was their expenditures on information processing equipment and software. This can be interpreted as evidence for the increasing competitiveness of the global business world. To be able to compete not just with other companies in the domestic market but also with foreign companies in the same industry, American companies felt the need to increase productivity and achieve cost savings by investing in information processing equipment and software. The need can be gauged from the fact that the increase in expenditures on information processing equipment and software came in years when the financing gap was very large.

Occurring at a time when markets were becoming more global, the increase in investment in information processing equipment and software may be explained by the theory of compensating advantage. According to Hymer (1976) and other developers of this theory, when multinational enterprises compete in foreign markets with the local companies in those markets, they suffer from disadvantages such as local consumer loyalty to home products, inadequate understanding of cultural preferences of local consumers, and obstacles created by governments of those markets to discourage foreign competition. To be able to compete with local companies, multinational enterprises contemplating entry into those markets must possess some form of compensating advantage that will offset the disadvantages under which they operate. And one of the sources of compensating advantage is a technological edge.

In the knowledge economy that is increasingly characteristic of economies in advanced industrial countries, the nature of competition has shifted from price or product differentiation to technological competition. During the 1990s companies in the United States and in other advanced industrial countries all increased their investment in information processing equipment and software. Gust and Marquez found that such investment resulted in greater gains in productivity in the United States than in the other G-7 countries (2000, 665). Thus, aside from the gains in global market share enjoyed by U.S. high-technology industries such as communication equipment and computers and office machinery, other U.S. companies that increased their investment in information processing equipment and software in the second half of the 1990s

Figure 6.3   **U.S. Share of Global Value Added, High-Technology Industries, 1995–2003**
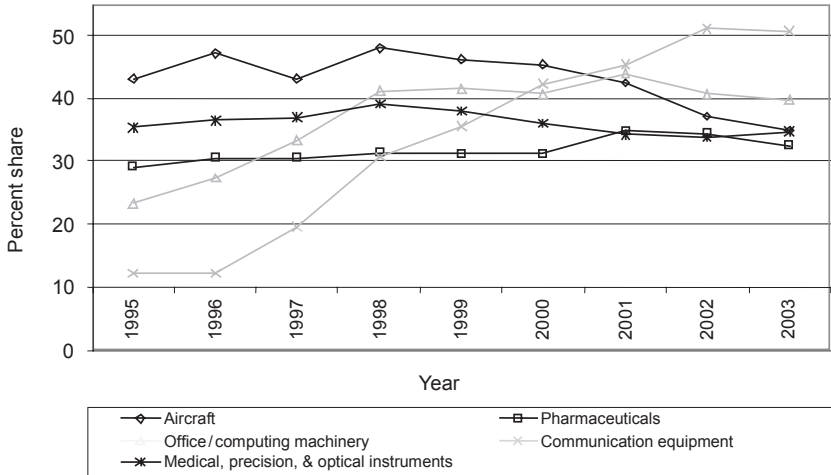
have made themselves more competitive in the global market by increasing their labor productivity more rapidly than other countries.

The increase in investment by U.S. companies in information processing equipment and software has not only increased sales in the computers and office machinery industry and in the communication equipment industry within the United States. These two high-technology industries also increased their share of the global high-technology market in the 1995–2003 period. But in the global economy of the second half of the 1990s and beyond, market shares change rather rapidly. Figure 6.3 illustrates this feature of high-technology industries.

In 1995 the U.S. aircraft industry, the leader in the world market for aircraft, had the biggest share of the global market if we measure that share by value added. It was followed by the medical, precision, and optical instruments (sometimes called scientific instruments) industry and the pharmaceuticals industry. The office and computing machinery industry and the communication equipment industry were the last among the five high-technology industries. By 2005 the aircraft industry, while still a leader in the world aircraft market, saw its market share fall to only about 35 percent, whereas the communication equipment industry, whose world market share has exhibited a pronounced upward trend, had captured more than 50 percent of the world market. The

office and computing machinery industry also gained world market share and became the high-technology industry in the United States with the second biggest world market share. If we recall that the two industries that gained the most global market share were also the industries with the biggest increase in investment expenditures, we can see the crucial role played by investment in high-technology equipment in business expansion and growth.

The emphasis on production in the first half of the twentieth century, pointed out by Gordon (1998), affected how economists analyzed investment. Before Dhrymes and Kurz (1967) started to probe the mutual impact of investment and financing decisions on each other, economists who studied investment believed that investment decisions and financing decisions were separate. Because of their acceptance of the Modigliani and Miller (1958) separation principle asserting that, in the presence of perfect capital markets, a firm's value is independent of how it finances its productive assets, they believed that corporations first determine what investment projects should be accepted before they figure out how to raise the funds needed to finance these projects. Eichner shared this view when he argued that megacorps determine their markup with an eye toward providing enough internal funds for financing investment.

At some point in the second half of the twentieth century, corporations realized that repurchasing previously issued shares might be better for increasing firm value than production. Although the use of funds for share repurchases was noted in the previously cited studies by Wolfson (1993) and Weller and Helppie (2005), without an examination of FOFA data we cannot see to what extent share repurchases have been a major use of corporate funds since the mid-1980s.

As of the time of this writing, annual FOFA data are available through 2005. To see the change in the investment and financing behavior of U.S. nonfinancial firms, let us look at the last forty years of data. Figure 6.4 has been constructed from Table F.102 of the FOFA data, for the nonfarm, nonfinancial sector of the United States. The chart shows four time series: (1) net funds raised in markets, the major components of which are (2) net new equity issues, (3) corporate bonds, and (4) bank loans. The data are net figures obtained by combining funds raised (positive figures) and funds repaid (negative figures), so a negative number for a year means that more funds were repaid than raised. For example, if the net new equity issues series is negative, it means that for the nonfarm, nonfinancial sector as a whole, more funds were spent on repurchasing shares than were raised through issuance of new shares.

Figure 6.4 shows the prevalence of share repurchases beginning in the mid-1980s, a phenomenon noted by Fama and French (2001, 6). In the eighteen-

Figure 6.4   **Components of Net Funds Raised in Markets by U.S.
             Nonfinancial Corporations, 1966–2005**
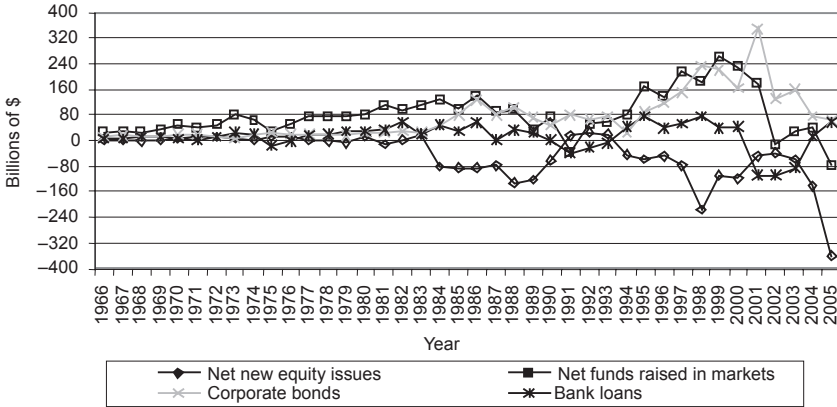
Source: See Figure 6.2.

year period from 1966 to 1983, there were only four years when funds spent on share repurchases exceeded funds raised by new issues, and the highest net share repurchase figure was $13.5 billion (in 1983). By contrast, in nineteen years of the twenty-two-year period from 1984 to 2005, funds spent on share repurchases exceeded funds raised by new issues, with an average net share repurchase of $103.2 billion. The data underscore the point that since the mid-1980s American corporations have no longer considered production the primary means of increasing firm value.

Also noteworthy from Figure 6.4 is the increase over time of the number of years in which the funds spent on repayment of bank loans exceeded funds raised by new bank loans. In *The Macrodynamics of Advanced Market Economies* Eichner argued that megacorps usually had a revolving line of credit with banks, so that as old loans are paid new loans are taken out to provide a continuous source of external finance to ensure adequate total finance during cyclical downturns (1987, 475). If that is so, the time series for bank loans should show positive figures for most years. Beginning in the 1990s, there have been stretches of years (e.g., 1991–1993 and 2001–2003) when that time series had negative net figures. These negative figures suggest that corporations were not using bank loans to finance capital expenditures. The large negative figures for the bank loans time series for 2001–2003 may also be evidence that corporations might have used bank loans for acquisition of other companies in earlier years and were repaying those loans in 2001–2003.

Undoubtedly some of the share repurchases, beginning in the late 1990s,

Table 6.2

Cross-Border Mergers and Acquisitions: Sales and Purchases by Region, 1990–1999

| Region/ | Sales | | | | | Purchases | | | | |
economy	1990	1995	1997	1998	1999	1990	1995	1997	1998	1999
Developed countries of which:	134.2	164.6	234.7	445.1	644.6	143.2	173.7	272	511.4	677.3
European Union	62.1	75.1	114.6	187.9	344.5	86.5	81.4	142.1	284.4	497.7
United States	54.7	53.2	81.7	209.5	233	27.6	57.3	80.9	137.4	112.4
Japan	0.1	0.5	3.1	4	15.9	14	3.9	2.7	1.3	9.8
Developing countries of which:	16.1	15.9	64.3	80.7	63.4	7	12.8	32.4	19.2	41.2
Africa	0.5	0.2	1.7	0.7	0.6	—	0.1	—	0.2	0.4
Latin American and Caribbean	11.5	8.6	41.1	63.9	37.2	1.6	4	10.7	12.6	24.9
Europe	—	—	—	—	0.3	—	—	—	—	—
Asia	4.1	6.9	21.3	16.1	25.3	5.4	8.8	21.7	6.4	15.9
Pacific	—	0.1	0.3	—	0.1	—	—	—	—	—
Central and Eastern Europe	0.3	6	5.8	5.1	10.3	—	0.1	0.3	1	1.6
World	150.6	186.6	304.8	531.6	720.1	150.6	186.6	304.8	531.6	720.1

Source: United Nations Conference on Trade and Development (UNCTAD), *World Investment Report 2000: Cross-Border Mergers and Acquisitions and Development*, p. 108 (Table IV.3). The report in turn got its data for that table from Thomson Financial Securities Data Company.

might have been undertaken to defend against the threat of being taken over by another firm, for merger and acquisition activity also increased over the same time. Table 6.2 shows that in the final three years of the 1990s world-wide mergers and acquisitions (M&A), both in sales and purchases, increased substantially from their levels in 1990, especially in developed areas like the United States and the European Union. The increase in M&A activity means that the threat of being a target of an acquisition became more pronounced in the late 1990s, prompting some corporations to repurchase their shares to make it harder for acquiring firms to gain control of a majority of their stock.

If we make the reasonable assumption that dividend payments and share repurchases are financed by internal funds, the increase over time in these two competing uses of internal funds implies that a smaller percentage of

internal funds will be available for financing capital expenditures. Weller and Helppie, after explaining why both dividends and share repurchases have increased since the 1980s, concluded that such increases might have reduced the internal funds allocated to capital investment:

> Beginning in the early 1980s, financial assets became increasingly concentrated in the hands of institutional investors, such as pension funds. Perceiving the lack of substantial returns on equities in the 1960s and 1970s as a principal agent problem, whereby managers had insufficient incentives to raise corporate share prices, institutional investors staged what is often called a "shareholder revolution." The result of this "revolution" was that the interests of managers and institutional investors were aligned by the use of the carrot of stock options and stock grants and the sticks of shareholder resolutions and corporate takeovers. . . . To avoid dilution of share prices and to raise stock prices to improve executive compensation and as defense against corporate takeovers, corporate management used larger proportions of retained earnings to buy back their own shares and growing shares of profits to pay for dividends. . . . Hence, fewer internal funds may have been available for investments in plant and equipment. (2005, 361)

The shift since the second half of the 1980s from defined-contribution to defined-benefit plans, which drove pension funds to seek greater returns from stocks, was another structural change that Eichner did not live long enough to observe. But he was able to anticipate the increased use of profits for dividend payouts. While discussing the pros and cons of debt versus new equity shares as sources of external finance, Eichner observed that "while the megacorp is not legally required to pay any dividend, let alone increase it, the practice, reflecting the power of the stockholders to depose the incumbent management group, is for the megacorp to raise the dividend rate over time in line with the growth of employee compensation" (1987, 479).

What do all these structural changes imply about Eichner's views on the financing behavior of megacorps? His insight that corporations rely mostly on internal finance to fund their investment expenditures is still valid, but corporate financial decisions today are much more complicated than they were when he was writing *Macrodynamics* in 1987.

On the generation of internal funds by megacorps through markup pricing, we have already seen that monopoly power has diminished in the years after the publication of that book. Even for megacorps that still have the power to control the size of the markup, it is not clear how they should determine the optimal markup when they are not looking at a steady long-period targeted growth rate. For in an environment in which opportunities for capturing new

markets in foreign countries are increasing, tremendous new sources of growth can confound previous growth rate estimates based on continued operation in only the existing markets in which the company operates.

In the area of competing uses of funds, we have seen that instead of regarding production and investment as the primary concern, corporations have allocated substantial amounts of internal funds for competing uses such as the payment of dividends and the repurchase of shares. All these changes imply that megacorps of today need more external funds for financing investment than megacorps in Eichner's time.

The desirability of using external sources of finance has also changed. In the global markets of the 1990s and beyond, many of the megacorps that Eichner wrote about have become multinational corporations with significant cash inflows and outflows in foreign currencies. For a multinational corporation receiving earnings in foreign currencies from its subsidiaries abroad, one way of managing exchange rate risk is to borrow in the currencies that it expects to receive as earnings from its foreign subsidiaries. The multinational corporation can then use its earnings denominated in foreign currencies to service its debt securities sold in foreign countries, thus minimizing the need to exchange earnings in foreign currencies for the domestic currency. And there is evidence that U.S. corporations are making increased use of debt denominated in a foreign currency.

Since 1982, the BEA has kept in its National Income and Product Accounts a time series measuring new issues of U.S. corporate bonds sold abroad by U.S. corporations. Figure 6.5, prepared from that time series, shows the growth in the debt finance that U.S. corporations have tapped from foreign countries between 1982 and 2002.

As we can expect, there are fluctuations in the amount of funds raised by selling corporate bonds to foreign countries from year to year. The relative attractiveness of U.S. corporate bonds to foreign investors depends on, among other things, the level of interest rates in the United States relative to the level of interest rates in foreign countries. Because relative interest rates change over time, we should expect fluctuations in the time series depicted in Figure 6.5. In spite of the fluctuations, there is an unmistakable upward trend in the amount of funds U.S. corporations have raised in foreign countries.

Eichner's insight that the main goal of megacorps is growth to ensure long-term survival is as valid today as when he wrote *The Macrodynamics of Advanced Market Economies*. To exploit the opportunities for growth fully, megacorps have more financing needs when they become multinational corporations than when they were operating only within their home countries. Although they should not overuse external sources of finance to avoid bankruptcy, limiting their use of external finance because of excessive financial

Figure 6.5 **New Corporate Bond Issues Sold Abroad by U.S. Corporations, 1982–2004**
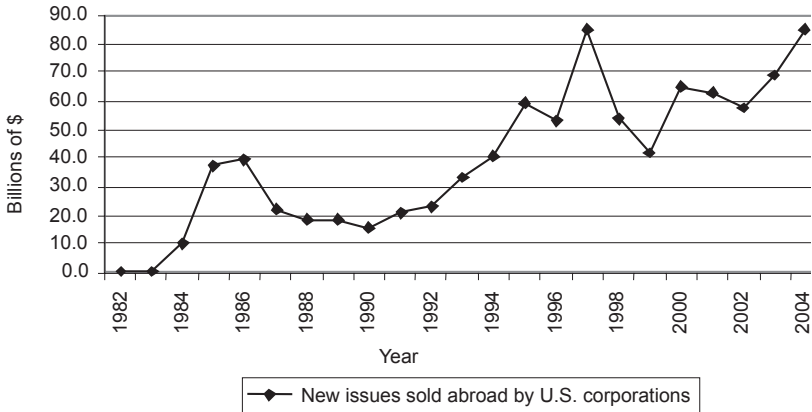
Source: Bureau of Economic Analysis, U.S. International Transactions Accounts Data, Table 7a.

prudence is not consistent with the goal of maximizing growth. As investment opportunities for megacorps become more complicated, megacorps need to adopt more complicated financial strategies to exploit these opportunities than they did during Eichner's unfortunately short life.

The Continuing Significance of the Macrodynamics of Advanced Market Economies

Although the structural changes I have surveyed in this chapter lessen the validity of some specific positions taken in *The Macrodynamics of Advanced Market Economies*, they do not diminish the true significance of the book. For that significance lies not so much in Eichner's specific views as in his method for conducting economic inquiry. The hallmark of that method is an insistence on surveying all the relevant literature on a subject regardless of the school of thought it represents, on demanding that the predictions of theory be supported by economic data and historical and institutionalist studies, and on being open to the light that new research may shed on subjects on which we have already formed our own opinions. Readers who adhere to that method of inquiry will find it invaluable in their own research.

A unique feature of that method is the systems approach to modeling an economy, covered in the introduction of the book. Eichner saw the economic system as part of a larger system that is society as a whole; he also saw it as

the larger system for economic subsystems within it. The systems approach forces us to explore the interdependencies between parts of the whole system. For Eichner, the economic system is one of the three operative systems that make up the system of society—the other two being the political system and what he calls the anthropogenic system. Although each system has its own internal operational process, each system acts upon and receives feedback from the other two.

The structural changes that I have discussed have only underscored the importance of Eichner's systems approach to economic modeling. For the globalization of markets is a reminder that each national economy is only a part of the larger global economic system. Eichner's delay in publishing his views on the rest of the world sector (the chapter in which he planned to discuss this subject was not available at the time his 1987 book was published) suggests that he recognized the magnitude of the task and wanted to avoid a superficial treatment that would not measure up to the systems approach he advocated.

But a systems approach to economic modeling involves more than studying the global context of economic decisions. To understand the behavior of the economic actors and other decision-making units (such as households and firms), we should also recognize that many complex factors affect economic decisions. As Eichner pointed out, the economic system is affected by the political system and the anthropogenic system and in turn affects them. But for many years neoclassical economists have studied economic behavior assuming that it is predominantly guided by rational thinking. In that approach there is no consideration for the possible impact of the other two operative systems upon economic behavior.

Research in experimental economics has already shown that economic actors do not always behave rationally. Economists are beginning to see the need to team up with psychologists to design experiments that will shed more light on how economic actors actually behave. Given Eichner's interest in turning economics into a science—see his paper "Why Economics Is Not Yet a Science" (Eichner 1983)—he would have welcomed the efforts of economists who insist on experiments rather than the internal elegance of economic models to support their hypotheses about economic behavior. Readers inspired by his work can enrich our understanding of economic behavior if they take seriously his example of further developing a systems approach to the study of that behavior.

The mark of a classic work is its ability to speak to readers of different historical periods, stimulating new thoughts and suggesting new modes of inquiry. Like Keynes's *The General Theory of Employment, Interest and Money* (1936), which was written for a depression economy but contains insights that

can be applied even in today's economy, Eichner's *The Macrodynamics of Advanced Market Economies* was written at a time when the U.S. economy was very different from today's economy, but the book continues to provide insights that can be applied today.

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7

Pricing and Profits Under Globalized Production

A Post-Keynesian Perspective on U.S. Economic Hegemony

William Milberg

The balance of payments position of the British Empire in the late nineteenth and early twentieth centuries was characterized by a surplus on the trade account—especially in manufacturers' trade—and a capital account deficit. This was consistent with the theories of imperialism of the day, including those of Lenin, Hobson, and even Kalecki, who all saw export markets as the necessary supplement to domestic markets and the political control of these markets as part of the logical expansion of capitalism—its "highest stage," as Lenin put it. Today, the U.S. is widely recognized as dominating the world economy, and yet its balance of payments structure is the reverse of Britain's, with a large trade deficit and capital account surplus. Kalecki's analysis (1991) is particularly relevant here, because he saw the trade surplus as the basis for expanding the profit share, through a profit multiplier.[1] Blecker (2001) notes that with this insight, Kalecki felt he had "solved the problem of imperialism"; that is, he had captured the logic of the pursuit of foreign markets in relation to the pursuit of profit.

Blecker (1989) sought to place this Kaleckian view in the context of modern trade competition among industrialized countries. He identified import competition as an important force mitigating the power of oligopoly to raise markups. In the presence of import competition, domestic cost increases (such as a wage increase) would reduce firms' markup over costs, reducing the profit share and leading to a reduction in investment and economic growth.

Kalecki's (and Blecker's) insight seems to have been borne out, with one unpredicted twist: the imports are being driven by U.S. firms themselves in

their effort to cut costs by importing low-cost inputs of goods and services. In the process, these firms have also reduced the demand for, and cost of, U.S. labor, further easing the costs of production. The result is that a growing trade deficit is essential to retaining profits, markups, and market share—just the opposite of Kalecki's prediction.

This chapter builds on the post-Keynesian theory of markup pricing to formulate the outlines of the microfoundations of a theory of U.S. economic hegemony in an age of global production networks. U.S. firms have successfully used global production networks to reduce costs and raise markups without pushing up final goods and services prices. The concern with cost control as opposed to prices per se constitutes a shift in firm strategy. It results from product and process innovation by oligopoly firms, and these innovations themselves are a response to changes in technology and in market demand conditions. Here I focus on the ability of lead firms to induce more competitive and risky conditions among supplier firms while augmenting existing barriers to entry to the position of lead firm. The situation requires a modification to post-Keynesian pricing theory and has implications for the scope of the firm, income distribution, economic growth, and the balance of payments.

The new firm strategies have changed the structure of U.S. production and trade, making them more dependent on imports. The reliance on imported intermediates has intensified in the past ten years, corresponding with historic highs in the profit share in the United States and creating new obstacles to industrial upgrading among its developing-country trading partners. The U.S. trade deficit is thus compatible with the hegemonic role of U.S. corporations and potentially with a robust rate of investment and growth. From this perspective, the sustainability of current international payments imbalances may hinge more on the tensions resulting from rising economic inequality in the United States and abroad—in part the result of this process—than on the traditional calculation of the growth rate of foreign debt or official reserves.

Globalized Competition

The shift in oligopoly firm strategy is the result of two factors, which combined come under the category of globalized competition. The first is the emergence of global production networks, whereby lead firms have increasingly broken up the production process into parts and located the parts in different countries. The second is the increased price elasticity of demand in consumer product markets, which has encouraged mass customization, whereby firms retain mass manufacturing methods while introducing considerable product differentiation and customization.

Emergence of Global Production Networks

Production has increasingly been broken up into components, which are performed in different countries. This process, called variously globalization of production, vertical disintegration of production, vertical specialization, or international fragmentation of production, has been attributed to the availability of new computer, telephone, and transportation technology, which has greatly reduced the costs of, and allowed more careful management and control of, foreign operations than ever before. The resulting global production networks (also called global supply chains, global commodity chains, and global value chains) are organized through a parent firm and its transnational affiliates or through a series of arm's-length subcontracting relations. In either case, the networks are generally governed by large, oligopolistic, lead firms. Gereffi (1994) distinguishes between buyer-driven and producer-driven value chains, the distinction depending on the nature of the lead firm in the chain and thus with implications for the governance structure of the chain. A producer-driven chain is typical in industries characterized by scale economies and driven by multinational producing firms that may outsource production but keep research and development and final good production within the firm. Automobiles, computers, and aircraft are examples. Buyer-driven commodity chains occur mainly in consumer durables such as apparel, footwear, and toys. In this case the global commodity chain is driven by large retailers (e.g., Wal-Mart); that is, firms that do no manufacturing themselves, but perhaps do design and marketing and subcontract the entire production of the good. Gereffi, Humphries, and Sturgeon (2004) have extended the traditional dichotomous taxonomy between market and hierarchy by adding three intermediate modes of organization of global production networks, between the two extremes of hierarchy (transnational corporation) and market (completely based on arm's-length subcontracting).

One measure of the importance of global production networks is the steady increase in imported inputs used by industry in the industrialized countries. In U.S. manufacturing, the share of imported inputs has risen to over 30 percent in many industries.[2] Those industries relying most heavily on imported inputs are apparel (38 percent), textiles (29 percent), motor vehicles, metal, and electronics (all about 22 percent). In the services sector, imported input use is generally lower, led by publishing and software (13 percent), management services (10 percent), and computer system design (7.5 percent).

Imports of intermediate goods and services now constitute a large share of total imports. Yi (2003) calculates that trade in intermediates accounted for over 50 percent in the growth of U.S. trade in the period 1962–1997. The intermediates category may even understate the importance of global production

networks, as firms have increasingly become importers of completely finished goods, providing only brand design and marketing. These manufacturers without factories outsource every aspect of production and are able to earn profits based on entry barriers maintained with strong brand identity. Examples of such firms are found in apparel (The Gap), children's toys (Mattel), and computers (Dell). The latter provides after-sales service, but increasingly even this dimension of the product is provided from abroad.

As a share of total trade, intrafirm trade has been fairly constant over a long period of time, indicating that the great source of growth in intermediates as a share of total trade comes from arm's-length trade. Nonetheless, U.S. intrafirm trade is particularly high for some regions (Latin America, especially Mexico) and rising rapidly for others (East Asia, in particular Korea and China).

Price Competition, Mass Customization, and the Persistence of Oligopoly

Despite the assertion of the lead role of large oligopoly firms in global production networks, price increases per se have not been the main driving force for firm profits in the era of globalization. Competition among large firms has revolved instead around greater variety—and thus more customization of design—and higher quality. The move to these other forms of competition was driven by the interaction of economic, technological, and cultural forces. Inward foreign investment, foreign capacity expansion, and slow growth in the global economy have rejuvenated competition among oligopoly firms, limiting their pricing power.[3] On the technology side, firms' ability to produce a greater variety of goods was furthered by new management techniques and the computerization of production and its management. As this production capacity grew, consumers increasingly demanded low prices and high quality, giving further impetus to the changes on the production side.

The proliferation of varieties in consumer products began with Toyota's introduction of more models in a given year than any of its competitors (Madrick 2002). This capacity is typically associated with changes in the management of the assembly line, the introduction of just-in-time inventory control, and a system of industrial relations that promoted flexibility and production worker cooperation. The introduction of information technology to processes of production has affected not only productivity, but also the variety of products offered. Computer-aided design and computer-aided manufacture (CAD-CAM) have changed firms' ability to vary product lines and rapidly introduce new designs. Computerized inventory controls such as stock-keeping units (SKUs) have led to rapid, detailed collection of sales and inventory information. Firms can now regulate inventory with utmost preci-

sion. Giant retail firms boast of a designer line of consumer goods, changing as seasons and fashions change. In the apparel industry, "fast fashion" is the name given to those firms that are able to alter each store's offerings within days, based on the latest trends and buying patterns at that particular store.[4] Variety in consumer goods—from fancy coffees to household appliances to cell phones—has exploded, in part the result of greater flexibility in production and better data collection on consumption patterns.

Mass customization has been an effective corporate response to rising consumer power and the heightened demand for variety and quality. The result has been a consolidation of power by large firms, indicated by a rise in industrial concentration since the mid-1990s. Nolan and colleagues characterize the increase in industrial concentration internationally as a "global big business revolution." This revolution, they write, "produced an unprecedented concentration of business power in large corporations headquartered in the high-income countries" (Nolan et al. 2002, 1). They identify a broad range of industries with high degrees of concentration as measured by market share, including commercial aircraft, automobiles, gas turbines, microprocessors, computer software, electronic games, and even consumer goods, including soft drinks, ice cream, tampons, film, and cigarettes, and services such as brokerage for mergers and acquisitions and for insurance. A selection of this market share evidence is presented in Table 7.1 (see page 122).

Thus the rise of global production networks and the pressure on product market prices have not affected the general dominance of oligopoly firms in the world economy. Oligopoly pricing continues to appear as a much higher markup over costs than is found in more competitive sectors. A recent cross-country study, for example, found that in a number of industrialized countries, the markups in oligopoly sectors are twice the level in competitive sectors.[5]

Heightened Competition Among Suppliers

There is less evidence available on markups and market structure among supplier firms in global production networks, especially in developing countries. While firm size no doubt matters, it is the structure of product and factor markets, and the investment strategies of firms, that determine markup pricing power. Among supplier firms, the constellation of power between lead and supplier firms will be crucial. At the low end of the global commodity chain, low entry barriers are the norm. More and more countries are establishing production capability in manufacturing sectors. Most of this spatial dispersion of production is in low value-added niches of markets. The pattern has often been identified in the textiles and apparel sector and in consumer electronics, but the phenomenon of more countries entering production in low value-added sectors over time has

been identified much more broadly across manufacturing.[6] Mayer et al. (2001) measure industry concentration in terms of the number of countries involved in production. They use a standard measure of concentration (the Herfindahl-Hirschman index), substituting the number of countries for the number of firms in an industry. A decline in the index thus reflects a decrease in "concentration" or, more accurately, an increase in the spatial dispersion of production in that sector. Of the 149 sectors in the data set, 119 experienced decreased concentration over the period 1980–1998. In nonmanufacturing sectors, 50 of 76 experienced decreased concentration.[7] These results are supported by econometric studies of the degree of competition in developing countries.[8]

There is evidence that even many large supplier firms (in terms of output and employment), including many Chinese producers in electronics and apparel, are without pricing power. Only in the past year is there emerging evidence in the popular press that these firms are gaining some ability to demand higher markups.[9]

Markup Pricing Theory With Endogenous Asymmetry of Market Structure

The Shift to Cost Control

Thus we discern two seemingly incongruous tendencies in the evolving structure of global industry. On one side, there continues to be a high degree of concentration of industry. And markups in these oligopoly sectors are much higher than in traditionally competitive sectors. On the other side, there is evidence that more and more developing countries are entering lower value-added manufacturing industries. The result is an asymmetry of market structures through the global value chains, with oligopoly, lead firms, at the top, and competitive markets among the lower-tier suppliers.

The apparent paradox is resolved, however, when we see that it is precisely this asymmetry of market structures in global commodity chains, and the ability of lead firms to generate and maintain the asymmetry, that are at the core of the oligopoly firms' cost-cutting strategy that has helped them maintain their dominance. Product pricing power per se is no longer crucial to maintaining markups. This is now accomplished by customization and by cutting costs, the latter being managed increasingly through offshore sourcing in global production networks.

The increase in price competition in product markets among oligopoly firms—especially in the retail sector, but also in sectors as technologically diverse as automobiles and computers—has made the firm's implicit cost of raising the price prohibitively high. With this price competition, combined with

Table 7.1

Market Shares for Various Business Activities

Firm	Business activity	Market share
Aerospace		
Boeing	commercial aircraft over 100 seats	70
Airbus	commercial aircraft over 100 seats	30
Bombardier	20–90 seat aircraft	38
Embraer	20–90 seat aircraft	36
Rolls-Royce	aero-engine orders	34
GE	aero-engine orders	53
Pratt & Whitney	aero-engine orders	13
Fast-moving/branded consumer goods		
Coca-Cola	carbonated soft drinks	51
Reckitt Benckiser	dishwashing powder	38
Procter & Gamble	tampons	48
Gillette	razors	70
Fuji Film	camera films	35
Chupa Chups	lollipops	34
Nike	sneakers	36
Fuji	camera film	32
Kodak	camera film	35
Konika	camera film	11
IT/Electronics		
Intel	microprocessors	85
AMD	PC microprocessors	20
Microsoft	PC operating systems	85
Microsoft	word processing applications	90
Microsoft	business desktop computer applications	90
Cisco	computer routers	66
Cisco	high-end routers	80
Corning	optical fibers	50
Hynix	DRAMS	17
Samsung Electronics	DRAMS	29
Compaq	Servers	20
Sony	electronic games	67
Nintendo	electronic games	29

(continued)

the newfound advantages of international offshoring, the strategic emphasis in the firm's effort to sustain the markup has shifted from price-setting to cost-cutting. That is, while the emphasis in the classic post-Keynesian work by Eichner (1976) was on price setting, recent developments in corporate strategy and the globalization of production require a shift in emphasis of pricing theory. The markup over costs is defined as $m = (p - c)/c$, where p is price, c is average total costs, and m is the markup. The focus in the literature has been on the ability of firms to raise p, subject to various constraints. Eichner (1976) identified these constraints as the result of substitution by consumers, entry by new rival firms, and the possibility of government intervention. To

Table 7.1 *(continued)*

Firm	Business activity	Market share
Power equipment		
GE	gas turbines (1993–1998)	34
Siemens/Westinghouse	gas turbines (1993–1998)	32
ABB/Alstom	gas turbines (1993–1998)	21
Alstom	heavy-duty turbines	15
Others (including services)		
Barry Callebaut	industrial chocolate	33
Whirlpool	major household appliances	36
Shimano	mountain bike parts	30
Brita	point-of-use water filters	85
Goldman Sachs	announced global M&A	40
MSDW	announced global M&A	33
Marsh	insurance broking	32
Aon	insurance brokerage	25
Reuters	financial information	30
Bloomberg	financial information	30
WPP/Young and Rubicam	advertising	20
Omnicom	advertising	18
Interpublic	advertising	18

Source: Nolan et al. 2002, 91.

add the offshoring of inputs, let variable costs, $c = wa$, where w = wage and a = the unit labor requirement. Suppose $c = (r)w^*a^* + (1-r)wa$, where r is the share of inputs produced offshore, an asterisk designates foreign, and it is assumed that foreign production costs are lower than U.S. costs—that is, $dc/dr < 0$. Indirectly, the move offshore or even its threat can lower wage demands and dampen domestic wages. That is, if $w = w(r)$, where $dw/dr < 0$, as outsourcing rises, U.S. wages fall, reinforcing the positive relation between offshoring and the markup.

This shift in corporate strategy from product prices to costs does not invalidate the earlier post-Keynesian insights. Shapiro and Sawyer, for example, argue that the strategic nature of both prices *and* costs is important for the post-Keynesian theory. Regarding the cost accounting literature, they note that "products have no 'real,' inherent, full cost of production. . . . The firm can administer its costs as well as its prices. . . . [N]either the cost of products nor the demand for them are taken as given in the product pricing of the firm" (2003, 9, 10, 11).

Endogenous Asymmetry of Market Structure in Global Production Networks

In this section I argue that the asymmetry of market structures found in many supply chains is not some natural outcome, but the result of the competitive

process itself. That is, it is endogenous to the formation of the supply chains. I discuss a series of company strategies aimed at raising competition among suppliers and blocking entry to lead firm markets.

The asymmetry of market structure in global supply chains may take a variety of forms distinguished by the markup over costs and the share of value added at different points in the chain. Four hypothetical cases are depicted in Figure 7.1. In all cases, value added rises at higher levels of the commodity chain, reflecting the standard view that "moving up the value chain" implies moving into higher value-added production activities. Case I in the figure is labeled "Vertical competition" because it depicts the competition of uniform markups at each point in the chain. Case II is titled "Pressure on Subcontractors" because it shows declining markups and declining value-added share at lower points in the commodity chain, indicating both the possible motivation for outsourcing (less value added) and the ability to squeeze suppliers (lower markups over costs). Case II describes an oligopolistic market structure at the top of the chain and a highly competitive structure at the bottom. This case most clearly reflects the asymmetry associated with the increasing volume of arm's-length outsourcing.[10]

Case III is that of the "Strong first-tier supplier," typically in a developed or newly industrialized country—for example, airplane parts manufacturers in Japan, automobile parts producers in Brazil, semiconductor firms in South Korea, or even some apparel producers in Mexico. Case IV is titled "Strong middleman," reflecting a bloated markup in the middle of the chain, resulting from the ability of traders to both squeeze suppliers below them and retain proprietary advantages not appropriable by demanders to whom they sell. Examples of this are the cut flower industry, the Hong Kong apparel trade, and the cocoa and coffee trade.[11]

An important feature of the asymmetry of market structure in global production networks is its endogeneity, which can take a variety of forms depending on the strategic focus of the lead firm. Four strategies stand out in the recent case study literature on global production networks: inducing competition among suppliers, erecting entry barriers through branding, offloading risk, and minimizing technology sharing. Some sectors lend themselves to only one or the other of these mechanisms. In many sectors, lead firms engage in more than one form at a time.[12]

Inducing competition is the process of diversifying among suppliers in order to spur competition among them. Playing one supplier off another, working with multiple suppliers, and even creating new supplier firms have become standard strategies of lead firms in global production networks. These techniques keep input prices low. Of course, this diversification also reduces risk in the event of political, economic, or natural disaster in any particular

Figure 7.1   **Cost Markups and Value Added in the Global Commodity
Chain: Four Hypothetical Cases**

CASE I
VERTICAL COMPETITION

markup

LEAD FIRM

FIRST-TIER
SUPPLIER

VALUE ADDED

CASE II
PRESSURE ON SUBCONTRACTORS

$$P = (1+m)wa \Leftrightarrow m = \left[\frac{P}{wa}\right] - 1$$

CASE III
STRONG FIRST-TIER SUPPLIER

CASE IV
STRONG MIDDLE MAN
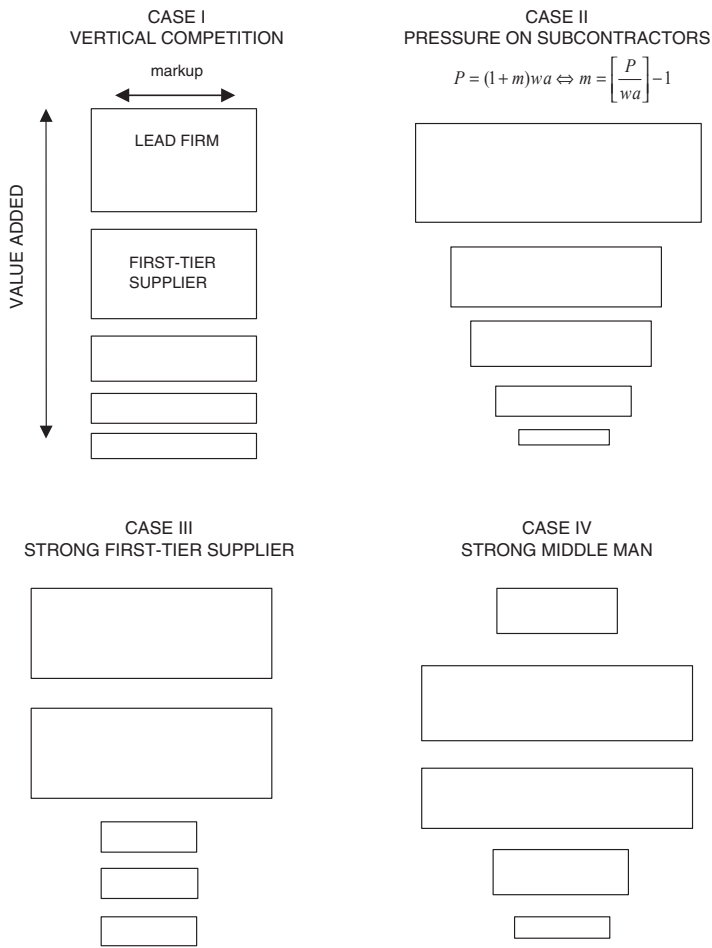
country or a unionization effort or work protest at any particular location. It
is easiest where global capacity is already excessive.

Sustainability of the Asymmetry

At least four factors make this asymmetry sustainable over time. First is the
nature of entry barriers, which we have seen are formidable at the high end
of the value chain and nonexistent at the low end. At all levels of the global
commodity chain, scale economies may deter entry. In addition to the barrier

from branding, which makes market access difficult at the top of the supply chain, scale economies may deter entry especially for lead firms and many first-tier suppliers. Even fab-less firms limit market access by innovative product design and marketing activity. In this environment, it is difficult for developing-country firms to develop their own brands.

A second factor is capital mobility, which affects the low value-added operations much more significantly than the high value-added ones. Gereffi (1999) shows how apparel production has moved over time to lower-cost (i.e., wage) locations. There is evidence that this mobility is affected even when the supply chain is organized within a single firm. Brainard and Riker's (1997) finding that the elasticity of labor demand is much greater for low-wage af-filiates of multinational enterprises with respect to other low-wage operations than it is between a high-wage and low-wage location suggests that capital mobility creates competition among low-wage locations.

A third factor is political. Tariffs have fallen most in low value-added sectors. This is true generally, but has also been an explicit policy goal, as seen in the tariff policies that promote low-wage offshore assembly op-erations, such as the 8208 program of the United States, provisions of the Lomé convention, and the establishment of export processing zones in many developing countries. These programs are highly concentrated in the gar-ment and electronics sectors. Textiles and apparel are traditionally one of the lowest value-added sectors in manufacturing. And the electronics parts and components that dominate in export processing zones are at the low end of the spectrum of value added for electronics goods.

A fourth factor sustaining the asymmetry is the persistence and even growth of global excess capacity in many industries. Freeman (2007) describes the entry of China, India, and Eastern Europe into the world capitalist economy as a historic, "great doubling" of the world's labor force, adding enormous productive capacity. This competitive pressure on suppliers translates into pressure on labor costs or on labor standards.[13]

"Core competence" and the Scope of the Firm

If outsourcing can create competition among suppliers, reduce costs, and raise flexibility beyond what could be accomplished within the realm of internal operations, then globalized production will be increasingly coordinated exter-nally rather than within firms. Thus, an additional consequence of globalized competition is that the scope of the firm has in many cases narrowed. In the management literature, this is presented as a focus on "core competence." But core competence is a synonym for rent-generating, and many firms have outsourced the non-rent-generating parts of their operation, at the same time

encouraging competition among foreign suppliers so as to ensure low prices for the purchased inputs.

Markups and the Profit Share in the United States

Substituting lower-cost intermediate goods and services imports for higher-cost domestic inputs will raise the markup and thus the profit share.[14]

The markup, $m = (p–c)/c$, and costs, are defined as variable costs, wa, where w is the wage and a is the labor coefficient. Thus, we can write:

(2)
$$m = (p – wa) / wa$$

or

(3)
$$p = (1 + m) wa$$

Since the pretax profit share

(4)
$$R = (p – wa) / p,$$

this implies that

(5) $R = ((1 + m)wa – wa) / (1 + m)wa = mwa / (1 + m)wa = m / (1 + m)$.

Viewed alternatively, the wage share, $S = 1–R = 1/(1 + m)$. Thus $dS/dm < 0$.

The share of corporate profits in U.S. national income has increased to levels not seen in forty years. Has globalized competition, specifically offshoring, been a factor in this rise in the profit share? This is a claim often made in the popular press, but there is little empirical research by economists on the contribution of offshoring to corporate profits—perhaps it is considered too obvious an issue—and what does exist is surprisingly ambiguous in its findings. Firm-level surveys (for example, McKinsey Global Institute 2003) find that services offshoring reduces costs to the firm by around 40 percent for the outsourced activity. Dossani and Kenney (2003, 7) report that a 40 percent cost saving represents the hurdle rate of return on services offshoring. A number of large firms they survey reported savings considerably higher than this. Gorg and Hanley (2004), using a sample of twelve Irish electronics manufacturers, find that firm-level profits are directly related to outsourcing for large firms (in employment terms) and not significantly related for the small firms in the sample. In a study of small and medium-size Japanese firms, Kimura (2002) found no relation between subcontracting and profitability. And in a study of German manufacturing firms, Gorzig and Stephan (2002) found that outsourcing of materials was

Figure 7.2   **Outsourcing and Profit Share in Private Industry**
(All variables in percentage changes 2000–2003,
with multivariate regression results)

$$\%\Delta ps = -0.27 + 0.97\%\Delta os + 0.54\%\Delta empsh + 0.92\ \%\Delta labprod + 1.19\%\Delta kint$$
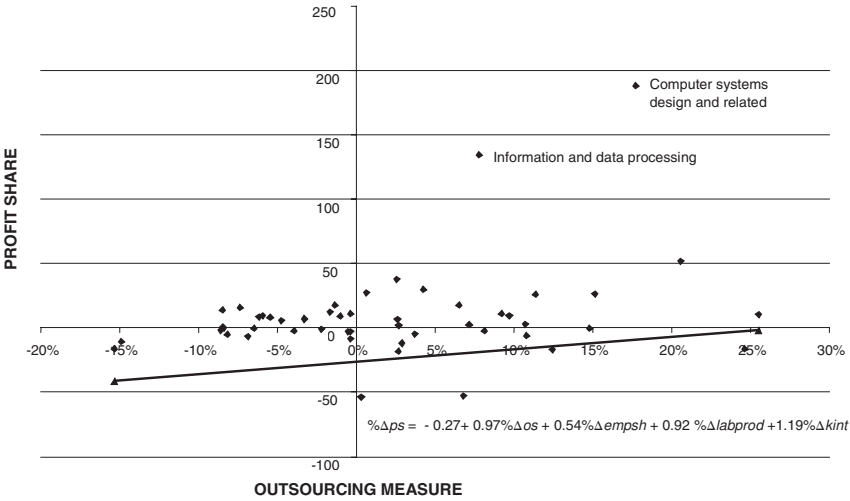
associated with higher profits but outsourcing of services was associated
with lower profits.

We estimated changes in the profits share at the sectoral level, adding a mea-
sure of offshoring while controlling for variables commonly used in models
of the profit or wage share, including the sectoral share of total employment,
labor productivity, and capital intensity. Using ordinary least squares, we es-
timated the model for a cross-section of fifty-nine industries by looking at the
percent change in all variables over the period 2000–2003. Corporate profits
in the United States have reached a historic high, and the share of corporate
profits in national income is higher than at any time since 1969. The model
follows the specification of Bentolilia and Saint-Paul (2003):

(6) $$PSHARE_i = \beta_0 + \beta_1\ (EMPSHAREi) + \beta_2(CAPINT_i) \\ + \beta_3(LPRODi) + \beta_4\ (OFFSHORE_i) + \varepsilon_t$$

where PSHARE is the profit share, EMPSHARE is the sector share of total
employment, CAPINT is the ratio of capital to value added, LPROD is labor
productivity, and OFFSHORE is the level of offshoring.

The regressions rely on a very small sample; thus the results, presented
along with a scatterplot of the profit share and offshoring data in Figure 7.2,
are merely suggestive. The offshoring variable is positive and significant. The

same results were found when we regressed these variables on the percentage change in the sectoral profit *rate.* In sum, changes in the profit share at the sectoral level during 2000–2003 were positively and statistically significantly associated with changes in outsourcing.

Asymmetry as an Obstacle to Industrial Upgrading

We turn briefly to consider the consequences of endogenous asymmetry for U.S. trading partners, in particular in developing countries. Economic development has been transformed by the emergence of global production networks. Whereas previously export-oriented industrialization meant competing according to comparative advantage, today the predominance of global production networks means that economic development is now closely tied to a nation's industry's ability to successfully enter these networks, to become a supplier in the supply chain, and then to move up into higher value-added activities in the global supply chain. Industrial upgrading is the new synonym for export-oriented industrialization.[15]

The endogenous asymmetry of these supply chains is an obstacle to such industrial upgrading. Each of the four aspects of asymmetry described above constitutes an obstacle to upgrading: supplier firms face enormous competitive pressure from other suppliers to keep costs low, keep quality consistently high, and to keep delivering on schedule or risk losing the contract. They must bear much of the risk of carrying inventory in the face of volatile demand. They are sometimes limited in the technologies they can adopt. And they are limited in moving to the top of the supply chain by the expensive and successful branding strategies of the lead firms.

The evidence is that these obstacles have been binding. Developing countries have very successfully expanded their share of world exports of manufactured goods. But in general their share of manufacturing value added has not increased proportionally.

Milberg and von Arnim (2007) developed a country-level "coefficient of upgrading" as the percentage change in the country's share of world manufacturing value added relative to the percentage change in the country's share of world manufacturers exports. Data for the period 1980–2004 shows that in general developing countries have had much success in expanding their exports of manufactured goods. But in general their share of manufacturing value added has not increased proportionally. As a result, most developing countries, and in particular all of the sample Latin American countries, can be described by industrial "downgrading," whereby the growth in export share outstrips the growth in value-added share. Mexico is a particularly extreme case, having seen a more than sixfold export share expansion and effectively no increase in its manufacturing value-added share.[16] Korea and

India, by contrast, experienced "upgrading" according to the definition. Korean increase in its share of world export value added was more that twice its increase in manufacturing export share. For India, its world manufacturing value added share rose more that 30 percent more than its expansion of world manufacturing export share. I should note that China had massive expansion of both its manufacturing export share (growth of 723 percent) and its share of manufacturing value added (growth of 446 percent). In general, the Asian economies show a very different profile than those of Latin America.

These findings on industrial upgrading are supported by recent studies showing that the export-led growth strategy adopted by most developing countries following the debt crisis in the 1980s (in place of the previous strategy of import substitution industrialization) has suffered from a "fallacy of composition" problem. That is, it may be advantageous for one country if it alone achieves exporter status in a particular industry. But if many countries make the same calculation, all countries will be unable to capture the same advantage because of lower prices that follow from the expansion of world supply.[17] Thus the picture on upgrading provided by Milberg and Arnim (2007) is supported by data on trends in the terms of trade faced by many developing countries. The situation would appear to be a contemporary version of the Prebisch-Singer dilemma. In the contemporary context, developing country firms have made the transition to manufacturing exports, yet are again suffering the terms of trade stagnation predicted by Prebisch-Singer in earlier years.[18]

In addition to terms of trade weakness in developing countries, the endogenous asymmetry of market structures also implies higher inequality in these countries. Competition among suppliers requires both low markups in supplier firms and careful control of wages. Generally speaking, large excess supplies of labor in developing countries, and especially large pools of female labor to serve as a buffer, result in downward pressure on wages. Even China, with its explosive growth in output and exports, has seen little increase in average wages and almost no convergence of its wages with wage levels in the industrialized countries (Glyn 2006). This perspective on trade and income distribution contrasts with that of the factor endowments model of trade, according to which trade liberalization is expected to raise inequality in rich countries abundant in capital and high skills and, by symmetry, should lead to the reduction of inequality in labor- and low-skill-abundant countries.

Conclusion: The Political Economy of Balance of Payments Sustainability

Globalized competition has implications for the dynamics of international payments. The U.S. current account deficit in 2006 soared past $800 billion

Table 7.2

Sources of Finance: U.S. Current Account, 1980–2006 (in percent)

	2004	2005	2006	1980–1989	1990–1999	2000–2006
Current account	−5.7	−6.4	−6.6	−1.7	−1.6	−5.2
Financed by:						
Direct investment	−0.9	0.8	−0.4	0.3	−0.1	−0.01
Other private capital	2.6	3.7	3.0	0.8	0.9	3.3
Official reserves abroad	3.3	1.6	2.4	0.4	0.7	1.7

Source: Bureau of Economic Analysis and author's calculation.
Note: All numbers are flows relative to GDP.

on an annual basis, with a bilateral deficit with China exceeding $200 billion in the same period.[19]

The situation would appear to be unsustainable; over the past few years, many prominent economists have predicted a hard landing for the dollar and a sharp rise in interest rates in the United States to sustain the capital inflow. Despite the steep recession over the past two years, these have not taken place.

Capital flows are driven by calculations about risk and return, and I have shown that the rising U.S. import surplus works favorably on both these fronts. U.S. imports of intermediate (as opposed to final) goods and services have risen steadily in the past fifteen years, and resulting cost reductions have been important for maintaining markups and the profit share in a period when product market prices have not moved up much. The positive impact on nonfinancial corporations' markups and profit shares has served to attract capital from abroad. Despite all the discussion of Chinese government purchases of U.S. Treasury securities as crucial to financing the U.S. deficit, private capital inflows play a much more significant role than official flows. For the period 2000–2006, in which the current account deficit was on average 5.2 percent of GDP, only 1.7 percent of GDP came from official reserve flows and 3.2 percent of GDP came into the United States in the form of direct investment or other private capital inflows (see Table 7.2).[21] These capital inflows continued even as U.S. corporations were awash in cash and thus were raising dividends, share buybacks, and their involvement in mergers and acquisitions.

With the onset of economic crisis in 2008, the U.S. deficit has fallen from 7 percent of GDP in 2006 to 4.4 percent in the fourth quarter of 2008 and 2.9 percent in the first quarter of 2009, as imports have dropped by more than exports. Nonetheless, the debate continues over the need for the U.S.-China imbalance to be resolved. Our analysis indicates that these imbalances, although large, appear to be self-reinforcing, since capital inflows require higher profit rates that in turn require a relatively high reliance on cost- and risk-reducing offshore suppliers. The fact that more than 25 percent of U.S. imports from China are related-party imports—that is, from firms with at least 5 percent ownership by U.S. transnational corporations—provides further reinforcement of the link.

The forces driving the imbalances have led to rising income inequality in the main deficit and surplus countries, and this may be a greater source of instability than the payments imbalances themselves. In the United States, as we have seen, the profit share increase has occurred as real wages have risen much more slowly than productivity and employment rates have not moved up in pace with economic growth. Inequality has worsened also because the profit gains have been taxed at the lower rates on capital gains and dividends.

Similar income distributional considerations are present in China. Low Chinese wages, lagging behind productivity growth, are an important driver of China's export surplus and thus of its foreign reserves accumulation. Chinese workers are effectively providing a subsidy to the Chinese government in the amount of the interest being earned on China's holdings of U.S. assets.

Notes

1. Simple manipulation of Kalecki's well-known equation of the sources and uses of income gives the profit multiplier, whereby an improvement in the trade balance raises the profit share following:

$$\Delta R = \Delta (X - M) / 1 - C_r$$

where R is the profit share, C_r is capitalist consumption out of profits, and X and M are exports and imports.

2. See Milberg and Winkler (2009) for a more detailed discussion of U.S. imported input use by sector.

3. For some supporting evidence, see Crotty (2003).

4. See Abernathy et al. (1999).

5. Oliveira and Scarpetta (1999), Table 1. The location of lead firms is also indicative. Almost all the world's lead firms are based in developed countries. In 2003 only 5 percent of Fortune 500 companies and 3 percent of *Financial Times* 500 companies

were based in low-income countries. Of the twenty-seven developing-country firms on the *Financial Times* list, twenty-four were in Asia and only three were in Latin America. Of the hundred largest nonfinancial multinational enterprises in the world in 2000 (ranked by foreign assets), just five were from developing countries and two of these are petroleum producers (Petroleos Venezuela and Petronas of Malaysia).

6. See, for example, Gereffi (1999) on apparel and Ng and Yeats (1999) on electronics.

7. As discussed below, such high rates of entry can be explained, in part, by a fallacy of composition in export markets.

8. See Milberg (2004a) for a brief survey of the empirical literature.

9. See Gough (2005).

10. One problem with using the global commodity chain for understanding the generation of value and its distribution is that there is very little data on wages, markups, and value added along particular chains. In some cases there is even difficulty tracing the chain, either because home-based production is largely un-regulated and unaccountable or because the push for monitoring of labor standards by nongovernmental organizations (NGOs) has provided an incentive for sup-pliers to simply hide the identity of the firms with which they are subcontracting (Balakrishnan 2001).

11. See Milberg (2004a) for references to the specific case studies.

12. There is an enormous literature relating to each of these practices. For example, on the inducing of competition, see Gibbon and Ponte (2005) and Lynn (2004). On the offloading of risk, see Weil (2006) and Kaplinsky (2005). On the limiting of technology sharing, see Seishi (2006). Branding has been the subject of research for years, but see, for example, Schor (2001).

13. Similarly, arm's-length relations with suppliers reduce the buyer firm's re-sponsibility for standards in the supplying firm. A company is less likely to be held accountable for standards if the supplier is independently owned than if it is an af-filiate of the buyer firm.

14. This section and the next one draw on Milberg and Arnim (2007).

15. See Milberg (2004b).

16. Similar findings on Mexico are reported in Moreno-Brid et al. (2005).

17. See Mayer et al. (2001) and Blecker and Razmi (2008) for empirical evidence of this phenomenon.

18. For a review of the evidence on the terms of trade, see Kaplinsky (2005). In ad-dition to terms of trade weakness in developing countries, the endogenous asymmetry of market structures also implies higher inequality in these countries. Competition among suppliers requires both low markups in supplier firms and careful control of wages. Even China, with its explosive growth in output and exports, has seen little increase in average wages and almost no convergence of its wages with wage levels in the industrialized countries (Glyn 2006). We leave for future research the question of how the distribution of value added in specific Latin American cases has been af-fected by the expansion of U.S. offshoring.

19. This section builds on Kregel and Milberg (2006).

20. See, for example, Godley et al. (2004).

21. Milberg et al. (2007) give recent data on these various uses of funds. On official reserve holdings, it is useful to put the Chinese situation in some perspective. China now holds over $320 billion of U.S. Treasury securities. But that is just 16 percent of

foreign holdings. Japan holds twice that amount, the United Kingdom holds another 8 percent, and 5 percent is held by oil-exporting countries. On the strength of private capital inflows, see Kregel (2006) and Glyn (2006). For a skeptical view on these private capital flow data, see Feldstein (2006).

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PART III

Credit, Money, and Central Banking

8

Eichner's Theory of Endogenous Credit-Money

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Revisiting Alfred Eichner's book *The Macrodynamics of Advanced Market Economies* (1991) two decades after he gave me a first draft copy to read for comments, I am struck how well this work has held up against the passage of time. Aiming to present a complete alternative to the neoclassical orthodoxy, Eichner's book remains to date one of the seminal contributions in the development of post-Keynesian theory, on a par with such pathbreaking works as Weintraub (1966), Kregel (1975), Eichner and Kregel (1975), and Davidson (1978).

While the most important facets of Eichner's distinct theory are discussed elsewhere in this volume, I shall focus my attention on what he had to say about the role of money in an advanced market economy. Even though Eichner covered this topic less extensively than his aforementioned colleagues, he nevertheless managed to make an important contribution to our understanding of money's inner workings in contemporary capitalist economies. Post-Keynesians break with the orthodox view of money to stress its linkage to bank credit and derive from that connection its inherently endogenous nature. Eichner pushed this heterodox tradition a step further by exploring in detail how such endogenous credit-money operates in practice. Let us examine step by step how he set about to accomplish this task.

The Orthodox View of Money

The neoclassical orthodoxy stresses essentially nonmonetary equilibrium models of exchange and production to which it adds a monetary sphere connecting the money supply in direct relation to the general price level. In this vision money is presented as an exogenous stock variable under the direct control of the central

bank. Rooted in the 250-year-old quantity theory of money, neoclassical econo-mists then stress, above all, the need for the central bank to furnish the correct amount of money in circulation to ensure price stability at full employment.

Three equations play a crucial role within this theoretical construct:

- The first equation, $M = MB \times m$, connects the monetary base MB, com-prising currency (coins and central bank notes) and bank reserves, both of which are under the direct control of the central bank, to the money supply M via the money multiplier m. The latter is also subject to central bank determination, as the reciprocal of the reserve requirement that that institution imposes on commercial banks under its jurisdiction.[1]
- The second equation, $M = k.P.Y$ depicts the (transaction) demand for money k by the public as a constant percentage of income Y, in fact the reciprocal of money's velocity V. This rather narrow view of the public's desire to hold cash balances has the advantage of turning the demand side of the money "good" into a passive residual that fluctuates automatically in tandem with the overall level of economic activity, thereby enabling us to consider only the supply side of money an active policy issue.
- The third equation, the famous equation of exchange $M \times V = P \times Q$ by Irving Fisher (1911), has been transformed by modern quantity theorists, the so-called monetarists, from a simple accounting identity juxtaposing two different measures for nominal gross domestic product (GDP) into a unidirectional cause-and-effect theory linking the money supply M to the general price level P. That clever reinterpretation (see Friedman 1956) rests on two crucial stability assumptions. The first pertains to the velocity of money V as the reciprocal of essentially constant money demand; the second assumes that the economy's physical output Q will, if left to its own (market-driven) devices, tend toward full-employment equilibrium. Over time Q will automatically expand at the national economy's so-called natural (i.e., long-run average) rate of growth, which in turn is a function of its productivity growth and labor-supply growth. If V is constant and Q grows steadily, then M will also have to grow at that natural rate of growth for P to end up constant. Hence the monetarists' policy prescrip-tion, known as the quantity rule, of having the central bank let the money supply grow at a slow, steady pace in order to ensure price stability.

This set of standard equations reduces money to a stock, depicted as a good (albeit with unique supply and demand functions) that exists side by side with other goods. The economy is here effectively divided into two separate, yet intertwined spheres. The "real" sphere of exchange and production is essentially nonmonetary in nature, comprising barter-like exchange, physical production

functions, markets that can be reduced to simple demand and supply functions, and a balanced-growth path. Each of these aspects of the economic system is conceptualized in terms of equilibrium and at the same time devoid of money. This is no coincidence, since money and equilibrium do not go hand in hand. The moment money is included, equilibrium becomes nothing but an entirely coincidental and temporary matching of supply and demand in the marketplace.[2] Money is thus conceptually separated from production, exchange, and growth. To assure its status as exogenous variable, money is given its own sphere. There it connects to other purely nominal variables, notably the general price level (inflation), but is otherwise neutral vis-à-vis variables of the real sphere. More realistic monetarists (Johnson 1962) have recognized that an economy can be momentarily thrown off its full-employment equilibrium by exogenous shocks, in which case fluctuations in the money supply can temporarily have a direct impact on output and employment levels.

An Alternative View of Money

Taking a radically different approach, post-Keynesian theory aims at a more realistic account of contemporary market economies. Its adherents seek to avoid the excessive separation of money from production and exchange found in mainstream economic theory. On the contrary, they stress—together with other heterodox approaches, such as Marxism and institutionalism—the need to provide a monetary theory of production in which money is intimately linked to production.[3] The investment activity of businesses, central to the growth dynamic of capitalist economies, typically involves spending money now in order to make more money later. Businesses may even face cash shortfalls in their ongoing, day-to-day operations. Whether for working-capital purposes or to invest in new plant and equipment, they will seek to cover those cash-flow gaps by borrowing funds from banks. Such bank loans may also cover the external funding needs of consumer households, government units, or nonbank financial institutions facing cash-flow gaps when temporarily incurring greater expenditures than inflows ($E > F$). It is precisely here, in the coverage of the public's borrowing needs by banks, that we find what today constitutes the heart of the monetary production economy.

Modern societies no longer have a system of commodity-money, as used to prevail before the final collapse of the gold standard in 1931, nor a system of fiat-money in the form of government-issued currency, which dominated during key moments in the late eighteenth, nineteenth, and early twentieth century. What they have instead is what Eichner (1991) characterized as a "credit-based system of money," a system of credit-money created in the form of checks by banks loaning out their excess reserves. Whenever banks receive

deposits, they gain an equivalent in reserves, a small portion of which they set aside ("required reserves") to meet withdrawals. The remainder constitutes excess reserves, which the banks will want to loan out in order to earn interest income. It is this loaning out of excess reserves that creates new money when the borrowers spend their loans by writing checks. In other words, banks create new money in acts of credit extension through which they transform their zero-interest excess reserves into income-yielding bank loans.

Responding in this fashion to the public's borrowing needs, this type of (credit-)money operates like a flow variable. The transformation of deposits into reserves and ultimately into loans within the banking system runs parallel to the expenditures of buyers being turned into income for the sellers. Given the intertwined nature of reserve transfers within the banking system and income transfers between buyers and sellers in the marketplace, there is really no way to separate money from production and exchange, as mainstream economists are apt to do. The post-Keynesian monetary theory of production, taking proper account of the realities of modern credit-money, thus ends up recognizing money as an endogenous flow variable, a vision diametrically opposed to that of mainstream neoclassical economics described above.[4]

Intersectoral Flows and Macrodynamics

Eichner (1991) gets to this crucial point about money relatively late, in Chapter 12, just before the incomplete manuscript got cut off by the author's untimely death in February 1988. In more than 800 pages preceding that chapter, Eichner barely mentions money—except for an early reference (84) to the strategic importance of endogenous money creation in allowing one sector (e.g., businesses) in the economy to strengthen its financial position without such improvement necessarily coming at the expense of a deterioration in another sector (e.g., consumers). Eichner himself explained this methodological choice at the beginning of Chapter 12 by stating that monetary factors, while important to the functioning of the economy, do not matter as much as other "real" elements of macrodynamics, which had to be laid out first before getting to money (805–806). He further justified this relegation of money to a secondary role by claiming that business investment was mostly self-financed and that the endogeneity of the money supply was nearly automatic, hence fully responsive to credit demand.

We shall return later to the question of whether these two justifications are accurate or not. At this point we confine ourselves to noting that Eichner still seems to share the widespread tradition of distinguishing between the "real" sphere of production and the "monetary" sphere of nominal variables such as prices and interest rates. But unlike the reigning orthodoxy, in which this

separation plays a central role, Eichner uses it as a strategic device with which to order the sequencing of variables. Those methodological differences in how and why money gets kept apart from the rest of the economy are also evident when comparing how each approach connects real and nominal spheres. Rather than relying on Fisher's aforementioned equation of exchange or, in a more sophisticated variant, on the real-balances effect of Patinkin (1965) and their respectively implied constancy of the transaction demand for money, Eichner follows the post-Keynesian tradition of preferring to link the two spheres together within the context of a fully monetized economy in which the demand for money extends beyond the transaction motive and is allowed to vary in response to interest-rate fluctuations.[5]

Where Eichner really shines as an important contributor to the evolution of post-Keynesian theory is in his elaboration of the macrodynamics of such a fully monetized economy in order to integrate real and nominal variables into a coherent system of economic activities.

The first structural device introduced by Eichner for that purpose (1991, Chapter 2, section 3) is Copeland's flow-of-funds model, which traces money flows in and out of the economy's key subdivisions—financial institutions, nonfinancial enterprises, government, and households. Measured today on a regular basis by the Federal Reserve for the U.S. economy, those intersectoral flows allow the identification of possible inequalities between inflows F and outflows E per sector, akin to (and also parallel to) the separation of savings S and investment I.

The other structural device (elaborated by Eichner in Chapter 5) is Leontief's input-output model of a multisector economy, to which Eichner added the original twist of distinguishing between competitive "flex-price" sectors, where prices are market-determined, and a majority of monopolistically structured "fix-price" sectors whose typically few and large sellers have enough power to set their own prices—a distinction at the core of his work from its beginning (since Eichner 1976).

These components of his macrodynamic model give rise to two cumulative-adjustment channels. One is the multiplier effect already encountered in Keynes (1936), according to which spending begets additional spending by those earning that last round of expenditures as income. The other is a cash-flow feedback effect whereby any discrepancy between savings S and investment I, or between inflows F and outflows E, for that matter, moves the economy cumulatively up along a path of expansion or down along a path of contraction. While Eichner (1991) considered these adjustment processes as essential to the dynamic pattern of advanced market economies, he put much less emphasis on pinpointing the cyclical turning points in such an economy's growth path.

One reason for downplaying the cyclical nature of growth in capitalist economies was Eichner's decision to postpone any serious consideration of money until later. As already mentioned, money seems entirely absent from his intersectoral model and makes its appearance only after full presentation of the model, 800 pages into the book. Of course, his model implicitly assumed the presence of endogenous credit-money throughout. The flow-of-funds framework, after all, considers money flows between sectors that are connected via Leontief's input-output matrix to real resource flows. And the administered markup pricing imposed by oligopolistic suppliers in the so-called fix-price sectors could not possibly persist in any systematic fashion without the presence of an elastic money supply allowing such artificially heightened prices to be realized (i.e., paid for) in the first place. Still, by not putting money at the center of his macrodynamic analysis right from the beginning, Eichner deprives the cyclical forces he identifies—the Kaleckian profit-investment dynamic tending toward excess capacity, for instance—of their monetary and financial dimensions.

Bank-Issued Credit-Money

When Eichner finally gets to an explicit consideration of money, in Chapter 12, he starts with a useful distinction of money forms (1991, 809–812). This is an important point of departure, albeit one ignored by too many economists, since it is precisely the form of money that determines its modus operandi.[6] In a regime of commodity-money, which prevailed for centuries under various gold-standard arrangements, money does indeed represent a stock variable. Later on, especially during the late nineteenth and early twentieth century, when governments in Europe and the United States imposed inconvertible notes as fiat-money, the authorities had great trouble targeting the right amount of money with which to ensure both full employment and price stability. They typically erred first on the side of excess, only to respond to the inevitably ensuing hyperinflation by overreacting in the opposite direction. During this era of fiat-money, all major economies experienced great volatility in the money supply. In today's credit-based system of money, however, new money is created by banks in the form of checks whenever they use up their excess reserves to make loans. Such a regime of credit-money is, according to Eichner, much more capable of responding to the liquidity needs of deficit-spending actors and hence of accommodating desired levels of economic activity than either commodity-money or fiat-money. Public demand for credit, such as associated with business needs for working capital or consumer purchases of expensive durables, creates automatically new money as banks respond with additional lending and the central bank accommodates banks' desired (excess) reserve position in support of such lending and money

creation. Banks keep a reserve of commodity-money (i.e., gold) or fiat-money (i.e., government-issued currency in the form of notes or coins) in order to settle their payment obligations in something other than their own checks—for Eichner, the major reason why these otherwise anachronistic forms of money have persisted in the modern economic system.

Eichner goes on to describe the money creation process of the banking system in response to the public's credit demand by means of an expanded flow-of-funds model that adds a financial sector that is principally composed of banks and similar depository institutions (e.g., savings and loan associations, credit unions). These attract deposits counting as reserves and then use the portion representing excess reserves for loans or security purchases. Both of those activities, taking deposits and making loans, earn bankers a profit to the extent that the income earned from their assets (loans, securities) exceeds the interest they have to pay on their liabilities (deposits).

Eichner then examines how changes in the balance sheets of nonfinancial entities affect the balance sheets of banks, individually and in the aggregate. This mode of presentation, which links the economy's real and monetary flows in novel fashion, is more useful than the traditional presentation of such spillover effects via income statements. Eichner applies this demonstration of monetary effects specifically to four different situations.

The first situation he discusses is the most common, yet least consequential type of activity, namely the purchase of a good or service paid for out of existing income. Such simple monetary exchange can be characterized as a nonfinancial transaction between two "real" (i.e., nonfinancial) actors in which the total sum of deposit balances in the banking system stays the same. The only impact of this transaction is a shift in ownership of the relevant bank deposit from buyer to seller of the good or service concerned.

Eichner then introduces, as the second monetary effect under investigation, a net increase in savings. That kind of change in the system may originate from any of the "real" sectors (enterprises, households, government), may be voluntary or involuntary, and may be the result of an income increase not fully spent or arise from someone spending less than before. Any such addition in savings will typically increase deposit balances within the banking system, but will only be reinjected into the spending flow if and when the banks concerned make a loan. Otherwise, the new savings just get absorbed as part of banks' excess reserves. Thus, Eichner concludes (1991, 818), the banking system may at times actually play the role of monetary stabilizer by absorbing excess income saved in the wake of an overheating economy. I shall argue below, in the concluding section, that, quite to the contrary, banks are more likely to be destabilizing in the sense of amplifying fluctuations in the growth path in procyclical fashion.

Eichner's third monetary effect involves a portfolio shift that may take the form of switching from a checking deposit to a nonchecking deposit (e.g., savings deposit) or from a checking deposit to a liability of a nonbank financial institution, as would occur for instance when purchasing mutual fund shares. Introduced here for the first time are two more types of financial institutions, besides commercial banks. One type groups together various nonbank intermediaries, notably pension funds and mutual funds; the other refers to market-making institutions, such as investment banks and securities dealers and brokers. At this point in the story, Eichner makes a somewhat misleading argument about the Glass-Steagall Act of 1933, Roosevelt's landmark legislation reorganizing America's broken-down banking system (1991, 822). This act's separation of commercial banking and financial market-making (i.e., investment banking) activities had, according to Eichner, the primary objective of preventing banks from investing in long-term assets (e.g., bonds, stocks) when carrying short-term liabilities (e.g., deposits), because such a maturity mismatch would posit too much risk of illiquidity in the banking system. This argument does not make much sense, I am afraid to say, since banks can, after all, engage in long-term loans (e.g., thirty-year mortgages) that are typically even less liquid than bonds or stocks. As a matter of fact, managing a maturity mismatch between short-term liabilities and long-term assets is at the heart of the commercial banks' financial-intermediation role and also their source of profit in compensation for taking on risks that would otherwise have to be borne by their clients. The more pressing motivation for Glass-Steagall's separation of commercial and investment banking, rooted in America's long-standing tradition of economic populism against excessive accumulation of power in the hands of banks, was to prevent banks from underwriting securities for fear of market manipulation and other conflicts of interest that may easily arise when a bank is both shareholder and creditor of a company.

The fourth and final monetary effect that Eichner discussed involves a net increase in debt, coming about by means of a (money-creating) bank loan. This is the only scenario in which nonfinancial sectors (businesses, households) actually end up with increased cash reserves in the banking system and thus enhanced spending power. In that sense it is not surprising that Americans have come to depend on continuous debt-financing of excess spending, a structural change in the economic system made possible by the introduction of endogenous credit-money with Roosevelt's New Deal reforms of money and banking.[7]

Eichner's presentation of monetary effects by means of four different transactions aimed not least at showing a reverse causality from investment to savings, directly the opposite of what most mainstream economists would

argue. In orthodox theory, saving begets investment. Eichner, on the other hand, followed the post-Keynesian tradition of arguing that investment causes spending-induced increases in income as a result of which savings increase. The increase in savings does not by any means generate automatically any additional investment, as generally believed. Any equalization of savings and investments occurs only *ex-post*, as the result of involuntary adjustments in inventories that in turn prompt businesses to alter their output targets for the next planning period. These two-step adjustments in inventory and production levels give the whole tension between savings and investment its uniquely dynamic dimension. In this context it is also worth pointing out, in line with the conclusion drawn by Eichner (1991), that excess levels of investment spending beyond what would be supported by a given level of savings have been rendered systemically possible by the money-creating activity of bank lending, which generates additional spending power through a net increase in debt. Banks have become vested in such a credit-driven expansion, which involves continuous increases of their assets and liabilities, hence easy growth for them.

Eichner concludes this opening section of Chapter 12 by reiterating the crucial importance of endogenous money-supply growth in response to the public's borrowing. That ongoing money-creation process within the banking system integrates a nexus of deposits, loans, and spending that provides the monetary condition for continuous expansion of the economy. After discussing a set of equations linking growth of spending, income, and money deposits, Eichner finally gets to the same equation as the monetarists' equation of exchange mentioned above—except that in this case the causality runs in reverse, from output and prices (i.e., nominal GDP) to money supply and velocity. In addition, Eichner also draws here an emphatic distinction between the standard assumption of constant money velocity underlying the traditional equation of exchange and his own rate at which banks improve the efficiency of the payments system so that a given level of deposits supports a larger level of income (or a given level of income ends up requiring a smaller deposit base).

Eichner thus ends up concluding this first section on money and credit with a brief allusion to the important phenomenon of financial innovation. As also stressed by the author elsewhere (for instance, Arestis and Eichner 1988), his interest in this fascinating topic crystallizes around whether and to what extent financial innovations make the regime of credit-money—above all, its money-creation process—operate more efficiently. In particular, he has in mind here the rapid spread of so-called borrowed liabilities (e.g., federal funds in the intrabank market, negotiable certificates of deposit, Eurodollar deposits, commercial paper) during the 1960s and 1970s, which has allowed

the banks to boost their income-earning lending and money-creation activity potentially far beyond their limited deposit base, especially important when central banks keep a relatively tight rein on bank reserves. For Eichner, money velocity is hence rendered variable by financial innovations that boost the lending volumes of banks for any given amount of deposits (1991, 857). More recently, we have seen in the same vein the very rapid spread of loan securitization (e.g., mortgage-backed securities), which enables banks to operate on a much larger scale by speeding up the turnover of their assets and so freeing up cash for new investments.

Central Banking, Monetary Policy, and the Role of the Interest Rate

The second section of Chapter 12 in Eichner's *Macrodynamics of Advanced Market Economies* (1991) is dedicated to a systematic analysis of the central bank. By and large, this institution acts as a fail-safe mechanism against cataclysmic breakdowns in the banking system of the kind encountered during the Great Depression in the 1930s. A central bank is thus, above all, responsible for maintaining the liquidity and solvency of banks. Toward that objective it typically possesses certain regulatory powers (e.g., safety regulations limiting the risk exposure of banks) as well as a variety of tools with which to alter (excess) reserves of banks, notably setting reserve requirements, offering reserve-short banks discount loans, and so-called open-market operations, which involve trading of government securities (844). Central banks use these tools concurrently to adjust the reserves position of banks and hence bear upon their money-creating ability. Central banks will usually wish to accommodate the liquidity needs of commercial banks so that those in turn can satisfy the borrowing needs of their clients.

Eichner then discusses in detail what happens when a central bank decides not to accommodate fully the banks' funding of the public's borrowing needs. Such pursuit of a "tight" policy disrupts money creation and debt-dependent activities, with multiplier and cash flow feedback effects further undermining the overall level of production and employment. Eichner views such nonaccommodating policy by the central bank as a mistaken choice, a possible trigger of financial and economic crisis.

Monetary policy bears directly on the level of the interest rate, which Eichner regards as a politically administered distributional variable rather than a market-determined price (858–860). This argument aims to present an alternative to the orthodox view of money demand and supply as separate variables. Such a separation, Eichner repeatedly points out, does not reflect the reality of credit-money where the supply of excess reserves for new money creation

and the demand for extra cash via bank loans are one and the same process. Turning his attention to the structure of interest rates, Eichner develops this notion of administered pricing to the fullest: the central bank sets two crucial interest rates (the discount rate and the federal funds rate for interbank loans), the banks then set their own rates in a process of markup pricing over these costs of funds, while all other interest rates are subject to their own unique risk premiums, with the Treasury bill rate reflecting the zero-risk floor.

This view, while consistent with other key elements of Eichner's theory (especially the intertwined nature of credit demand and supply as well as his emphasis on oligopolistic markup pricing), does not do the complex phenomenon of the interest rate full justice. He draws no distinction either between interest rates set within the banking system and those determined in financial markets (e.g., bond yields) nor between short-term rates and long-term rates, downplaying the latter and ignoring in the process the hotly debated implications of the so-called yield curve.[8] Unfortunately, that view of interest rates also ignores their importance for measuring the time value of money and does not link them adequately to the investment behavior of the enterprise sector or consumer purchases of durables. Instead, Eichner ends up focusing on the rate of commodity-price increases as the interest-rate floor the central bank has to respect if it wants to prevent an acceleration of inflationary pressures.

Tragically, Eichner never lived to complete this chapter on money. His inability to finish planned sections on "alternative monetary theory" and "the international dimension" deprived us of many additional insights and left us with only a half-finished work to assess. It would have been especially interesting to read Eichner's treatment of the different orthodox theoretical approaches to money (e.g., monetarist, rational expectations, Keynesian), especially when considering what an outstanding job he did in earlier chapters when discussing alternative theoretical approaches to the key concepts and questions in economics. I would have also liked to see Eichner's treatment of the international monetary system and in particular the dollar's unique status, in comparison to the approach of other post-Keynesian thinkers like Paul Davidson or Philip Arestis. Alas, it was not to be! His notes on those two concluding sections planned for Chapter 12 had not advanced enough before his untimely death to warrant inclusion in the final text, leaving his treatment of money and credit incomplete.

The Procyclical Nature of Money

When assessing the contribution of Eichner's *Macrodynamics of Advanced Market Economies* to our understanding of a modern monetary production economy, it is clear that we must place at its center the innovative attempt

of integrating monetary and real flows by means of Copeland's flow-of-funds analysis and Leontief's input-output matrix. That fusion, by means of an expanded flow-of-funds framework that now includes a financial sector centered on the banking system, provides a powerful insight into the endogenous nature of credit-money in support of new spending commitments. That sector's inflows and outflows to and from the other sectors translate into the money-creating steps of deposit-taking and loan-making, thus anchoring a near-automatic process of money growth as the basis for more or less continuous expansion of debt-financed spending. In this process, money supply (i.e., reserves turned into loans) and money demand (borrowing needs of bank clients) are inseparably intertwined, two sides of the same coin. Already, in his earlier work (e.g., Eichner 1983; Eichner, Forman, and Groves 1985), Eichner had crystallized this intertwined nature of demand for and supply of credit-money in the ratio of bank loans to bank deposits, a measure of what he characterized as liquidity pressure underlying the money-creation process of banks.

Eichner tends to emphasize the stability of this ratio, implying a general willingness of the banking sector to accommodate the public's demand for bank loans. This notion, surely aimed at highlighting the endogeneity of credit-money, endows the process of money creation with a degree of automaticity and steadiness that may not be realistic. In fact, Eichner denies credit-money's inherently procyclical nature altogether. After all, banks are, like any other service provider in the economy, profit-seeking institutions. They make their profit by attracting deposits and then turning thereby earned (excess) reserves into loans. Reserves earn very low, if any, returns. Loans, on other hand, carry relatively elevated interest rates, usually higher than those paid out to deposit-holders. Chasing larger profits in the face of great credit demand typifying periods of economic boom, banks are inclined to loan out their reserves for larger income gains rather than hold onto them. They tend to feed any boom with a flood of cheap credit and accelerating pace of liquidity creation, thereby helping the economy overheat to the point of unsustainable excess.

Credit overextension and overproduction thus go hand in hand, a procyclical reality of endogenous money creation that Eichner failed to appreciate fully. As argued so powerfully by Minsky (1982), boom-induced excess spending causes growing financial fragility of borrowers in the face of sharply rising debt servicing charges. This fragility sooner or later triggers a financial crisis. Such crisis marks typically the cyclical turning point, after which generalized cutbacks in spending and lending spread recessionary forces throughout the economy. Such contraction phases typically witness a crisis-induced collapse of business and household demand for bank loans, since excessively leveraged borrowers are trying hard to bring their financial house in order by weaning

themselves off debt. Both businesses and households desire to hold more cash for precautionary purposes. At the same time, spreading loan-default losses in the wake of ultimately unsustainable credit overextension will have rendered banks a lot more cautious, prompting them to hold back their lending (and money-creation) activity in favor of keeping more excess reserves available. This confluence of cautionary reactions was already recognized by Keynes (1936) in his famous discussion of the liquidity trap, where the public's precautionary demand for cash balances experiences such a crisis-induced hike that it overpowers any attempt by the banking system to increase the money supply (and spending levels) in the economy.

Had Eichner himself recognized the inherently procyclical nature of credit-money, he would not have justified his decision to postpone any explicit discussion of monetary factors by arguing (1991, 806) that business investment was largely self-financed anyway and that the banking system would typically accommodate the public's funding needs fully. Neither of these conditions holds in the course of cyclical turning points from boom to bust. For one, it is usually during booms in the late phases of the upswing that the economy sees a concentrated burst of large-scale, capacity-enhancing business spending on new plant and equipment that requires relatively large amounts of external funds. Hence we typically observe a large increase in corporate indebtedness just when the financial position of those producers is about to be squeezed by a confluence of rising debt servicing charges and slowing inflows amid peaking sales volumes. It is this squeeze, amid credit-driven overextension of production capacity, which prompts economic activity to move from boom to bust. Moreover, it is also around those cyclical peaks, amid a build-up of financial distress for many borrowers, that Eichner's claim of near-automatic elasticity of money ceases to apply. During such moments of acute financial instability, banks may not be willing or able to sustain their level of lending, nor may central banks be in a position to counteract the tightening of credit. Money becomes less elastic when banks begin to ration credit and deny loans to many once-welcome borrowers now considered no longer sufficiently creditworthy.

The key question underlying the challenge of recognizing the role of money in the cyclical dynamic of the system's growth pattern concerns how money gets integrated into what is, after all, a fully monetized production system in which all relevant economic activities take the form of cash flows. Perhaps quite useful in this context would be to look at the different types of economic activity—exchange, production, credit—as interdependent monetary circuits. We have, of course, a variety of heterodox approaches that have attempted precisely that, especially Marx (1967/1867) and the so-called circuitists (Graziani 1990; Lavoie 1994, 1999; Parguez 2001; Parguez and Seccareccia

2000). The key here is to find ways to integrate these approaches with the post-Keynesian theory of endogenous credit-money.[9] Eichner's work has enabled us to move a step closer toward that important task. Extending his contribution in that direction of paradigmatic integration would enable us to advance our analysis of capitalist economies further while at the same time presenting a more effective challenge to the dominance of the neoclassical orthodoxy.

Notes

1. The reserve requirement, a key monetary-policy tool of central banks across the globe, refers to the percentage of reserves that banks have to set aside to meet cash withdrawals. A reserve requirement of, say, 20 percent means that banks have to set aside $20 for every $100 in deposits (reserves) and can only loan out $80. In this case the money multiplier m would be 5, the reciprocal of 20 percent

2. Smart neoclassical economists, such as Frank Hahn (1973), have recognized that the presence of money cannot be reconciled with standard claims of market equilibrium.

3. The concept of "monetary theory of production," already highlighted by Keynes (1933), is central to post-Keynesian theory (see Arestis and Eichner 1988). In a similar vein, this approach conceives of capitalism as a monetary production economy or, as Eichner (1991) preferred to put it, a "monetarized system of production."

4. Elsewhere (Guttmann 1994) I have drawn out in great detail the many profound implications of our modern system of credit-money that commercial banks create in acts of credit extension to satisfy the public's need for bank loans for coverage of temporary cash-flow shortfall.

5. The post-Keynesian emphasis on additional (precautionary, speculative, finance) motives for money demand, best elaborated in Tobin (1958) and Davidson (1978), follows the pathbreaking work of Keynes (1936, 1937) in this area. Eichner himself (see Forman, Groves, and Eichner 1985) stressed the need to replace the traditional demand for money with the demand for credit as a more relevant behavioral variable in any system of endogenous credit-money.

6. See Guttmann (2003) for a more extensive discussion of money forms and their far-reaching implications in terms of how money gets inserted and is allowed to function in a market-economy setting.

7. Roosevelt's New Deal reforms of money and banking, which included the Glass-Steagall Act of 1933, the Emergency Banking Act of 1933, the Gold Reserves Act of 1934, and the Banking Act of 1935, replaced the collapsed gold standard with a new monetary regime centered on elastic credit-money and backed by government-issued currency.

8. The yield curve, which measures the relationship between short-term interest rates and long-term interest rates, has been the subject of intense discussions, with a variety of theories (e.g., market segmentation, expectations theory, liquidity premium, preferred habitats) trying to explain the typically positive slope of that curve. Even more important, the yield curve has also been recently followed closely in financial markets as a leading indicator used to forecast economic activity levels or to identify changes in inflation expectations.

9. Marx's analysis of production, exchange, and credit in terms of monetary circuits struck Kalecki and apparently even Keynes as a promising point of departure. We also note recent efforts at integrating post-Keynesian and circuitist approaches to money, such as Fontana (2000) and Rossi (2001).

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9

Eichner's Monetary Economics

Ahead of Its Time

Marc Lavoie

Although Geoff Harcourt once thought that Alfred Eichner "was not an absolutely top-line economist," adding that "he did a lot of harm to Post Keynesianism" (Harcourt in King 1995, 85), I tend to think instead that Alfred Eichner's contribution to post-Keynesian economics in general, and to post-Keynesian monetary theory in particular, was ahead of its time and of great relevance today. Now, this opinion runs somewhat against the standard assessment of Eichner's contribution to monetary theory, which is usually perceived as being very minor, perhaps even nonexistent, Eichner being viewed somehow as the man of one idea, that of markup pricing being dependent on the amount of internal funds necessary to finance capital accumulation. The following quote partly illustrates this standard assessment:

> Money didn't have a crucial role to play, in the way that I think Minsky and others would see money and the financial system as having important implications for the way that the economy operated. . . . I think this is one of the unresolved issues in Post Keynesian economics. The paper that Paul Davidson wrote in the *Festschrift* for Alfred Eichner, for example, points out that Alfred had not incorporated any essential role for money in his analysis. Most, or maybe all, of Eichner's analysis doesn't really come to grips with the nature of money and the financial system. It essentially assumes that investment can be financed, and doesn't analyse the financial system at all. So I think there is a continuing debate inside Post Keynesian economics on this, and a degree of tension among different Post Keynesian economists over the role of money. Much work within Post Keynesian theory, ranging from Amitava Dutt and Joseph Steindl to Kalecki and Eichner, whilst

> making some mention of money, does not really incorporate money in any
> essential way. (Sawyer in King 1995, 145)

Malcolm Sawyer's judgment would rely, at least partly, on Davidson's (1992) reading of Eichner's unfinished 1987 textbook, a paper that did appear in the Eichner Festschrift edited by William Milberg (1992). But Davidson's own opinion seems to be based on an overly quick read of Eichner's book. All but one of the references made to the book are taken from the first twelve pages of the fifty-eight-page Chapter 12, titled "Money and Credit." In addition, while praising Eichner for his use of the flow of funds approach in that chapter, Davidson seems to be unaware that Eichner presents financial flows in great detail as early as Chapter 2, from pages 79 to 108; instead, Davidson claims that "monetary aspects of his book do not appear until chapter 12—800 pages into the volume" (Davidson 1992, 187–189).

The purpose of this chapter is to show that, by contrast, Eichner was very much concerned with monetary economics and the financial system, and that in the course of his work, besides claiming, as many heterodox authors before him contended unproductively, that he intended to explain "the monetarized production system" (Eichner 1987, 8), he did put forward four key concepts that are now at the forefront of post-Keynesian monetary economics.[1] Indeed, it is rather ironic to note that Sawyer himself later showed that, despite being terse, Kalecki's contribution to monetary economics was quite relevant; and it also turns out that Dutt (1995) constructed a little model, inspired by Steindl's work, showing the importance and impact of corporate debt for economic growth. Thus, with respect to Eichner's contribution to monetary economics, there is some similarity with the widely held belief that Joan Robinson only dealt with growth and capital theoretic issues or with methodology, with no concern about monetary and financial issues, a belief that was shown to be without foundations by Rochon (2005), who demonstrated instead that Robinson had a much better comprehension of monetary theory than most of her contemporaries. The history of thought is full of these paradoxical assessments!

The four key monetary theory concepts highlighted by Eichner are the following: the starting point of monetary theory is the demand for credit, not the demand for money; the liquidity pressure ratio of banks plays an important role throughout the economy; central banks pursue essentially defensive operations when intervening on the open market; and an understanding of the economy can only be acquired by going beyond the standard national income and product accounts; that is, by making use of the flow of funds accounts. Each of these four points will now be taken in turn, by relating them to present-day post-Keynesian monetary economics.

The Starting Point: The Demand for Credit

In his most famous book, *The Megacorp and Oligopoly*, Eichner says that "the premise underlying this volume . . . is that the function of the monetary system is primarily to provide lubricating fluid for the real economy" (1976, 12). It is this statement that may have led some economists to believe that Eichner had very little to say on money and finance. A similar statement opens up Chapter 12 on "Money and Credit" in his 1987 book, *The Macrodynamics of Advanced Market Economics*:

> This lack of attention to money *per se* is no accident. It reflects the belief among post-Keynesians that while monetary factors are clearly important— and indeed under certain circumstances, may be critical—they are typically less important than the real factors which have been emphasized up to this point. It is not, as some critics of this and other Keynesian-inspired theories have charged, that "money does not matter." It is rather that other factors matter more. (805)

It is precisely this passage that drew most fire from Paul Davidson, and some would say rightly so, in the paper mentioned by Sawyer in the introductory quote. It led Davidson to write that "in the area of monetary theory and macrodynamics [Eichner] barely scratched the surface" (1992, 185). This passage may also reflect the fact that, as pointed out by Andrea Terzi, "the question of whether monetary factors should play an essential role or should rather be regarded as mere reflections of more fundamental phenomena . . . was probably still unresolved in Eichner's own mind" (1992, 157), although the indented quote above is confirmed earlier in the book, when Eichner says that up until Chapter 12, "we shall simply adhere to the logic of the basic Keynesian model by assuming a fully accommodating policy on the part of the central bank" (1987, 139).

However, as early as 1979, in his brief presentation of the broad post-Keynesian econometric model that he intends to construct, Eichner, citing Minsky, claims quite explicitly that it would be a mistake to set aside or ignore monetary factors and focus only on real features.

> Post-Keynesian short-period models emphasize the importance of credit availability—as determined by the central bank—in enabling business firms and other spending units to bridge any gap between their desired level of discretionary spending and the current rate of cash inflow. Credit availability is important in determining not only discretionary spending but also liquidity crises and the number of bankruptcies. . . . Thus it is credit availability—or

the degree of "liquidity" pressure throughout the economy—that becomes the critical monetary factor in a post-Keynesian short-period model, not the stock of money. The latter, as distinct from the monetary base, is regarded as partly the result of endogenous economic processes rather than the determinant of those processes. (Eichner 1979, 40–41)

While this statement is clearly reminiscent of Minsky's views on the possibility of financial fragility, there is still some ambiguity in Eichner's statement. Eichner seems to imply that the supply of money is mostly endogenous, as most post-Keynesians would claim, but that the supply of the monetary base is not. This ambiguity will be lifted a few years later. But the point that I wish to make is that Eichner clearly puts the focus of the analysis on the ability of agents, noncorporate firms in particular, to obtain bank credit. The critical monetary factor is the availability of credit, and not the availability of money, a point also underlined with great force at that time by Albert Wojnilower when he wrote that "I can testify that to all except perhaps the most indigent of the economic actors, the money stock—in contrast to oil or credit—is a meaningless abstraction" (1980, 324). This point will be reiterated forcefully by Eichner a few years later: "It is the demand for credit rather than the demand for money that is the necessary starting point for analyzing the role played by monetary factors in determining the level of real economic activity" (Eichner 1985, 99). This is confirmed by Arestis and Driver when they analyze the key features of the Eichnerian econometric model: "In terms of its monetary aspects the emphasis is on credit rather than money in enabling spending units to bridge any gap between their desired level of discretionary spending and the current rate of cash inflow" (1984, 53).

Eichner's emphasis on the demand for credit rather than the demand for money led him to completely remove the money stock from his econometric model as early as 1981 or 1982, a move that was to be imitated, without acknowledgment, ten or fifteen years later by the proponents of the New consensus in monetary policy and by central bankers. As Eichner pointed out then, "Eliminating the money stock from the model has the further advantage that it avoids any need to distinguish the 'demand' for money from its supply. It also renders moot the question of how the money stock is to be defined. . . . Indeed the only disadvantage is that it would mean abandoning the LM-IS framework that has dominated macroeconomics. . . . But then that might not be such a disadvantage" (1985, 110). Indeed, New Keynesian supporters of the New consensus have done just that: they have removed the LM part of the LM-IS model (see Lavoie and Seccareccia 2004).

The credit or lending side, rather than the money or deposit side, is normally the most crucial aspect of monetary relations, because "it is the possibility of

the non-financial sectors being able to make credit-financed purchases that, by relaxing the income constraint that would otherwise preclude any such possibility, explains how the level of national income can increase from one time period to the next" (Eichner 1987, 838). This statement is crucially important: some people must accept increasing their load of debt in order for the overall economy to grow. If the private sector does not do it, then the public sector will have to go into debt. This is another way to introduce balance sheet implications in macroeconomic theory. As Eichner says: "The only way the amount of funds circulating as checkable deposits can be increased is if some nonfinancial sector is prepared to increase, not its net savings but rather, its net debt" (1987, 824).

What do bank loans depend upon? Eichner very neatly rejects the standard textbook money multiplier: "Banks are not inclined to approve bank loan applications just because they have excess reserves. They will, in fact, be willing to grant loans only to those who can demonstrate that they are 'credit-worthy,' and once this demand for loans has been satisfied, no additional credit is likely to be extended." The actual amount of credit depends on the demand for credit and the extent of credit rationing by banks, not on the amount of excess reserves. Thus, provided they are credit-worthy, "those in need of bank loans can obtain all the additional credit they need at a fixed rate . . . and the supply of additional funds, or bank credit, can be represented by the type of curve shown in exhibit 12.20" (Eichner 1987, 854, 858). Now, what is this curve? It is a perfectly flat (horizontal) curve, with the interest rate on the vertical axis and the increase in bank credit on the horizontal axis. Still, elsewhere, as we shall see in the next section, Eichner emphasizes the existence and the importance of credit rationing. So why is the supply curve of credit horizontal? How is credit rationing reflected in this diagram? Eichner's answer, which must be found in Arestis and Eichner (1988), is that credit rationing is to be reflected in shift parameters that enter the demand for credit functions, as I have suggested earlier (Lavoie 1985) and as Wolfson (1996) has explained in great detail, providing a very clear graphical apparatus. Thus, Eichner's means to reconcile the endogeneity of money with the possibility of credit rationing (or the liquidity preference of banks) are no different from the solution proposed by Wolfson. Credit rationing is reflected in shift parameters "that have nothing to do with the slopes of the two relationships," the demand for and the supply of credit (Arestis and Eichner 1988, 1010–1011).

The Liquidity Pressure Ratio

As pointed out by several colleagues (Efaw 1992; Kregel 1990), Eichner, for better or worse, believed in the persuasion power of econometrics. He thus endeavored, as pointed out above, to construct a post-Keynesian economet-

ric model of the American economy, while a similar model was also being adapted to the United Kingdom's economy (Arestis and Driver 1984). One of the blocks of this model consisted of the monetary-financial block, which gave rise to a series of interesting and original empirical findings. As early as 1979, Eichner and his research assistants found a new variable, the liquidity pressure ratio, which seemed to perform well in the regressions of several equations. Originally, this liquidity pressure ratio was described as the difference between the growth rate of bank loans and the growth rate of base money. This was called "the degree of liquidity pressure" or the "liquidity effect," and it was thought to "influence the real sphere of production in two ways: (a) directly, by making it more or less difficult to finance any discretionary spending in excess of discretionary income; and (b) indirectly, by leading to a lagged change in the long-term interest rates which, after a further lag, affect discretionary spending" (Eichner 1979, 46).

The description of the degree of liquidity pressure gets somewhat changed a few years later. Informally, it is defined as the "lending capacity of the commercial banking system"; that is, "the ratio of bank loans to bank deposits" (Eichner 1985, 99). More formally, the variable that explains the cyclical evolution of investment expenditures or of personal consumption of durables is the discrepancy between the actual degree of liquidity pressure and its secular or trend value (Forman, Groves, and Eichner 1984).

The empirical relevance of the degree of liquidity pressure in explaining the future evolution of discretionary expenditures, as well as the future level of bank loans and some interest rates, including the federal funds rate, is mainly attributed to credit rationing. Eichner says that the amount of bank deposits "measures the lending capacity of the commercial banking system," and thus that when the degree of liquidity pressure decreases (relative to its trend value), "the commercial banking system will become less liquid and less capable of providing credit" (1985, 105). All this becomes more explicit in the 1987 book, where Eichner provides the following explanation:

> The ratio of bank loans to bank deposits can, in fact, be regarded as a measure of the banking system's lending capacity, with any deviation from the secular or normal ratio . . . a disequilibrium condition created by the Fed's nonaccommodating behaviour. A less than accommodating policy . . . will put pressure on the banks to cut back on their loans to business firms and households—even beyond what will be happening as a result of the simultaneous rise in interest rates. . . . The [liquidity pressure] variable in effect captures the extent to which the banking system is forced to ration credit when the Fed, as the U.S. monetary authority, decides to pursue a nonaccommodating policy. (854–855)

The empirical evidence about the liquidity pressure ratio provided by Eichner has often been used as confirming evidence of the structuralist position in the debates between horizontalists and structuralists. For instance, Dow and Dow (1989, 164) have linked the upward-sloping credit-money supply curve to the empirical evidence gathered on the importance of the degree of liquidity pressure. For Dow and Dow, this shows that the balance sheet position of banks—that is, their liquidity—is influential in determining the interest rate at which they will lend and their willingness to do so. If one assumes further that increases in economic activity always lead to more illiquid balance sheets, then the upward-sloping credit-money supply curve defended by structuralists would be demonstrated on those grounds.

But as Dow and Dow (1989, 164) recognize, this is not Eichner's interpretation of his findings. Trend increases in the liquidity pressure ratio do not matter because they become the new norm for the banking industry. According to Eichner (1985, 106), fluctuations of the degree of liquidity pressure, compared to its ever-changing trend value, are the explanatory variable, and these are due to the nonaccommodating behavior of the central bank, as Eichner's quote just above reminds us. Indeed, Terzi goes as far as to argue that "for Eichner there is no constraint on the availability of bank credit, except for a less than fully accommodating policy of the central bank" (1992, 161). When the central bank does not accommodate, commercial banks are forced to sell their Treasury bills to the public; the deposits of the public will shrink as a result of the efforts of banks to reduce their secondary reserves to acquire primary ones. Banks may also be forced to borrow funds from other financial institutions, thus diminishing the proportion of deposits among their liabilities. But whatever happens, if the central bank refuses to accommodate, commercial banks will wind up with a smaller amount of free reserves and the federal funds rate will rise, as central bank deposits can be forthcoming only if the central bank provides advances or purchases Treasury bills. In all cases, the ratio of loans to deposits will rise. The increases in the degree of liquidity pressure and in interest rates are caused by a third factor: the nonaccommodating behavior of the central bank. Eichner, who attached so much empirical importance to the degree of liquidity pressure, remained a staunch exponent of horizontalism, as we recalled in the previous section.

The ability of the degree of liquidity pressure to explain fluctuations in discretionary expenditures, beyond and besides changes in interest rates, could also be explained by another factor. As is well known, monetary policy is associated with many lags. When the economy is slowing down, for whatever reason, firms first take notice by observing rising inventories. These inventories are usually financed by bank loans. As a result, with inventories and distress

bank loans rising, firms may be forced to reduce the size of their liquid assets (including bank deposits or certificates of deposits), while households, who see their incomes declining, may decide to reduce their money balances in order to keep up with their consumption living standards. The economic slowdown will thus be accompanied by a rising loans-to-deposits ratio, and these two events will be followed by a reduction in discretionary expenditures. Thus, as a consequence, the negative relationship between the degree of liquidity pressure and the growth rate of discretionary expenditures may also be attributed to a third factor. It may have little to do with credit rationing as such.

Whatever the exact dynamics that explain the liquidity pressure ratio and its effects, it is interesting to note that Wynne Godley (1999) in his stock-flow consistent model of a closed economy also makes use of a variable that closely resembles the degree of liquidity pressure variable. This is Godley's bank liquidity ratio, which is defined as the bills-to-deposits ratio, or the ratio of defensive assets to liabilities (it is also some kind of secondary reserves ratio, since bills can be sold to the central bank to obtain reserves if these are lacking). The bank liquidity ratio is thus the converse of the degree of liquidity pressure. According to Godley, when the federal funds rate and hence the Treasury bills rate moves up, hence when the central bank is pursuing a nonaccommodating policy, the bills-to-deposits ratio drops, because some economic agents will move out of bank deposits and into Treasury bills in their attempt to rebalance their portfolio. This will only be avoided if banks raise their deposit rates. Simulations with the stock-flow consistent models built by Godley clearly show that the bank liquidity ratio, and hence the degree of liquidity pressure, will be modified substantially following shocks in the private economy or changes in the fiscal position of the government. For instance, a recession induced by a reduction in government expenditures initially leads to a substantial decrease in the bank liquidity ratio and hence to an increase in the degree of liquidity pressure (Godley and Lavoie 2007, Chapter 10). As long as investment in machinery and durables gets reduced as the slowdown proceeds, the correlation noted by Eichner would be observed in the model simulation, even though credit rationing has been assumed away.

Thus whatever explains the evolution and the effects of the degree of liquidity pressure, Eichner has certainly uncovered an intriguing relationship between monetary and real factors.

The Defensive Role of the Central Bank

The third key characteristic of a monetary economy developed by Eichner is the "defensive" role of central banks. This contribution to post-Keynesian theory by Eichner has been recently highlighted by Rochon (1999, 164–168) in

his defense of the horizontalist brand of endogenous money. As was pointed out above, Eichner did not view the monetary base as an essentially endogenous variable from the very start. He came to this view, not through the reading of high theory, but through his empirical work.

> It is usually assumed that a change in the Fed's holdings of government securities will lead to a change, with the same sign attached, in the reserves of the commercial banking system. It was the failure to observe this relationship empirically which led us, in constructing the monetary-financial block of our model, to try to find some other way of representing the Fed's open market operations on the banking system. . . . No matter what additional variables were included in the estimated equation, or how the equation was specified (e.g., first differences, growth rates, etc.), it proved impossible to obtain an R^2 greater than zero when regressing the change in the commercial banking system's nonborrowed reserves against the change in the Federal Reserve System's holdings of government securities. (Eichner 1985, 100, 111)

Thanks to the works of Mosler (1997–1998) and Wray (1998), post-Keynesians now understand much better why this is so. These two authors have explained in great detail that the main purpose of central banks is to provide the exact amount of reserves or high-powered money desired by the banking system and the overall economy, for a given base rate (the targeted federal funds rate) and interest rate structure. The amount of reserves held by banks depends on the demand for currency by the general public, the cash holdings of the Treasury, and possibly the amount of foreign exchange reserves (and many other smaller items). When the public decides to reduce its cash balances held in the form of banknotes, transferring these into bank deposits, bank reserves increase. In a fixed exchange rate regime, as is well known, a surplus position in the balance of payments also leads to an inflow of bank reserves, unless they are "sterilized" or "neutralized." What is less known is that government expenditures, financed through a reduction in the cash holdings of the Treasury at the central bank, also lead to an increase in bank reserves. These reserve inflows, or their corresponding outflows, when the public acquires more banknotes, when the balance of payments is in a deficit position, or when taxes are collected and deposited at the central bank account of the Treasury, require a "defensive" intervention of the central bank, to avoid wild fluctuations in bank reserves and in the overnight interest rate.

These defensive interventions may involve explicit open market operations, as happened in the American economy examined by Eichner, or implicit open market operations, through the use of repos and reverse repos, as is the case

now, or, alternatively, inflows and outflows of government deposits in and out of central bank or commercial bank accounts. This explains why Eichner (1985) could not find any correlation between the change in bank reserves and the change in government securities held by the central bank, in contrast to the conventional money multiplier story found in all mainstream textbooks. But this lack of correlation forced him to look for an alternative foundation for central bank intervention, which he found in the work of Lombra and Torto (1973), whose article covered the defensive operations of the Fed and the reverse causation argument, meaning that deposits led to the creation of high-powered money, rather than the opposite.

This explanation became well understood by Eichner, who claimed, "The Fed purchases or sales of government securities are intended primarily to offset the flows in and out of the domestic monetary-financial system and thereby hold bank reserves constant" (1987, 849). These were the defensive operations. As to the "accommodating operations," they involved providing the increased amount of reserves required by the banking system as a result of the increase in loans and deposits associated with a growing economy. A nonaccommodating central bank would provide additional unborrowed reserves in insufficient amounts, so that banks would have to either take advances from the central bank or be left with smaller amounts of free reserves. In either case, the federal funds rate would tend to rise. Thus, "The Fed's primary objective, in conducting its open market operations, is to ensure the liquidity of the banking system. This means that its open market operations necessarily consist, for the most part, of two elements: (1) defensive behavior, and (2) accommodating behavior" (Eichner 1987, 847).

This distinction is ever more transparent in financial systems such as Canada's, where compulsory reserves have been eliminated altogether. This zero rate of reserves has been made possible because at the end of the day, participants in the electronic large-value clearing system, including the Bank of Canada as the agent of the federal government, know with perfect certainty what is their individual clearing position. By the end of the day, the Bank of Canada thus wipes out any positive settlement or clearing balance that remains in the system or provides the liquidities that are required to bring the balances of the entire banking system from a negative position back to a zero position. Thus, before the closing of the overnight market, any settlement participant that has a negative clearing balance knows that there is some other participant with an equivalent positive balance. The demand for clearing balances is always exactly equal to the supply of clearing balances, whatever the overnight interest rate within the channel set by the central bank; that is, provided the overnight interest rate is somewhere in between the rate of interest on central bank advances and the rate of interest on deposits at the central bank.

As a result, the actual overnight interest rate will converge toward the target overnight rate announced by the central bank (Lavoie 2005).

In a system such as the Canadian monetary system, defensive operations on the one hand and accommodating or nonaccommodating operations on the other hand can be clearly separated. Defensive (or neutralizing) operations are tied to open market operations or government deposit transfers that occur in the course of the day and mainly at the end of the day, when the central bank makes sure that the overall amount of clearing balances in the system is brought back to zero. The accommodating or nonaccommodating operations (or "dynamic" operations) are simply tied to the determination of the target overnight rate (in the United States, the target federal funds rate). One could say that the central bank is accommodating when the target overnight interest rate (in nominal or in real terms) remains constant and that the central bank is nonaccommodating when the target overnight rate is being raised. A more than fully accommodating policy would be associated with a lower target overnight rate. In the American system at the time of Eichner, a more than fully accommodating policy would be associated with an increase in free reserves relative to total reserves and hence in a fall in the federal funds rate.

Eichner (1985; 1987, 846–851) explains in great detail, with the help of algebraic equations, what defensive and accommodating policies imply. He provides the most illuminating explanation of what the Fed is actually doing when intervening on the open market, providing as well empirical work that demonstrates that indeed the Fed fully accommodates most of the time. Eichner's description of the operations of the central bank is the most detailed among post-Keynesian economists, and retrospectively, from what we now know about central banks since their operations have become much more transparent (Bindseil 2004; Fullwiller 2003, 2006), we can also say that his description is the most correct and appropriate.

Retrospectively, it is also clear that Eichner's views about the federal funds rate are also right on the dot. Central banks have now made transparently clear that what they do control is the target overnight rate and that the actual rate will indeed gravitate around it, with a one or two basis point spread, as in Canada, or with a six or seven basis point spread, as in the United States. Eichner asserts that "it is clear that the Fed is able to set the short-term interest rate at whatever level it wishes. . . . The Fed is fully able to determine the [federal funds rate]—along with the other short-term interest rate, the Treasury bill rate. . . . The Fed can cause the federal funds rate to rise simply by forcing, through its open market operations, a reduction in the banking system's free reserves—just as, by increasing the amount of free reserves, it can cause the federal funds rate to fall." As a result, Eichner argues that the "basic interest rate is a politically determined distributional variable rather than a market-

determined price" and that this fact implies a "rejection of the Marshallian demand-and-supply framework for analyzing changes in the interest rate and other monetary variables" (1987, 857, 860). From that point of view, omitting his views on the liquidity pressure ratio, Eichner is clearly one of the few post-Keynesian authors of the 1980s in the horizontalist camp, as is Wray (1998) when his writings are looked at in the same light. This position is also recognized by previous readers, besides Rochon (1999)—for instance, Carvalho and Oliveira, who speak of the "Kaldor/Moore horizontalist view adopted by Eichner" (1992, 197).

Flow of Funds Analysis

Eichner's explanation of the defensive operations of the central bank "consists of viewing the Federal Reserve System as an integral part of the overall banking and financial system" (1985, 100). In other words, the Fed is viewed as part of a flow of funds system. Eichner's insistence on going beyond the standard national income and product accounts by adding flow of funds accounts and the analysis of balance sheets is his key fourth contribution to post-Keynesian monetary economics.

As pointed out in the introduction to this essay, flow of funds analysis is presented as early as Chapter 2 of *Macrodynamics of Advanced Market Economics*, right after an introduction to national income accounts. Thus Eichner considered that flow of funds analysis was an integral part of his fully integrated macrodynamics. Flow of funds concepts had already appeared in Eichner's earlier work (1979, 43), as gross saving—the sum of tangible investment and the net acquisition of financial assets—is a key variable in both the analysis of corporate firms and the behavior of households.[2] Indeed, Eichner relates household consumption to stocks of financial assets and to the availability of credit, interest rates on consumer loans, and the loan amortization duration (1987, 660–661).

In *Macrodynamics* (1987, 810–838) Eichner devotes nearly thirty pages to flow of funds analysis in the chapter on money and credit, with more than a dozen tables reproducing flow of funds consequences of various decisions by economic agents. The very first of these tables (811) illustrates the quadruple accounting entry principle first put forth by Morris Copeland (Lavoie 2006, 80), according to which any transaction requires at least four recorded changes. For instance, the moment that a bank grants a loan to a firm, both the asset and liability sides of both the firm and the bank require an accounting entry. And indeed in the recommended readings of Chapter 2, Eichner refers to Copeland's research (108). Since Copeland had defined himself as an institutionalist economist, it confirms that Eichner was indeed attempting

to put together a synthesis of Cambridge Keynesian economics and institutionalist economics.

Although I do not find very useful or heuristic the rest of the tables that illustrate flow of funds analysis, the intent of Eichner in presenting this method is clear. He wants to convince his readers that "the amount of funds available to finance investment depends far more on the lending policies of the banks, including the central bank, than on the willingness of households to forego consumption" (Eichner 1987, 138)—an obviously Keynesian assertion. In particular, "As can be seen by tracing out . . . the full income effect of a net increase in savings by one of the nonfinancial sectors, this will simply reduce by an equal amount the net savings of one or more of the other financial sectors, leaving aggregate savings unchanged. If additional investment is going to be undertaken, it can only be financed . . . through bank loans" (836–837)—a conclusion that is highly praised by Davidson in his assessment of Eichner's work on monetary theory. Indeed Davidson points out, with enthusiasm, that Eichner "almost alone among economists—recognized that the flow-of-funds approach provides a much more useful analytical tool for explaining economic processes than the national income accounts" (1992, 189).

Thus one could say that Eichner has been in the vanguard of the post-Keynesian movement to bring back flow of funds analysis to the fore. There is now a fairly sizable group of post-Keynesian economists, led by Godley (1999) and Lance Taylor (2004), who combine this flow of funds analysis, tied to the necessary equality between the uses and the sources of funds, with stock-flow consistency requirements at the sectoral and intersectoral levels.[3] As shown by Dos Santos (2006) and Godley and Lavoie (2007), this approach is akin to post-Keynesian theory and has some strong ties with other heterodox traditions (Dawson 1996). The clever use of flow of funds analysis for economic policy and economic forecasting, as reflected in the numerous reports issued by Wynne Godley and his associates at the Levy Economics Institute since the late 1990s, which has since been imitated by several other researchers in other economics institutes or in central banks, shows that flow of funds analysis or any other approach related to it may benefit from a revival of interest.

Conclusion

This intent of this chapter was to show that Alfred Eichner's contribution to post-Keynesian or to heterodox economics included monetary theory and extended far beyond his contribution to pricing theory and the behavior of the megacorp. Eichner had a Grand Design, as Kregel (1990) called it. He wanted to synthesize the various brands of heterodox economics around a

Cambridge Keynesian view, and he wanted to provide an integrated model of the economy that was realistic, empirically based, and devoid of the straitjacket imposed by the supply and demand analysis of orthodox theory (Eichner 1985, viii).

Eichner believed in the resilience of the monetary and financial system. He thought that the banking system had built-in characteristics that enabled it to act as a buffer when the economy was confronted by either a positive or negative shock and that it possessed enough elasticity to support any growth rate. Eichner believed that this flexibility was only endangered when the central bank pursued a nonaccommodating monetary policy; that is, when it forced down the amount of free reserves and when it raised interest rates. Thus, as long as the central bank was not too much concerned with inflation and accepted the need to accommodate expansion, the monetary-financial system did not cause problems for the expansion of the real economy, and hence it could be left in the background of the analysis. This is perhaps why some people believed that Eichner's analysis does not, in Sawyer's words, "really come to grips with the nature of money and the financial system" (Sawyer in King 1995, 145).

By contrast, I would say instead that Eichner did come to grips, in great detail, with the nature and the functioning of the monetary and financial system, but that, from his study, he concluded that monetary processes were sufficiently resilient as long as the central bank declined to pull the switch by raising the fed funds rate. I would go so far as to argue that Eichner's and Minsky's views are reconcilable since, as I have argued elsewhere (Lavoie 1986), there is not much in Minsky that can explain a macroeconomic financial crisis, except for large increases in interest rates brought about by the inflation fears or the bubble fears of the monetary authorities. Eichner's weakness, as was the case for many of us, was his inability to realize that real estate and stock market bubbles fed by financial euphoria could, in and of themselves, precipitate an economy into a financial crisis. Despite occasional references to periodic breakdowns, it is in this sense—his lack of attention to the potential instability of the financial system—that one could say that money did not play enough of a role in his analysis.

Part of the scaffolding to support Eichner's Grand Design was built on flow of funds analysis, a monetary approach that is congenial to post-Keynesian economics. Eichner also provided an original analysis of the monetary policies pursued by central banks—specifically, the Fed—an analysis the validity of which has been confirmed by the more transparent procedures that are now followed by modern central banks—with explicit defensive behavior and explicit interest targeting. Eichner also very adequately described the key features of a credit-money economy, and he provided a highly interesting analysis of a

new variable, the banks' degree of liquidity pressure, thus reconciling bank liquidity preference and the possibility of credit rationing with the undeniable presence of endogenous money. It seems to me that all these features are important characteristics of modern post-Keynesian monetary theory, although they were not necessarily so at the time of Eichner's writings, and hence that Eichner's monetary theory was ahead of its time.

Notes

1. Instead of a *monetarized* production economy, most authors today would speak of a *monetized* production economy.

2. Terzi (1992, 160) points out that there is already a (very brief) mention of flow of funds accounts in Eichner (1976, 316, fn. 19).

3. Ironically, Eichner (1987, 863) was obviously favorably impressed by the work of Godley and Cripps (1983). He recommends the book to his readers, besides making use of it by drawing on some of its tables.

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10

Alfred Eichner, Post-Keynesians, and Money's Endogeneity

Filling in the Horizontalist Black Box

Louis-Philippe Rochon

I never met Alfred Eichner. He passed away when I was in my senior year of college. But this does not mean that I was not familiar with his work. In fact, as an undergraduate student in economics at the University of Ottawa, studying under Marc Lavoie and Mario Seccareccia, I was introduced to his work early on, especially his *Introduction to Post-Keynesian Economics*, and Eichner's work on credit and money was required reading in the fourth-year course, Post-Keynesian Economics: Money and Effective Demand.

Interestingly enough, as Lavoie indicates in his contribution to this volume, Eichner was never considered a monetary economist, and he was subsequently ignored by the post-Keynesian community at large. His views on the megacorp and on markup pricing are generally what post-Keynesians refer to when discussing his work. Yet I first came to know of Eichner through his work on central banking and endogenous money. In fact, for many years, I thought that he was, first and foremost, a monetary economist! It was only later that I realized he had written extensively on markup pricing and other issues.

The purpose of this chapter is to explore Eichner's views on money and on endogenous money in particular. As we will see, Eichner should be considered one of the original defenders of the post-Keynesian theory of endogenous money, along with Joan Robinson, Nicholas Kaldor, and Basil Moore. He understood the functioning of the central bank and how money was endogenous. Credit and money are an integral part of his overall macroeconomic framework. In this sense, while many post-Keynesians were speaking in very general terms about endogenous money, Eichner was, in fact, busy showing *why* money was endogenous.

Indeed, Eichner's approach to money's endogeneity lies in his deep understanding of the role and functions of the central bank, which in many ways is years ahead of its time. In researching and writing my doctoral dissertation (see Rochon 1999), I reread Eichner and was struck by his unique, original approach to central banking, using double-entry accounting and a flow-of-funds approach. In rereading him yet again for this contribution, I was truly amazed at the originality of his work on endogenous money. This is someone who, in 1987, was writing, with exceptional clarity and details, on the daily operations of the central bank and the management of money.

In fact, Eichner's analysis was not only ahead of the mainstream, but also years ahead—decades, in fact—of what other post-Keynesians were doing at the time. In this sense his book, *Macrodynamics of Advanced Market Economies* (1987), or at least the chapter dealing with banks, credit, and the central bank, stands alone in the annals of post-Keynesian monetary thought. I would venture to say that much of the work by post-Keynesians today can be traced to Eichner's work of two decades ago.

In the next section, I will briefly summarize the main tenets of the post-Keynesian theory of endogenous money. I will then explore Eichner's views on credit, money, and central banking. His analysis is focused on the details of "the process by which money is introduced into the system" (1987, 7), placing him clearly in the endogenous-money camp.

In this chapter, I concentrate largely on Eichner's 1987 book and refer only sparingly to some of his other writings. In this book, Lavoie examines in much fuller detail some of Eichner's earlier writings and the evolution of his thinking.

The Post-Keynesian Theory of Endogenous Money

The debate between horizontalists and structuralists focused largely on the appropriate response and role of the central bank. Having argued that the rate of interest was a bureaucratically determined price, exogenously set by the central bank at a choosing that conformed with its overall macroeconomic objectives, horizontalists were left in fact with very little in terms of the mechanics behind central bank policy. Indeed, nowhere in Moore (1988), for instance, is this spelled out, beyond some vague generalities about central bank reaction functions.

Rightly so, structuralists picked up on this lack of specifics and argued that "horizontalism could only offer a 'black box' theory of money and interest rates, while the Keynesian liquidity preference approach [structuralism] is rich in institutional detail" (Wray 1995, 273). Structuralists, in contrast, argued that interest rates were partly endogenous, beyond the direct control of the

central bank. Indeed, their principal argument was that interest rates varied with relative debt burdens, at the level of the firm as well as the macro level. In this sense, they were able to argue that interest rates moved with cycles: as banks expanded loans and the economy grew, it also became more fragile and interest rates were pushed up as a result. Central banks were unable to keep interest rates fixed or pegged. Horizontalists at best replied that the increases in the rate of interest were best represented by upward shifts of the horizontal curve, thereby reinstating the argument that such increases were still the result of some bureaucratic decision. Once again, in light of a clear presentation or understanding of what can be called the mechanics of central banking, the argument, although correct, lacked institutional support.

The post-Keynesian endogenous money debates took place largely between 1988 and 1996, following the publication of Moore (1988). Eichner had published his book only a year earlier. Having passed away in 1988, he was therefore not able to participate in these debates. And this is a great shame, for I think that Eichner had precisely what other horizontalists needed: a clear grasp of central bank mechanics. In other words, Eichner could have filled the "black box" in a way that would have changed the debates considerably.

Post-Keynesians and Money

I have always found it useful to study the endogenous nature of credit-money by referring to Lavoie's two poles of endogeneity (1984). In this early article, Lavoie argues that any theory of endogenous money ought to emphasize two crucial relationships: (1) the one between the entrepreneurial sector of the economy and the banking system (the endogeneity of credit); (2) the relationship between the banking system and the central bank (the endogeneity of the monetary base). Each of these elements, though crucial for understanding the endogeneity of money, addresses two very different arguments.[1]

The first of these relationships concerns the demand for short-term bank credit. Indeed, firms are freed from the constraints imposed by *ex ante* savings: firms can borrow credit to cover the costs of production, mainly working capital, but also other costs related to the productive activities of the firms. Provided firms are deemed creditworthy by the bank (usually by meeting the banks' minimum creditworthiness criteria), they will receive the necessary credit, at a rate of interest that reflects the firms' creditworthy robustness (Rochon 2006). In meeting the credit needs of firms, banks are able to create money endogenously. It is in this sense that money is created ex nihilo.

Yet this argument carries another important implication: banks cannot be seen as mere financial intermediaries. Indeed, if this were the case, it would

simply be a restatement of the traditional saving-investment causality: savings would be channeled through the banking system to those needing saving to meet their needs. Rather, banks are seen as creators of money through their lending activities. To fully break the saving-investment causality link, we must further claim that it is the assets of the banks that create the liabilities, a central theme of post-Keynesian monetary theory. In the end, this first relationship has been aptly captured by Moore's expression that money is both demand-determined and credit-led.

This argument makes clear that banks are active players in the endogenous money story. They seek out potential new borrowers, and they are limited only by the availability of those they deem creditworthy. In other words, there cannot be a supply of credit if there is no demand for credit.

The second pole of endogeneity in Lavoie's analysis is central to post-Keynesian theory and indeed is at the heart of the horizontalist and structuralist debates. If assets create liabilities—that is, loans create deposits—deposits create the reserves needed to meet the banks' obligations (assuming a world still with reserve requirements). Horizontalists posit that banks simply borrow these reserves from the central bank. There are two endogeneity arguments at play: not only is the supply of credit endogenous, but so is the supply of reserves. As such, the central bank would set the rate of interest at a level consistent with its overall economic objective and then supply the necessary reserves to the system. Beyond this, there was not much explanation.

Structuralists counterargued that central banks might refuse to accommodate the needs of the banking system, thereby triggering increases in the rate of interest. As such, the rate was not purely exogenous.[2] The structuralist attack was justified in the absence of specific institutional discussion from horizontalists. This void has now been filled, with contributions from Marc Lavoie and others, as well as myself but Eichner at the time had provided all the necessary institutional discussion necessary to fill the horizontalist black box.

Eichner, Money, and Endogeneity

From the very early pages of the introduction to *Macrodynamics*, Eichner spells out clearly the importance of money in his analysis. He writes, "the economic system to be modeled is characterized by production, markets and money," in which the banking system plays a key role. As he puts it, "there must be some social mechanism for supplying the money used in transactions. The failure of this mechanism to work properly is one of the things that can go wrong in a monetarized economy, and no description of such a system that aims at completeness can avoid specifying in some detail the process by which money is introduced into the system" (1987, 5).

The focus of this analysis is contained in Chapter 12 of *Macrodynamics*, titled simply "Money and Credit." While the specific analysis of money appears rather late in the book, Eichner stresses that while little about money has been discussed earlier in the book, "the neglect of money has been more apparent that real. . . . the existence of a monetarized system has been implicit in all that has been said up to this point" (1987, 805). Indeed, earlier in the book, Eichner specifically argues that he would keep, in his own way, "monetary details in the background"; for now, "we shall simply adhere to the logic of the basic Keynesian model by assuming a fully accommodating policy on the part of the central bank" (139). The reason Eichner gives for this is that real factors are more important that monetary ones.

It is easy to understand why some post-Keynesians would make the claim that Eichner did not appreciate monetary factors (see Chapter 9 by Lavoie in this volume for a development of this argument). Yet one could easily argue, as has been done for Keynes, that Eichner wanted to get his story on real factors out before tackling monetary issues, banks, and central banking. It is obvious, reading Chapter 12, that Eichner had a profound understanding of credit, money, and production. In fact, his choice of flow of funds was precisely because it gave him a better understanding of "the countermovement of monetary flows to be traced out" (1987, 13).

On a more general level, Eichner's analysis is consistent also with the post-Keynesian emphasis on the need to reverse the causality inherent in the quantity theory: "the causation is clear. The fact that what serves as the means of payment under a credit-based system of money is endogenously determined, based on the demand for credit, means that it is the left-hand side [the growth of prices and output] . . . that determines the right-hand side [the growth of money and velocity]" (1987, 842).

While Eichner agrees that the creation of money is demand-determined and credit-led—indeed, he argues that "the amount of additional credit supplied by the banks is determined solely by the demand" (1987, 858)—he also agrees that the rate of interest is an exogenous variable, set by the central bank according to its own objectives. In fact, "it is clear that the Fed is able to set short-term interest rates at whatever level it wishes" (857). He is specific in stating that the rate of interest is "determined independently of demand and supply conditions in the credit markets" (858). Moreover, he also believes that the rate of interest is a distributive variable—that is, it affects the distribution of income: "i determines the distribution of income between fixed-interest debt holders and the rest of the household sector rather than the distribution of income between workers and non-workers or between equity share holders and the rest of the household sector" (859).

With respect to endogeneity, Lavoie's two poles of endogeneity are central

to Eichner's analysis. For the author, the relationship between banks and firms is the starting point of the production process and the creation of money, whereas the relationship between banks and the central bank is a pivotal element of contemporary economies, arising once money has been created.

Regarding the first pole of endogeneity, Eichner's analysis begins with the supply of bank credit to firms, following the demand from firms: banks cannot lend if there are no firms willing to enter into debt. Just like Keynes, Eichner see banks as "special" in the sense that investment and working capital are financed especially by banks: "if additional investment is going to be undertaken, it can only be financed . . . through bank loans," referring to both Keynes and Kalecki that investment generates savings, and not the opposite (1987, 837). But banks do not simply supply credit blindly; rather firms must be deemed creditworthy in the eyes of the banks: "Making loans to credit-worthy customers is, in fact, the specialized function which banks serve" (808); banks are "willing to grant loans only to those who can demonstrate that they are 'creditworthy,' and once this demand for loans has been satisfied, no additional credit is likely to be extended" (854). Lavoie similarly refers to the "solvent demand" (1996) and Wolfson refers to "effective demand" for loans (1996, 455); I have called it elsewhere simply the "creditworthy demand" for loans (Rochon 1999). Clearly, banks are not blind and do not lend to just anyone: borrowers must prove their ability to reimburse the loans: that is, they must show their creditworthiness (Moore 1988).

Firms require access to banks to cover their working capital and "banks emerge to provide other firms with working capital on a routine basis" (Eichner 1987, 809). There is thus a definite relationship between bank loans and the amount of money circulating in the economy: "Any change in the amount of funds circulating as drafts against bank deposits will depend on the demand for loans, or credit"; "the amount of funds in circulation depends on the need for working capital by business firms (along with the need for other types of short-term credit" (811). This is a theme that Eichner has touched on before. A few years earlier, he was already writing that "it is the demand for credit rather than the demand for money which is the necessary starting point for analyzing the role played by monetary factors in determining the level of real economic activity" and that "an increase in the demand for credit will . . . lead to an increase in bank deposits" (Forman, Groves, and Eichner 1985, 30, 32).

These are of course some familiar themes within the post-Keynesian approach to endogenous money, on which, in fact, we all agree. Indeed, the horizontalist/structuralist debates did not overly emphasize this first pole of endogeneity, apart perhaps from the question whether banks were passive players in the credit market. Indeed, structuralists, such as Cottrell (1994,

599), Minsky (1996, 77), and Wray (1992, 172), to name but a few, have labeled horizontalist banks as "passive" or "simpletons." This is an unfortunate criticism, as horizontalists never made the claim that banks met all demand for bank credit, as the quote by Eichner above makes clear.[3]

Rather, the debate between horizontalists and verticalists really focused on the relationship between banks and the central banks—in other words, on the demand and supply of reserve (or settlement balances, to use a more contemporary word). It is this part of Eichner's story that has been ignored, yet would have been enormously beneficial to post-Keynesians.

In his analysis of central banking and the second pole of endogeneity, it is evident that the monetary base is endogenous to the needs of the banking system. In the author's own words: "The amount of reserves, and thus the monetary base, is not the exogenously determined variable assumed in both orthodox Keynesian and monetarist models but instead depends on the level of nominal income. . . . The monetary base is endogenous precisely because the central bank needs to maintain the 'liquidity of the financial system'" (Forman et al. 1985, 30).

To explain the endogeneity of the monetary base, Eichner focuses on two types of examples involving the relationship between banks and the central bank. The first example involves transactions between nonfinancial entities. Within this example, he focuses on household decisions to hold onto more money (the conversion of deposits into currency), a transaction between two firms, or the purchase of a consumption good by households. The second example focuses on the impact of an increase in the demand for and supply of bank credit on banks' balance sheets. In both examples, however, central banks will react defensively in order to maintain the rate of interest at the desired level.

In the first case, no new money is created, as the "the banking system as a whole will be unaffected." Yet with respect to the second example, whenever agents enter a debt position by borrowing from a bank, "the amount of funds circulating as checkable bank deposits will necessarily rise" (Eichner 1987, 815, 825): there is thus the creation of new money. Regardless of whether a transaction takes place or credit is extended, both actions will have repercussions on the balance sheet of banks and their interactions with the central bank. Either way, Eichner's focus is on the role of the central bank in preventing the "cataclysmic breakdown" of the payment system (843).

While economists generally refer to this as the central bank's role of lender of last resort, Eichner goes beyond this, as I will argue, to explain that the central bank intervenes not only at the moment the system is threatened with collapse, but rather continuously in order to prevent the circumstances that may lead to such a "cataclysmic breakdown"—what he calls the defensive role of the central bank.

For Eichner, the overall or "primary objective [of the central bank], in conducting its open market operations, is to ensure the liquidity of the banking system," which applies to either the accommodating or defensive roles. In either case, Eichner argues that "the Fed's open market operations are largely an endogenous response to . . . the need both to offset the flows into and out of the domestic monetary-financial system *and* to provide banks with the reserves they require"; that is, resulting from the demand for money and the demand for credit respectively (1987, 847, 851).

And while the accommodating argument has been debated at length by post-Keynesians, the defensive role has been virtually ignored and only recently rediscovered (see Rochon 1999). Yet it is certainly Eichner's greatest contribution to the post-Keynesian theory of endogenous money. In fact, the defensive role of the central bank not only serves to fill the horizontalist black box, but also in fact is at the root of research carried out by a number of post-Keynesians today (see Fullwiler 2006, for instance, but also Rochon and Rossi 2004). In this sense Eichner was almost two decades ahead of his—and our—time.[4]

The "defensive" behavior is defined by Eichner as the "component of the Fed's open market operations [consisting] of buying or selling government securities so that, on net balance, it offsets these flows into or out of the monetary-financial system," leaving the overall amount of reserves unchanged. This is the result of changes in portfolio decisions and increases or decreases in bank (demand) deposits. As a result of an increase in the nonbank's desire to hold currency, for instance, "in order to maintain bank reserves at the same level, the Fed will need to purchase in the open market government securities equal in value to whatever additional currency the nonbank public has decided to hold" (Eichner 1987, 847). Forman, Groves, and Eichner similarly argue:

> a change in the amount of currency held by the public or any of the items included among the Fed's other assets represents a flow of funds either into or out of the Federal Reserve System, depending on the item and the sign attached to it, and that unless the Fed offsets this flow through the purchase or sale of government securities, the nonborrowed reserves of the commercial banking system will, as a result, change. Thus, in the face of a fluctuating public demand for currency, flows of gold into and out of the country, variations in the amount of deposits held at the Fed by foreigners and others, changes in the amount of float and fluctuations in the Treasury cash holdings, the Fed must engage in open-market operations just to maintain bank reserves at a given level. (1985, 33)

Conceivably, therefore, the public's demand for currency is a major component of the Fed's defensive policy. Growth in population over time, and therefore growth in the public's demand for currency, implies an ever-increasing injection of currency from the Fed. Edwards argues this point precisely:

> The amount of currency demanded from the public, both in the United States and abroad, tends to grow over time, in part reflecting increases in nominal spending. Consequently, an increasing volume of reserve balances is drained from the depository system and must be replenished. The expansion of currency outstanding is the primary reason the Desk conducts outright purchases of securities. . . . The Desk conducts far more outright purchases than outright sales, primarily because it must offset the reserve drain resulting from the public's increasing demand for currency. (1997, 861, 865)

Recently, Fullwiler has echoed Eichner's position:

> Outright or permanent open market operations are primarily undertaken to offset the drain to Fed balances due to currency withdrawals by bank depositors. . . . Temporary open market operations are aimed at keeping the federal funds rate at its target on average through temporary additions to or subtractions from the quantity of Fed balances. Temporary operations attempt to offset changes in Fed balances due to daily or otherwise temporary fluctuations in the Treasury's account, float, currency, and other parts of the Fed's balance sheet, in as much as is necessary to meet bank's demand for Fed balances. (2003, 857)

What this shows is that the central bank's defensive position is extremely important in achieving central bank policy. In fact, since the rate of interest is administratively determined, any movements in the interbank market will put either upward or downward pressure on interest rates. Unless the central bank is prepared to see the rate deviate from its target, it will quickly move in order to maintain the overnight rate on target. In Canada, for instance, when there are undesired pressures on the targeted interest rate, the Bank of Canada simply neutralizes these pressures by entering into special purchase and resale agreements (SPRAs) or sale and repurchase agreements (SRAs).[5] When there are upward pressures on the interest rate, the central bank agrees to purchase short-term securities and resells them the next business day. These are overnight instruments to achieve interest rate stability. Similarly, downward pressures on administered interest rates will lead the central bank to enter into SRAs, although these operations are much less frequent. Both these tools are

used in order for the central bank to address "transitory and undesired" pressures on the money-market rates of interest (Clinton and Fettig 1989, 51). The Bank of Canada has complete discretion over these intervention techniques (known as repos and reverse repos in the United States). It stands firm in its commitment of hitting its interest rate target: it will not allow the overnight rate of interest to deviate from its intended target rate. As Clinton and Fettig explain, "the decision to intervene with a repurchase or resale operation is usually prompted by a movement in overnight rates that appears at odds with the monetary conditions sought by the Bank" (52).

With respect to the accommodative behavior, it is this role that has traditionally been discussed by post-Keynesians. Indeed, the horizontalist-versus-structuralist debates were all about this component of Fed policy. The discussion arises when there is an increase in the demand for credit, which leads to an increase in deposits and, consequently, reserves. As Eichner explains, "Under a credit-based system of money, the amount of funds in circulation will increase automatically in response to the need for additional working capital by business firms (as well as in response to the need for other forms of short-term credit). . . . It is the banking system's need for additional reserves as the demand for credit increases that explains the other part of the Fed's open market operations, its accommodating behavior" (1987, 849). To meet need for reserves, the banks will usually borrow them from an accommodating central bank; otherwise, the banks will be unable to meet their reserve requirements. Hence, according to Eichner, "Unless the Fed acts through the purchase of government securities in the open market to provide banks with the necessary additional reserves, banks will find themselves with insufficient reserves to meet their legal requirements" (Forman, Groves, and Eichner 1985, 32). An increase in credit will increase the deposits, which will increase the banking system's need for reserves. "If the banking system is not going to be left with insufficient reserves, the Fed will need to take offsetting action. This means it must purchase additional government securities equal to the amount by which the banking system's required reserves are increasing" (Eichner 1987, 849).

Many structuralists retaliated against this horizontalist argument by stating that the central bank may refuse to fully accommodate, labeling the horizontalist central bank as "passive," prompting some to claim that the horizontalist arguments is "radical" (Cottrell 1988) has named it "radical endogeneity, or even "radical" (Wray 1992, 1160). Yet Eichner had foreseen this argument, claiming that this does not invalidate the horizontalist stance: of course, the central bank may not fully accommodate, either by design or miscalculation; that is, as "a matter of policy or inadvertently" (Forman, Groves, and Eichner 1987, 692).

By design, the central bank may choose not to respond. This will have, according to Eichner, two effects. The first, obviously, is to curtail the supply

of reserves. Some banks will therefore find themselves short on reserves and will have to either borrow them from the central bank or find them on the interbank (federal funds) market. The first option may have its limits as banks may think this casts doubt on their lending activities. If banks then find these reserves on the federal funds market, they will need to pay a higher price for them. The federal funds rate will rise, which is consistent with the horizontalist argument: the central bank will most likely adopt a nonaccommodating policy only when it wants to affect the rate of interest. Indeed, if the central bank wishes to affect the rate of interest, "all it need do is first reduce or increase the banking system's free reserves until the desired level of short-term interest rates has been reached and then switch from a nonaccommodating to a fully accommodating policy. Whether short-term interest rates remain fixed at that level will, in fact, be the best indication of whether the Fed has adopted a fully accommodating policy" (Eichner 1987, 858).

Graphically, as in Kaldor (1982), the "perfectly elastic supply curve for additional credit . . . may shift up or down, depending on whether the Fed is pursuing a less than or a more than fully accommodating policy" (Eichner 1987, 858). Eichner is quick to point out that this should not be confused with a movement along the curve of an otherwise upward-sloping (or vertical) supply curve, thereby specifically rejecting the structuralist argument.

Yet Eichner also argues that there could be a decrease in lending as a result, which would be consistent with the structuralist argument—for instance, Pollin (1996). Yet there is another way of understanding Eichner's argument, making it wholly consistent with the horizontalist approach. In fact, according to this logic, the cut in bank loans is not the direct result of a reserve constraint, but rather affects the creditworthiness of potential borrowers, leading banks to refuse to lend in the subsequent period. Indeed, as a result of the increase in the rate of interest, "the cost of servicing any newly acquired external debt will increase, discouraging prospective borrowers from seeking long-term loans, at least for the time being" (Eichner 1987, 855). Borrowers may be reluctant to seek more loans, but banks will also be reluctant to lend. Either way, a non-accommodating central bank will force up the rate of interest that will make borrowers less creditworthy. This is why I emphasized elsewhere (Rochon 1999) the difference between credit rationing and credit constraints.

With respect to the central bank's miscalculation of reserve needs, Eichner is silent on that part. Yet Lavoie provided what I consider the proper answer to this riddle. In comparing the Canadian and American central bank systems, Lavoie points out that while in Canada the central bank knows with precision the amount of reserves needed in order to neutralize the flows in and out of the system, the central bank in the United States "does not have perfect information about the drains on reserves that must be compensated for, nor does it have

perfect information about the daily or even hourly demand for free reserves or for discount window borrowing as a result, the Fed cannot perfectly equate supply to demand at the target funds rate" (2005, 265–266).

Conclusion

Although I never met Alfred Eichner, his horizontalist views on credit and endogenous money influenced mine deeply. As was shown in this chapter, Eichner's views on endogenous money were considerably developed and well argued. He showed great knowledge of central bank behavior, and his view of the defensive character of central banking was well ahead of its time, forming the basis of much post-Keynesian endogenous money theory today.

Moreover, with respect to the horizontalist-versus-structuralist debates, had post-Keynesians taken note of Eichner's views, the debate would have been considerably different as they would have filled the famous horizontalist black box.

Notes

1. There is a second reason why I find this approach useful. It allows for a better understanding of the debates between post-Keynesians and circuitists. Each of these schools tends to emphasize only one of these relationships, while simply assuming the other. In this sense, both approaches can be viewed as complementary.

2. For a thorough discussion of this debate, see Rochon (1999) and Lavoie (2007). Unfortunately, here is not the place to fully discuss the details of this debate.

3. Moore also assumed that banks did not meet all demand. The author argued, although apparently ignored, that "commercial bank loan officers must assure that loan requests meet the bank's income and asset collateral requirements. They must in general satisfy themselves as to the creditworthiness of the project and the character of the borrower. It is precisely for these reasons that banks develop client relationships with their borrowers" (1988, 62).

4. There is perhaps a single exception, of which I am aware. Moore does argue that "the money supply, bank reserves, and the high-powered base all vary endogenously in response to changes in the demand for *money* and *credit*," although the argument is never developed (1989, 26; emphasis added). Yet it is clear that Moore had the same idea in mind: central banks react accommodatingly whenever there is an increase in bank credit used to meet the needs of production or whether banks' balance sheet are affected simply by the fact that consumers and firms are purchasing goods such that deposits are moved around.

5. SPRAs are (repo-type) transactions in which the Bank of Canada offers to purchase government securities from designated counterparties with an agreement to sell them back at a predetermined price the next business day. SRAs are (reverse repo-type) transactions in which the Bank of Canada offers to sell government securities to designated counterparties with an agreement to buy them back at a predetermined price the next business day.

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