

Paul A. Samuelson & William D. Nordhaus

MICRO- ECONOMICS

Fourteenth Edition

MICRO- ECONOMICS

F O U R T E E N T H E D I T I O N

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TO OUR CHILDREN AND STUDENTS

MICROECONOMICS

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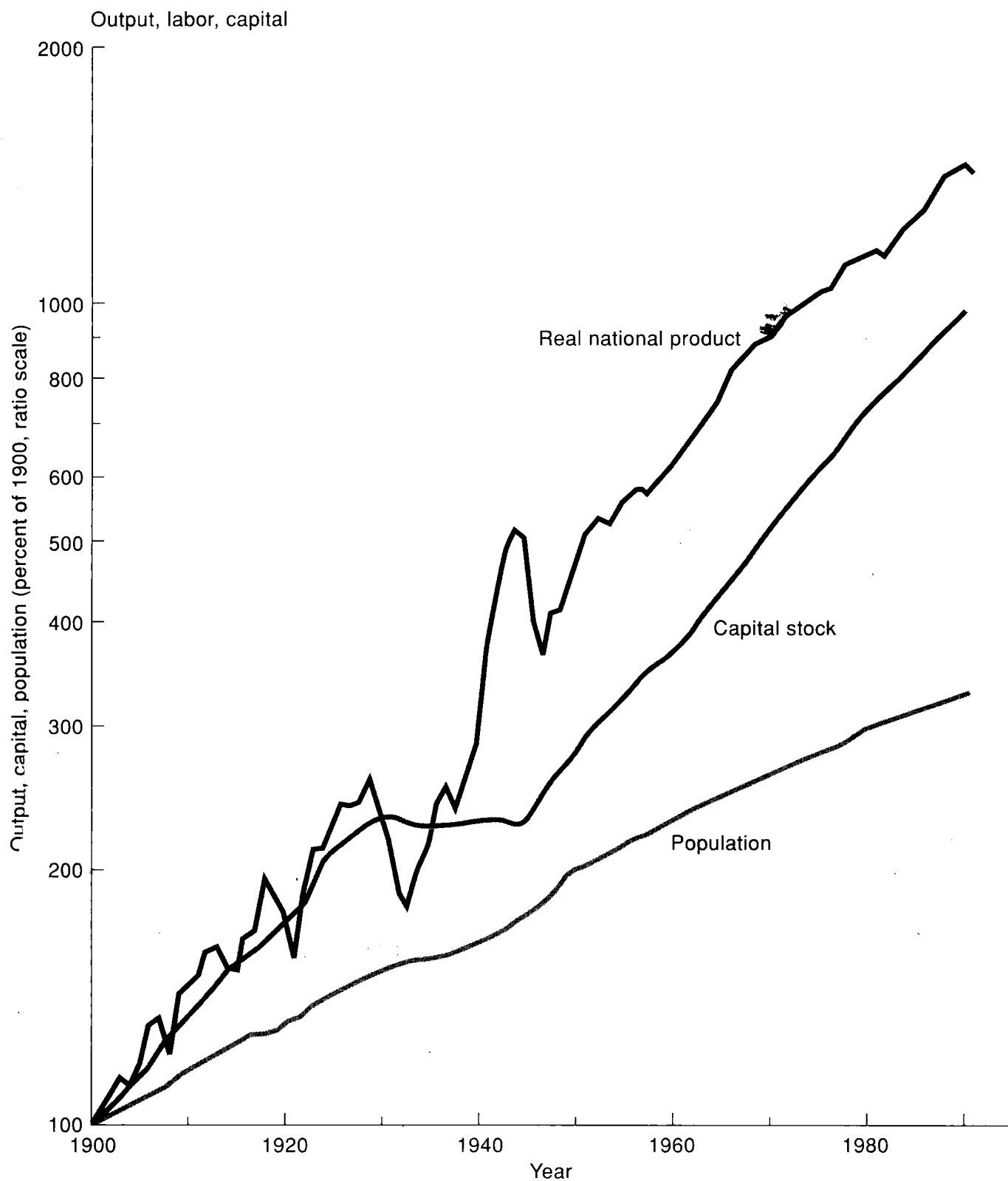
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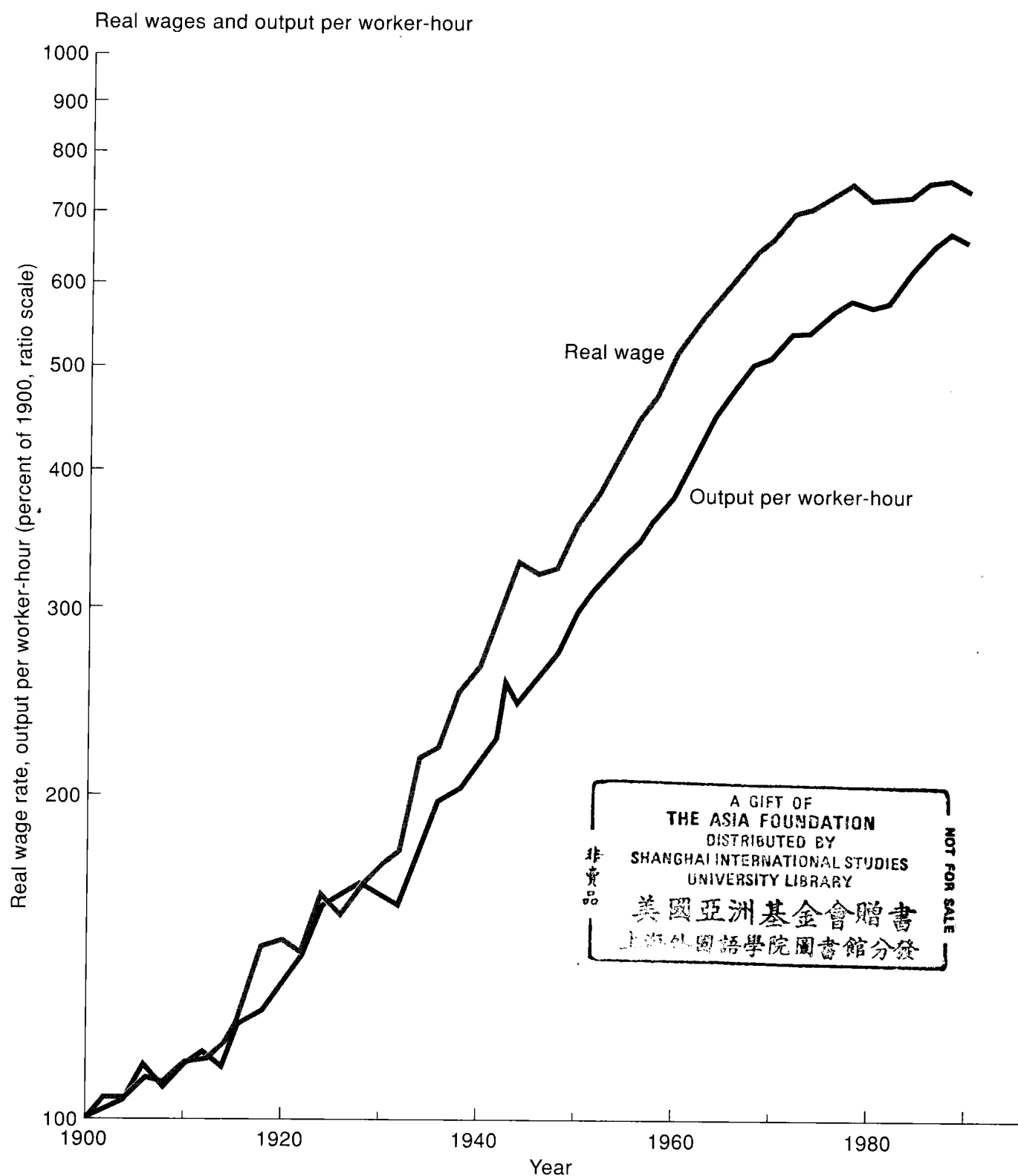
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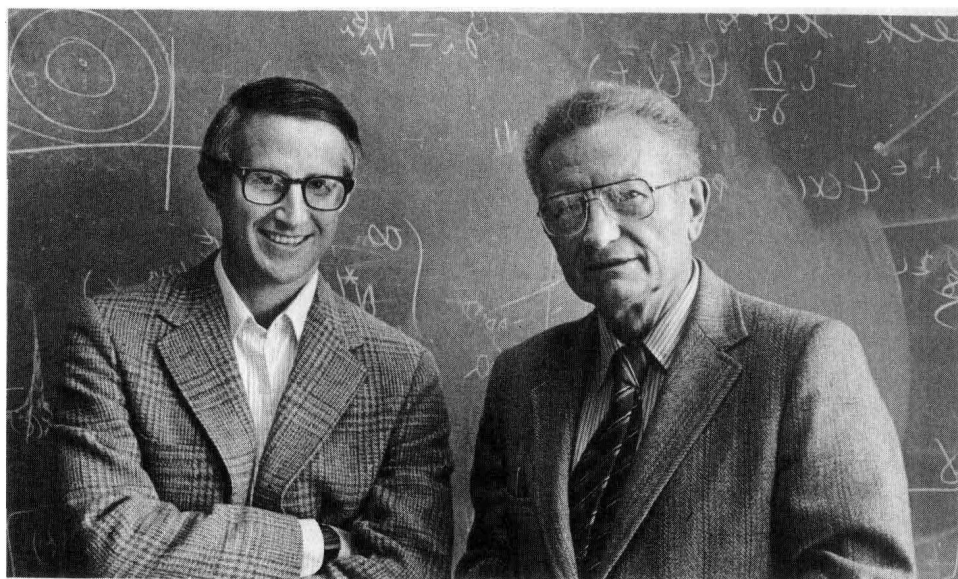
Patterns of Economic Growth



Patterns of Economic Growth



A B O U T T H E A U T H O R S



THOMAS MOON

Paul A. Samuelson, founder of the renowned MIT graduate department of economics, was trained at the University of Chicago and Harvard. His many scientific writings brought him world fame at a young age, and he was the first American to receive a Nobel Prize in economics, in 1970. One of those rare scientists who can communicate with the lay public, Professor Samuelson long wrote an economics column for *Newsweek*. He testifies often before Congress and serves as academic consultant to the Federal Reserve, the U.S. Treasury, and various private, nonprofit organizations. He was economic adviser to President John F. Kennedy. Professor Samuelson plays tennis daily, and his family's size doubled when triplets arrived.

William D. Nordhaus is one of America's eminent economists. Born in New Mexico, he was an undergraduate at Yale, received his Ph.D. in economics at MIT, and is now the A. Whitney Griswold Professor of Economics at Yale University and on the staff of the Cowles Foundation for Research in Economics. His economic research has spanned a wide variety of topics—including the environment, inflation, energy, technological change, regulation, resource economics, and trends in profits and productivity. In addition, Professor Nordhaus takes a keen interest in economic policy. He served as a member of President Carter's Council of Economic Advisers from 1977 to 1979, was Provost of Yale University from 1986 to 1988, and writes occasionally for *The New York Times* and other periodicals. He regularly teaches the Principles of Economics course at Yale. Professor Nordhaus and his family live in New Haven, Connecticut, and share an enthusiasm for music, hiking, and skiing.

ECONOMICS AND PERPETUAL YOUTH

It was never my idea to write an introductory economics textbook. My MIT department head, Ralph Freeman, came to me in 1945 and said:

Paul, here's an offer you can't refuse. A year of economics is compulsory for our MIT students. And they find it dull.

Take as much time off as you need. Write a book that people new to economics will like. It can be as short as you wish. Cover the topics *you* think important. I'm sure it will be a best seller.

More importantly, you'll contribute to the education of a generation. Then you'll have two reputations. Paul Samuelson, the economic theorist who pioneers at the frontiers of high-falutin' mathematical economics. And Paul Samuelson, who has paid his dues to promoting economic literacy and rational understanding among the citizenry.

I laughed at first. I hesitated. Then I was lost. The die was cast. The rest, as they say, is history.

My publisher, McGraw-Hill, and my coauthor, Bill Nordhaus of Yale, have asked me to tell the story. So here goes.

Back to the Classroom

1945 was a crucial time. Germany and Japan were defeated, and American colleges were full to overflowing with returning service people and war workers. Economics was at a dynamic stage. The Great Depression of 1929–1935 had finally been licked by forceful programs that threw out the window the old orthodoxies of do-nothing monetary and fiscal policies. Britain and America had later mobilized their economies for a successful war in a way that Hitler, Mussolini, and the Emperor Hirohito's chieftains never dreamed of. And, though we could

not know it in 1945, a successful Marshall Plan and MacArthur occupation of Japan were about to set the stage for miracle decades of postwar growth in the "Age after Keynes."

College students deserved to understand all this. But, as teachers of my generation knew to our sorrow, the best-selling economics textbooks were seriously out of date. No wonder beginners were bored—and not only at MIT. My students at Harvard often had that glassy look.

This account must not be like the fictional work the humorist Mr. Dooley attributed to Teddy Roosevelt under the mythical title "Me and Cuba." If Newton had not invented the calculus when he did, Leibniz or someone named Smith would have done so. If my 1948 *Economics* had not brought guns-and-butter choices into elementary microeconomics, someone somewhere would soon have done so. At the time of my first edition, even the word "macroeconomics"—the study of what determines a society's unemployment, its price-level inflation rate, and its rate of real GNP growth—was not yet in the dictionary! Some scholar just had to come along and revolutionize the introductory textbooks of economics.

But why me? I was back from the MIT Radiation Laboratory, where I had worked at the mathematical job of designing automatic servomechanisms to ward off enemy bombers. So to speak, I thirsted for a return to economic research and teaching. I was 30, the best age to write a text or innovate a treatise. By good chance, my advanced *Foundations of Economic Analysis*, which was to win me a Nobel Prize in economics 25 years later, was already in press. Now or never to author a textbook. But first I must tell a secret. Back in those days, a promising

scholar was not supposed to write textbooks—certainly not basic texts for beginning sophomores and freshmen. Only hacks were supposed to do that. But because I had already published so many research articles, it seemed that my reputation and prospects for lifetime tenure could afford me the elbow room to respond positively to MIT's request for a new textbook. Being cocky and even brash in those good old days, it was myself I had to please.

What clinched the argument for me was this: Linus Pauling, so great a scholar and humanist that he was to win two Nobel Prizes, had already written a leading chemistry text—just as the great Richard Feynman was later to publish classic physics lectures. William James had long since published his great *Principles of Psychology*. Richard Courant, top dog at Göttingen in Germany, had not been too proud to author an accurate textbook on calculus. Who was Paul Samuelson to throw stones at scholars like these? And, working the other side of the street, I thought it was high time that we got the leaders in economics back in the trenches of general education. (Running ahead of the story, one can report that by the 1990s the innovators in undergraduate economic teaching have often been those who pierced farthest out into the frontiers of economics as a scholarly discipline.)

The Long Grind of Creation

Starting a baby is easy. Bringing it to full term involves labor and travail. As soon as each chapter was written, the mimeograph machine ground it out for testing on our MIT students. I found it demanding work, but pleasant.

Rome wasn't built in a day. And what I naively thought might be a year's job turned into 3 years of writing and rewriting. For once my tennis suffered, as weekends and summer vacations had to be devoted to the task of reducing to plain and understandable prose the fundamental complexities of economic science. Even the traditional diagrams of economics, I discovered, were overdue for redesigning if the "dismal science of economics" was to become the exciting subject it really is.

Of course, the word got out that a breakthrough was in the making. And soon publishers swarmed to my office like bees around flowers. "Pick us because we're big," some said. Or, "Pick us because we're small and we'll concentrate on your needs."

Or, "We have sales representatives in 48 states and 1500 colleges." I flipped a few coins and in the end decided to sign up with McGraw-Hill as publisher. Why? Because the firm was prestigious in science and business? Yes, in part. Because it had a magnificent marketing and selling staff? Yes, in part (but the other big publishers were no slouches when it came to selling college texts). What principally influenced my decision was this: (1) McGraw-Hill had published a magnificent multivolume series for the MIT Radiation Laboratory, a commercial success and a treasure house for radar and electronic sciences; and (2) McGraw-Hill had published, more for prestige than profit, the two-volume classic *Business Cycles* of Joseph Schumpeter, my famous master in the Harvard Graduate School.

The Moment of Truth

In the autumn of 1948 the first edition of *Economics* rolled off the press. No matter how hard the advance work or how optimistic the dreams, one can never be sure how the future will turn out. Fortunately, from the word "go" this novel approach to economics hit a responsive chord. Colleges big and little opted for the new. As each fresh printing was sold out, *Economics* was back again for new runs of the press.

Semester after semester our share of the market grew. In one year there was a clean sweep, with every school in the Ivy League adopting the text. As important to me were its successes at junior colleges and state universities across the map of the United States and Canada. International editions soon proliferated in English. When a Guggenheim Fellowship took me to Europe, I checked each city's main bookstore for the availability of translations into French, German, Italian, Swedish, and Portuguese.

My labor was more than rewarded. Aside from experiencing the natural vanity of an author, I was pleased as an educator to see that the citizenry, who would be deciding global policies in the last half of the century, was being exposed to the pros and cons of up-to-date mainstream economics.

Reviews of the book speeded up the bandwagon. The first one came from the pen of John Kenneth Galbraith, then an editor of the conservative business magazine *Fortune*. He predicted that the next generation would learn its economics from the

Samuelson *Economics*. Praise is sweet in authors' ears, but I must confess that it was the durability of the book's dominance that surprised me. As Andy Warhol put it: We live in a time when anyone can be a celebrity for about 15 minutes. Galbraith turned out to be more prescient than I. *Economics* did set a new and lasting pattern. Most of its successful rivals are written in its general mode, and it is heartwarming that much of the competition has come from the pens of good personal friends.

One summer the U.S. Chamber of Commerce put out over the Associated Press news wires the mock charge that McGraw-Hill's Samuelson, who writes about the need for antitrust control of monopolies, ought to be indicted for controlling a lopsided share of the total textbook market! When I attended the annual meetings of the American Economic Association, instructors frequently came up to me and said, "We use your book at Siwash" or "Winnsockie" or some other far-flung place. There was always an awkward pause, as I never knew quite what to say. My problem got solved when, one day, I heard myself saying, "Mrs. Samuelson will be pleased."

When success comes into an autobiography, the going gets boring. And Joseph Schumpeter, the great Harvard expert on innovations, will remind me from the grave how important *luck* was in all this. I happened to be there, at the right time in the right place. True, luck does favor the prepared mind. But the important minds that had become prepared for the new approach to economics were those of teachers who had been debating the cons and pros of the so-called Keynesian revolution and were thirsting for a "national income" approach in *macroeconomics* and a "general-equilibrium" approach in *microeconomics*.

The Ever-Young Child

Actually, this account is not primarily about me as author. Just as a child takes on an individual identity distinct from the parent, so it was with the brainchild *Economics*. At first I was in command of it. But then it took over in its own right and came to be in charge of me.

The years passed. My hair turned from blond to brown. Then to gray. But like the portrait of Dorian Gray, which never grew old, the textbook *Economics* remained forever 21. Its cover turned from green

to blue, and then to brown and black, and to many-splendored hues. But helped by hundreds of letters and suggestions to the author from students and from professors with classroom experience, the economics inside the covers evolved and developed. A historian of mainstream-economic doctrines, like a paleontologist who studies the bones and fossils in different layers of earth, could date the ebb and flow of ideas by analyzing how Edition 1 was revised to Edition 2 and, eventually, to Edition 14.

And so it went. Hard, hard work—but ever so rewarding. Finally came the day when tennis beckoned. To McGraw-Hill I said: I've paid my dues. Let others carry on as I enjoy the good life of an emeritus professor, cultivating the researches that interest me most and letting revisions go hang.

McGraw-Hill had a ready answer: "Become a joint author. We'll make a list of congenial economists whose competence and views you admire." And so the search for the perfect William Nordhaus began. Yale is only 150 miles from MIT, and it was there that the real Nordhaus was to be found. It only helped that Bill had earned his Ph.D. at MIT. And in the days since then he has won his spurs serving on the President's Council of Economic Advisers and doing a tour of duty in Vienna with the International Institute for Applied Systems Analysis. Like Gilbert and Sullivan or Rogers and Hart, we turned out to form a congenial team.

And so, as in the classic tales, we have lived happily ever after. What matters is that the book stays young, pointing ahead to where the mainstream of economics will be flowing.

Rough Pebbles along the Way

Not always has it been fun and games. In the reactionary days of Senator Joseph McCarthy, when accusations of radicalism were being launched at the pulpit and in the classroom, my book got its share of condemnation. A conservative alumnus of MIT warned the university's president, Karl Compton, that Paul Samuelson would jeopardize his scholarly reputation if he were allowed to publish his apologetics for the "mixed economy." Dr. Compton replied that the day his faculty was subjected to censorship would be the day of his resignation from office. It all seems slightly comical four decades later, but it was no joke to be a teacher at a

public university when many of the fashionable textbooks were at that time being denounced as subversive. (One excellent text, which came out a year before mine, was killed in its infancy by vicious charges of Marxism that were false on their face.) Actually, when your cheek is smacked from the Right, the pain may be assuaged in part by a slap from the Left. *Anti-Samuelson*, a two-volume critique, was authored in the 1960s when student activism was boiling over on campuses here and abroad. Apparently I was an apologist for the laissez-faire world of markets where dog eats dog.

Each cold wind imparts a useful lesson. I learned to write with special care wherever controversial matters were concerned. It was not that I was a veritable Sir Galahad in all things. Rather, it was that I could only gain by leaning over backward to state fairly the arguments against the positions popular in mainstream economics. That is why conservative schools like my Chicago alma mater were motivated to assign *Economics* at the same time that prairie progressives found it an optimal choice. Even Soviet Russia felt a translation was mandatory, and within a month the entire supply of translated copies there had been exhausted. (Experts tell me that back in Stalin's day my book was kept on the special reserve shelf in the library, along with books on sex, forbidden to all but the specially licensed readers.) With the Gorbachev thaw, new translations are planned in Hungary, Czechoslovakia, Yugoslavia, Romania, and other Eastern European countries, as well as in China, Japan, Vietnam, and other Asian lands. All in all the number of translations, published or in the pipelines, involves more than 40 languages.

Tales, Tall but True

Legends abound concerning the saga of the textbook *Economics*. Here are a few from the dregs of memory.

Some years back one of MIT's graduate students, now a college president, went to a summer program at the London School of Economics. Attending were students from all over the world, from the jungles of Africa to the rice paddies of Asia. Only one thing did they have in common, he reported. All of them had begun their study of economics with the same textbook. He said his own stock went up because he could explain what some of the

American idioms meant and could pinpoint Fort Knox, Kentucky, as the place where the U.S. government stored its gold.

Japanese students are great buyers of books. *Economics* sells well there in English as well as Japanese. The erudite translator is my old Harvard classmate, Shigeto Tsuru, later to become president of Hitotsubashi University in Tokyo. With the royalties he received as translator, Dr. Tsuru purchased a luxurious condominium, and he invited various distinguished scholars to reside there during visits to Japan. As a special honor, he asked me to suggest a name for it. After some thought I came up with Royalty House, and thus it has been known ever since.

Once I received a letter from a diligent reader:

Sir, in your textbook you say that the \$24 that was paid to the Indians for the island of Manhattan—if invested at 6 percent compound interest—would have accumulated to about what all the real estate is worth today in Manhattan Island. I make that out, sir, to be several hundred billions of dollars. I don't think you can buy it for that little.

How was I to respond to her challenge? I asked my research assistant to look into the matter. The next day, Felicity Skidmore came back to say: "Tell her, boss, if 6 percent won't do it, try 6½!"

Another time I received in the mail the following letter:

I am a 10-year-old boy from Maine. When my Father and I were fishing last week in Lake Walden, I found a bottle floating. Inside it was the hand-printed message: If the finder of this bottle will get in touch with Professor Paul A. Samuelson of MIT, author of *Economics*, he will learn something to his advantage.

Peter Quigley

Although I had not written the note (and all my department pals denied they had), I was on my mettle. But what to do? Finally, I sent this reply:

Dear Mr. Quigley:

Yes, I will tell you something worth knowing.
Don't believe everything you read in print.

Paul A. Samuelson, Ph.D., MIT

Rumors naturally proliferate. No, the beard I don't have is not white. No, I have not been dead since 1977. No, graduate students don't ghostwrite

my book—nor do clever elderly females in white sneakers. Yes, I do admit to the vice of tennis.

Samuel Butler quipped: "While others polish their style, I perfect my handwriting." That is not my way. When I try to account for the textbook's durability, I suspect that its relaxed, almost colloquial style deserves some of the credit. That ease is not easily come by. Like Macaulay the historian, I write and rewrite in the hope that each sentence and clause will, at a first reading, reveal its meaning. I don't always succeed, but I do try. For this reason I take private pleasure in the fact that the book is used to teach English to foreigners; excerpts appear in anthologies for Japanese students and also in case materials used in teaching English as a second language to immigrants. Spread the gospel of economics anyway we can, I say.

Here is not the place to describe how the various editions have changed along with the evolution of modern mainstream economics. The first edition put much stress on what might be called "Model T Keynesian macro." With each new edition, the emphasis on monetary policy grew. And with the worst wastes of the Great Depression banished, the microeconomics of efficient market pricing has come to occupy more and more of the text's pages.

Science or Art?

Economics is not an exact science. Still, it is more than an art. We cannot predict with accuracy next year's national income—just as meteorologists cannot forecast next week's weather as precisely as they can guess the day after tomorrow's. But no bank or big business would be so rash as to consult astrologers rather than trained econometricians, or try to wing it by guess and by gosh.

Firms budget their machine replacements by microeconomic principles. Several of my former students earn a million dollars per year on Wall Street. Why? Because they know rich clients or are masters of slick sales techniques? Certainly not. It is because modern theories of finance, worked out intricately in seminar rooms at the business schools of Stanford, Wharton, Chicago, MIT, and Berkeley, really do stand up to statistical testing in the real world of markets.

A beginning textbook won't teach anyone to be an expert. Still, a journey of a thousand miles begins with the first hundred yards. The great Win-

ston Churchill, clever at writing history and heroic in leading nations, was color-blind all his life when it came to basic economic understanding. That kind of unnecessary illiteracy I and 10,000 teachers have vowed to fight.

Mine was the first generation of economists who were sought out by governments. I am the exception who never spent a full year in Washington. Still, I treasure in memory the many times I was called to testify before congressional committees or to serve as a Treasury and Federal Reserve academic consultant. Personally, most memorable were the years in which I had a chance to give economic counsel to John F. Kennedy (senator, presidential candidate, President-elect, and President in Camelot). Republican friends of mine—Fed Chairman Arthur F. Burns and Council of Economic Advisers Chairman Paul MacCracken—have similar stories to tell. Now that Eastern Europe has the need, in the "Age after Gorbachev," to move toward the market economy, Bill Nordhaus's generation is being drafted right and left.

A pseudoscience could not stand the Darwinian test of time. It was President Harry Truman who used to insist, "Give me a one-armed economist." Not for decisive Harry the adviser who says, "On the one hand this; on the other hand that." Well, I have advised legislators, candidates, and presidents. And this I have learned over a long lifetime: The prince or queen does not really want a one-armed economist. For in our profession, one-armed economists often come in two varieties: those with a Right arm only and those with only a Left arm. And then the sovereign must call in an eclectic economist like me to adjudicate between the rival zealots.

Economists are accused of not being able to make up their minds. In particular the brilliant John Maynard Keynes was accused of having volatile opinions. When a royal commission asked five economists for an opinion, it was said they would get six answers—two from Mr. Keynes. Keynes himself was quite unrepentant when pressed on the matter. He would say: "When my information changes, I change my opinion. What do you do, Sir?" He did not want to be the stopped clock that is right only twice a day.

The subject of economics is an ancient and honorable one, still growing and still having a long way to go before approaching the state of a tolerably accurate science. It began really with Adam Smith—

our veritable Adam—who wrote in 1776 that great text called *The Wealth of Nations*. Then in 1848 John Stuart Mill, clocked with the highest IQ of all times, wrote *The Principles of Political Economy*, which served as the layperson's bible until 1890, when Alfred Marshall prepared his definitive *Principles of Economics*.

I would be an ingrate not to feel thrilled that, on my watch, the baton has been carried forward by this serendipitous brainchild. Science is a cooperative affair, a matter of public knowledge and never the product of one person's hand. Mostly I have been the mouthpiece of late-twentieth-century mainstream economics, but occasionally I have been able, so to speak, to get my own few licks in. Could any scholar lust for more?

Fortunately, as coauthors, William Nordhaus and I bring independent viewpoints to problems. But we are enough alike in our experiences and judgment to work the canoe forward on its steady course. The book has been lucky for the continuity plus change of its authors.

The future is longer than the present. You readers will look deep into the twenty-first century. William Nordhaus and I try to keep that ever in mind. We remember: Science progresses funeral by funeral. Science never stands still. What was great in Edition 1 is old hat by Edition 3; and maybe has ceased to be true by Edition 14. If scholars have been able to mark the evolution of economic knowledge decade by decade through study of this work's successive revisions, what never goes out of date is Respect for the Facts and for the Methods of cogent analysis and inference. If anywhere, therein resides economics' refusal to go stale and *Economics'* secret of perpetual youth.

The wood I chop warms me twice. I cannot close without remarking that the day Professor Freeman launched me on the adventure of writing a textbook for beginners in economics was the beginning of what has been sheer fun every mile of the way.

Paul A. Samuelson
Massachusetts Institute of Technology
Cambridge, Massachusetts
December 1991

PREFACE TO *MICROECONOMICS*

Books are the carriers of civilization. Without books, history is silent, literature dumb, science crippled, thought and speculation at a standstill. They are engines of change, windows on the world, lighthouses erected in a sea of time.

Barbara Tuchman

Economics has developed as a science over more than 200 years. For almost half a century, this book has served as the standard bearer for the teaching of elementary economics in classrooms in America and throughout the world. Each new edition has distilled the best thinking of economists about how markets function and about what society can do to improve people's living standards.

But economics has changed profoundly since the first edition of this text appeared in 1948. Economics is above all a living and evolving subject. In every era, it must solve emerging mysteries and grapple with current dilemmas of public policy. Over the last decade, the United States grappled with new problems of slow growth in living standards and mounting poverty; with large government budget deficits and the need to make ends meet for both private and public households; with heightened foreign competition, trade deficits, and a large foreign debt; and with growing concern about international environmental problems and the need to forge agreements to preserve our natural heritage.

But all the news was not bad during the last few years. Many middle-income countries grew rapidly and slew the dragon of rapid population growth. And, in the most dramatic development of all, the nations of Eastern Europe threw off their socialist shackles and decided to cast their lot with market capitalism as a way of raising the living standards of their peoples. This was the *triumph of the market* as a way of organizing an advanced, technologically sophisticated economy.

All these and a host of other issues test the inge-

nuity of modern economics. The need to keep *Microeconomics* at the forefront of modern economic analysis in the rapidly evolving world economy affords the authors an exciting opportunity to present the latest thinking of modern economists and to show how economics can contribute to a more prosperous world.

Our task in this survey of microeconomics is straightforward: to present a clear, accurate, and interesting introduction to the principles of modern microeconomics and to the institutions of the American and world economy. Our primary goal is to survey microeconomics. In doing this we emphasize the basic microeconomic principles that will endure beyond today's headlines.

The Fourteenth Edition

Economics is a dynamic science—changing to reflect the shifting trends in economic affairs, in the environment, in the world economy, and in society at large. This book evolves along with the science it surveys. Every chapter has moved forward in time to keep pace with microeconomic analysis and policy. What are the major changes?

1. Rediscovery of the Market. One of the themes in the new edition is what we call “rediscovery of the market.” All around the world, nations are discovering the power of the market as a tool for allocating resources. The most dramatic example of this, of course, occurred after the “velvet revolution” in Eastern Europe during 1989 and after the

August 1991 putsch in the Soviet Union. Nation after nation threw out its Communist leaders and rejected the command economy. In 1990, Poland undertook a grand experiment of undergoing "shock therapy" by introducing markets into much of its economy; other countries followed more gradually. These countries believed that only by allowing markets to determine prices, outputs, and incomes would people have the incentives to invest appropriately and work hard.

The rediscovery of the market was found in market economies as well. Many countries deregulated industries or "privatized" industries that had been in the public sectors. The results were generally favorable as productivity rose and prices fell. Some economists have recommended using market mechanisms to promote environmental goals, levying pollution taxes as a way of curbing harmful pollution in the most efficient manner.

2. Weight Loss. Over the last few editions, *Microeconomics* had gained bulk as new topics were added and new economic problems were analyzed. The time had come for a fierce weight-loss campaign to reduce the weight of the material, literally and figuratively. With this objective in mind, we surveyed teachers to determine which material was least used. In addition, we questioned leading scholars to ascertain which topics could be omitted at least cost to educating an informed citizenry and a new generation of economists. We drew up a list of deletions and said sad farewell to many appendices and sections. But at every stage, the question we asked was whether the material was central to modern microeconomics. Only when a subject failed this test was it deleted. The end result of this campaign was a reduction of more than one-quarter in the size of the book.

3. Restructured Presentation. We have used the opportunity afforded by this fundamental change in the book's organization to restructure the coverage. We have deleted a great deal of institutional material that is less important for an understanding of modern microeconomics. These pages have been replaced by a more thorough development of the basic tools.

4. Emphasis on the Open Economy. Americans are learning that no nation is an island. Our living standards are affected by technological develop-

ments in Japan and Europe; domestic producers must contend with competitors from Korea and Mexico. Similarly, no complete understanding of modern economics is possible without a thorough grounding in the world economy. The fourteenth edition continues to increase the material devoted to international economics and the interaction between international trade and domestic economic events.

5. Games and Uncertainty. The analysis of uncertainty and game theory has become an increasingly influential part of modern economics. An appreciation of how private insurance can increase consumer satisfaction relies on understanding behavior toward risk. There is much misunderstanding of the role of speculation in a market economy. In addition, game theory has gained prominence in understanding imperfect competition, the dynamics of trade negotiations, strikes, the evolution of cooperation, and even the misunderstandings that lead to war. We have highlighted the importance of game theory and uncertainty with a new chapter devoted to the subject. Even a short introduction to the economics of games and uncertainty can change the way that we look at the world around us.

6. Emphasis on History and Policy. Economics is at its core an empirical science. It first aims to explain the world around us and then helps us devise economic policies, based on sound economic principles, that can enhance the living standards of people at home and abroad.

Drawing upon history, economic chronicles, and the authors' experience, the fourteenth edition continues to emphasize the use of case studies and empirical evidence to illustrate economic theories. The resurgence of the market is made vivid when we examine the experience of the socialist countries and their decision to become capitalist countries. The dilemmas involved in combatting poverty become real when we understand the shortcomings of the present welfare system and the history of discrimination. International economics comes to life when we study the reasons for the surging U.S. trade deficit of the 1980s or the successes of export-oriented countries.

The microeconomic chapters draw upon case studies, economic history, business decisions, and real-world experience to illustrate the fundamental

principles. Examples such as Soviet economic reform, OPEC pricing, gasoline taxation, airline deregulation, antitrust policy and practice, collective bargaining by labor unions, and an analysis of tax reform help bring the theorems of microeconomics to life.

This hands-on approach to economics allows students to understand better the relevance of economic analysis to real-world problems.

7. Improved Exposition in Every Chapter. Although there are many new features in the fourteenth edition, the accent is upon improving the exposition of the core concepts of economics. We have labored over every page to improve this survey of introductory economics. We have received thousands of comments and suggestions from teachers, experts, and students and have incorporated their counsel in the fourteenth edition.

The attention to improved exposition will be seen in the redesign of this edition, with clearer figures and a new typeface. We have introduced scores of new end-of-chapter questions as well as new examples in the textual material. Above all, we believe that cutting out superfluous appendices, sections, and even chapters will lead to greater focus and ultimately to better understanding by the beginning student.

The glossary, which was first introduced in the twelfth edition, has been carefully tuned to meet the needs of this edition. All major terms now have a capsule definition that students can easily turn to. As a study aid, the most important terms are printed in **boldface** when first defined in the text; they all then appear again in the glossary to reinforce the indispensable vocabulary of economics in the student's mind.

One of the distinguishing features of *Microeconomics* has been the presentation of central but somewhat advanced theories in understandable ways. For the fourteenth edition we have redrafted many chapters to make these topics understandable to beginning students.

Optional Matter

Economics courses range from one-quarter surveys to year-long intensive honors courses. This split edition on microeconomics has been carefully designed to meet all situations. The more advanced materials have been put in separate appendices or

specially designated sections. These will appeal to curious students and to those who teach demanding courses that survey the entire discipline thoroughly. We have included advanced problems to test the mettle of the most dedicated student.

If yours is a fast-paced course, you will appreciate the careful layering of the more advanced material. Hard-pressed courses can skip the advanced sections, covering the core of economic analysis without losing the thread of the economic reasoning. And for those who teach the bright honors students, this book will challenge the most advanced young scholar. Indeed, many of today's leading economists have written to say they've relied upon *Economics* or its split volumes all along their pilgrimage to the Ph.D.

Format

The fourteenth edition has changed its format to improve the readability and to emphasize the major points. Special footnotes (in gray boxes) are reserved for important and useful illustrations of the core material in the chapter. Every figure has been redrawn with an eye to crystallizing the essential parts of the analysis.

New features in this edition include scores of fresh end-of-chapter questions, with a special accent upon short problems that reinforce the major concepts surveyed in the chapter. Terms printed in **boldface** mark the first occurrence and definition of the most important words that constitute the language of economics.

But these many changes have not altered one bit the central stylistic beacon that has guided *Economics* and its split volumes since the first edition: to use simple sentences, clear explanations, and concise tables and graphs.

Alternative Formats

This textbook comes in three different formats. The standard hardcover text covers the entire subject. In addition, for those courses that do not need to cover the entire subject, the fourteenth edition is available in two paperback volumes, this split edition, *Microeconomics*, which covers Chapters 1 to 22 and 36 to 39 of the text; and another split edition, *Macroeconomics*, which covers Chapters 1 to 4 and 23 to 39 of the text.

Auxiliary Teaching and Study Aids

Students of this edition will benefit greatly from the *Study Guide*. This carefully designed aid has been prepared by Professor Gary Yohe of Wesleyan University, who worked in close collaboration with us in our revision. Both when used alongside classroom discussions and when employed independently for self-study, the *Study Guide* has proved to be an impressive success. There is a full-text *Study Guide* and, for the first time, micro and macro versions are also available.

In addition, instructors will find the *Instructor's Manual and Test Bank* useful for planning their courses and preparing multiple sets of test questions in both print and computerized formats. Moreover, McGraw-Hill has designed a beautiful set of two-color overhead transparencies for presenting the tabular and graphical material in the classroom. These items can all be obtained by contacting your local McGraw-Hill sales representative.

Economics in the Computer Age

This edition is accompanied by the *Interactive Economic Graphics Tutorial to accompany Samuelson/Nordhaus*. IGT III is an upgraded version of McGraw-Hill's very successful economics software program developed by H. Scott Bierman at Carleton College and Todd Proebsting at the University of Wisconsin. Thousands of students have used the *Interactive Graphics Tutorial* to learn, understand, and reinforce their study of economic graphics. This updated and technically advanced version includes microcomputer simulations, and is available for the IBM compatibles.

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A Word to the Beginning Student

Human history has witnessed waves of revolutions that shook civilizations to their roots—religious conflicts, wars for political liberation, struggles against colonialism, and nationalism. Today, the countries in Eastern Europe, in the Soviet Union, and elsewhere are wrenched by economic revolutions—people are battering down walls, overthrowing established authority, and agitating for a “market economy” because of discontent with their centralized socialist governments. Students like yourselves are marching to win the right to learn from Western textbooks like this one in hopes that they may enjoy the economic growth and living standards of market economies!

The Intellectual Marketplace

Just what is this market that Lithuanians and Poles and Russians are agitating for? In the pages that follow, you will learn about the markets for corn and wheat, stocks and bonds, French francs and Russian rubles, unskilled labor and highly trained neurosurgeons. You have probably read in the newspaper about the gross national product, the consumer price index, the stock market, and the unemployment rate. After you have completed a thorough study of the chapters in this textbook, you will know precisely what these words mean. Even more important, you will also understand the economic forces that influence and determine them.

There is also a marketplace of ideas, where contending schools of economists fashion their theories and try to persuade their scientific peers. You will find in the chapters that follow a fair and impartial review of the thinking of the intellectual giants of our profession—from the early economists like Adam Smith, David Ricardo, and Karl Marx to modern-day titans like John Maynard Keynes, Milton Friedman, and Robert Solow.

Skoal!

As you begin your journey into the land of markets and economic analysis, you may feel some apprehension. But take heart. The fact is that we envy you, the beginning student, as you set out to explore the exciting world of economics for the first time. This is a thrill that, alas, you can experience only once in a lifetime. So, as you embark, we wish you bon voyage!

Paul A. Samuelson
William D. Nordhaus