Paul J. Feldstein
HEALTH CARE

ECONOMICS

THIRD EDITION

HEALTH CARE ECONOMICS

THIRD EDITION

Paul J. Feldstein, Ph.D.

Professor
FHP Foundation Chair in Health Care Management
Graduate School of Management
University of California
Irvine, California



A WILEY MEDICAL PUBLICATION

JOHN WILEY & SONS

New York • Chichester • Brisbane • Toronto • Singapore

To Anna

Copyright © 1988 by John Wiley & Sons, Inc.

All rights reserved. Published simultaneously in Canada.

Reproduction or translation of any part of this work beyond that permitted by Section 107 or 108 of the 1976 United States Copyright Act without the permission of the copyright owner is unlawful. Requests for permission or further information should be addressed to the Permissions Department, John Wiley & Sons, Inc.

Library of Congress Cataloging in Publication Data:

Feldstein, Paul J.

Health care economics/Paul J. Feldstein.—3rd ed.

p. cm.—(Wiley series in health services, ISSN 0195-3907)

(A Wiley medical publication)

Includes bibliographical references and index.

ISBN 0-471-86031-X

1. Medical economics. 2. Medical economics—United States.

I. Title. II. Series. III. Series: A Wiley medical publication.

[DNLM: 1. Economics, Medical—United States. W74 F312h]

RA410.F44 1988

338.4'736210973-dc19

DNLM/DLC

for Library of Congress

88-273 CIP

Printed in the United States of America 10 9 8 7 6 5 4 3 2

Preface to the Third Edition

This book grew out of a course on the economics of health services that I have taught at the University of Michigan for many years. During this period the health economics literature increased rapidly, resulting in a course reading list sufficiently large to cause my students concern. As the literature increased, so did its technical content, often assuming a background students lacked. In addition, the literature developed unevenly, leaving gaps which this book is designed to fill. This introductory text attempts to provide an analytical approach to the study of medical care and, through the use of numerous applications, to illustrate the usefulness of economics to the understanding of public policy issues in medical care.

The material in this book presumes familiarity with some of the economic concepts presented in a microeconomics course at the undergraduate level. I have, therefore, tried to refresh students' memory of these concepts when discussing the applicability of economics to health care. Since institutional knowledge of medical care issues is generally not uniform among students, particularly undergraduates, I have defined concepts and described legislation that would be more familiar to students in a School of Public Health.

This book is meant to be used for a one-semester course in health economics. Realizing that instructors' preferences for topics to include in such a course may differ, more material is included than would normally be covered in one semester. For the interested student, both recent and historical references are provided should the student wish to pursue a particular subject in greater depth.

While writing this book and the subsequent revisions, I have tried to clarify those subjects found by my students to be most difficult and most inadequately explained in the classroom. If the reader has difficulty understanding certain sections, he or she will have developed a better appreciation for my students' experience. For example, as a result of student comments I became aware of the need to make explicit the relationship between economic analysis and the value judgments underlying different public policies. For this reason, I have tried to stress these issues in the various subjects discussed.

The emphasis of this book is on the financing and delivery of personal medical services, rather than on the broader issues of health and health services. This narrower

focus reflects the extensive emphasis of federal and state legislation and of current policy issues, such as financing medical services and concern with efficiency in the delivery of services, on personal medical services rather than health or health services, which might be well more appropriate. The relationship of personal medical services to health is discussed in an early chapter; thereafter, the text emphasizes the definition, measurement, and selection of public policies to achieve economic efficiency and equity in the financing and delivery of personal medical services.

Since the time the first edition appeared, in 1979, the medical sector has undergone dramatic changes. Health policy is constantly changing. The emphasis on national health insurance has declined; the concern over a shortage of physicians has changed to a concern over a surplus of physicians. From being reimbursed on a cost-plus basis, hospitals now face prospective, fixed prices. The provision of hospital services by independent community hospitals has changed, with hospital mergers being more frequent and multihospital systems being more common. Also, the movement toward increased regulation of medical services has changed to market competition along with the development of new alternative delivery systems, advertising, and hospital discounts.

This latest revision retains a historical perspective on how and why the medical sector has changed. Economic analysis is useful for understanding the effects on equity and efficiency of previous methods of financing and delivering medical services as well as current approaches. Economics is also helpful for understanding why these various changes have occurred.

In addition to updating tables and the text, a number of additional changes have been made in this latest revision. Chapter 21, "The Market for Long-Term Care Services" has been added. Several chapters have been extensively revised. New sections, such as comparable worth, physician payment methods, adverse selection, cost shifting, and who bears the burden of the social security tax, have been included in existing chapters. A large number of review questions have been included as an appendix. I hand these questions out to my students at the beginning of the semester, and as an incentive for the students to think about them I select several for the midterm and final exams. Hopefully, others might find them useful.

In writing this book and in teaching my course I have benefited from the work of other health economists. Some measure of that debt is indicated by the numerous references to others' work found throughout the book. In preparing this edition, Ron Vogel provided helpful comments and Thomas Wickizer and Robert Miller were able research assistants. I wish to acknowledge the valuable assistance of Jack Tobias, the Reference Librarian in the School of Public Health, University of Michigan, who is one of the great resources of that school. Jeremiah German gave me extensive suggestions for the second edition and Darrell Graham provided invaluable research assistance. For the first edition, Irene Butter, John Kuder, Geoffrey Shepherd, Kenneth Warner, Carolyn Watts, and Jack Wheeler provided many helpful comments and suggestions. John Goddeeris provided excellent research assistance.

PAUL J. FELDSTEIN

Contents

1	AN INTRODUCTION	TO THE ECONOMICS	OF MEDICAL CARE	1
---	-----------------	------------------	-----------------	---

Trends in Medical Expenditures 1

Basic Choices That Must be Made with Regard to Medical Services 4

The Applicability of Economics to the Study of Medical Care 10

The Trade-Off Between Quantity and Quality in the Provision of Medical Services 12

2 THE PRODUCTION OF HEALTH: THE IMPACT OF MEDICAL SERVICES ON HEALTH 15

Medical Care as an Output of the Medical Services Industry and as an Input to Health 15

Determining the Allocation of Resources to Medical Care Using a Health Production Function 16

Empirical Studies of a Health Production Function 21 Applications of a Health Production Function 26

3 AN OVERVIEW OF THE MEDICAL CARE SECTOR 33

Description of the Medical Care Markets 33
Applications of a Model of the Medical Care Sector 40
Concluding Comments 44

4 MEASURING CHANGES IN THE PRICE OF MEDICAL CARE 46

The Uses of a Definition of the Product of the Medical Care Industry 46
The Consumer Price Index 48

The Medical Care Component of the CPI (MCPI)	55
--	----

An Alternative Medical Care Price Index: The Costs of Treatment of a Representative Group of Illnesses 65

APPENDIX: Health Insurance Premiums as a Measure of the Price of Medical Care 72

5 THE DEMAND FOR MEDICAL CARE 76

The Purpose of Demand Analysis 76
Demand Versus Need as a Basis for Policy and Planning 76
A Model of the Demand for Medical Care 80
Applications of Demand Analysis 97
The Demand for Medical Care Faced by the Firm 102
APPENDIX: The Effect of Coinsurance on the Demand for Medical Care 103

6 THE DEMAND FOR HEALTH INSURANCE 110

Health Insurance Terminology 110

The Theory of Demand for Health Insurance 114

An Application of the Theory of the Demand for Health Insurance 124

Adverse Selection 126

The Demand for Health Insurance Under Conditions of Moral Hazard 128 Summary and Concluding Comments 132

APPENDIX 1: The Allocative Inefficiency of Blue Cross's Service Benefit Policy 135

APPENDIX 2: The Tax Advantage of Health Insurance as a Fringe Benefit 138

APPENDIX 3: The Effect on the Insurance Premium of Extending Coverage to Include Additional Benefits 140

7 THE SUPPLY OF MEDICAL CARE: AN OVERVIEW 146

Determinants of Supply 146
Evaluation of Economic Efficiency in Production 149

8 THE MARKET FOR HEALTH INSURANCE: ITS PERFORMANCE AND STRUCTURE 153

The Demand Side of the Health Insurance Market
The Supply Side of the Health Insurance Market
Concluding Comments
167

9 THE PHYSICIAN SERVICES MARKET 172

Introduction and Overview 172
Observed Performance in the Physician Services Market 175
Determination of Physician Prices 186
Proposed Changes in the Physician Services Market 192
Concluding Comments 208

10 THE MARKET FOR HOSPITAL SERVICES 213

Background 213
Theories of Hospital Cost Inflation 220
Determinants of Hospital Performance 224
Theories of Hospital Behavior 225
Determinants of Market Structure 236
Effect of Market Structure on Performance 245

11 RELYING ON REGULATION TO IMPROVE HOSPITAL PERFORMANCE 252

Introduction 252
The Theory and Practice of Regulation 253
Concluding Comments 296

12 MARKET COMPETITION IN MEDICAL CARE 305

The Emergence of Competition 305

How Competition Is Evolving in Medical Care 314

The Effect of Advertising on the Market for Medical Services 320

The Effect of Competition on Quality of Medical Care 325

Evidence on the Performance of HMOs 329

Historical Barriers to the Development of Prepaid Health Plans 334

Concluding Comments 338

13 HEALTH MANPOWER SHORTAGES AND SURPLUSES: DEFINITIONS, MEASUREMENT, AND POLICIES 347

Definitions of a Health Manpower Shortage 349

The Measurement of Health Manpower Shortages and Surpluses 355

14 THE MARKET FOR PHYSICIAN MANPOWER 368

Barriers to Entry in Medicine 369

The Physician as a Price Discriminating Monopolist 374

Proposed Changes in the Physician Manpower Market 380

15 THE MARKET FOR MEDICAL EDUCATION: EQUITY AND EFFICIENCY 385

The Economic Efficiency of the Medical Education Sector 385 Equity in the Current System of Financing Medical Education 398

16 THE MARKET FOR REGISTERED NURSES 406

Measuring the Performance of the Market for Registered Nurses 407
Federal Support for Nurse Training 419
An Economic Analysis of Comparable Worth 427
Concluding Comments 431
APPENDIX: The Effects on Wages and Employment of Registered Nurses of Unionization in a Monopsony Market 432

17 THE PHARMACEUTICAL INDUSTRY 437

Introduction 437
The Economic Performance of the Pharmaceutical Industry 439
Federal Regulation of Drugs 455
Public Policy Toward the Pharmaceutical Industry 464

18 THE POLITICAL ECONOMY OF HEALTH CARE 475

Introduction 475
The Demand for Legislation by Health Associations 477
Definition of Health Association Members' Self-Interest 478
A Framework for Analyzing Legislative Behavior 480
Implications of the Legislative Success of Health Associations 503

19 THE ROLE OF GOVERNMENT IN HEALTH AND MEDICAL CARE 510

Market Imperfections 511

Market Failure 514

Redistribution Using In-Kind Subsidies 519

20 NATIONAL HEALTH INSURANCE: AN APPROACH TO THE REDISTRIBUTION OF MEDICAL CARE 527

Achieving Efficiency for Different Values Underlying National Health Insurance 527 Specific Criteria for Evaluating National Health Insurance Plans 537

21 THE MARKET FOR LONG-TERM CARE SERVICES 559

Introduction 559
The Demand for Long-Term Care Services 560
The Supply of Long-Term Care Services 570
Financing Long-Term Care 583
Concluding Comments 588

22 CONCLUDING COMMENTS ON THE ECONOMICS OF MEDICAL CARE 593

APPENDIX REVIEW QUESTIONS 598

INDEX 613

Tables

- 1-1. Trends in personal medical care expenditures
- 2-1. Contribution of selected medical services and environmental factors to changes in the age-adjusted death rate, 1970-1985
 28
- 3-1. Total private and public expenditures for personal health care services by type of expenditure and source of funds, calendar years 1965, 1975, and 1985 34
- 3-2. Amount and percentage of personal health care expenditures met by third parties, by type of expenditure, calendar year 1985 (billions of dollars) 36
- 3-3. Percentage distribution by source of personal health expenditures in the United States, 1965, 1970, 1975, 1980, and 1985 37
- 4-1. Relative importance of major components of the CPI, selected years (percent) 51
- 4-2. CPI and major groups, 1935-1986 (1967 = 100) 52
- 4-3. Trends in the MCPI, selected years, 1940–1986 (1967 = 100 unless noted) 56
- 4-4. Relative weights of items in the MCPI (as of December 1986) 57
- 4-5. Relative weights of items in MCPI, in consumer expenditures on health services and supplies, and in total national expenditures on health services and supplies, calendar years 1964, 1975, 1981, and 1985 59
- 4-6. Weights of medical care in CPI, in personal consumption, plus government purchases, calendar years 1965, 1975, 1980, and 1985 60
- 4-7. Percentage increase in the costs of treatment of selected illnesses, 1951–1981 67
- 4-8. Number of physician visits, average length of stay, diagnostic and other services per case, selected illnesses, 1951–1981 69
- 5-1. Differences between plans in predicted total expenditures per person and in the probability of one or more physician visits or hospital admissions (all participants) 96
- 5-2. Factors affecting changes in personal health care expenditures 101
- 6-1. Classification of medical services by probability of occurrence, potential loss, and insurance benefits, 1957–1958
 125

- 6-2. Classification of medical services by probability of occurrence, potential loss, and insurance benefits, 1977 126
- 8-1. Enrollment of persons with hospital expense protection, 1950-1984 155
- 8-2. Ratio of benefit expenditures to premium income, according to type of plan, 1955-1986 157
- 9-1. Annual rate of change in the CPI and in physician fees, 1955-1987 177
- 9-2. Total expenditures on physicians' services by source of funds, 1950-1985 178
- 9-3. Number of physician visits per person per year and number of visits per physician per week 179
- 9-4. Average pretax net income from medical practice by specialty, selected years 181
- 9-5. Estimated optimal levels of aide input at various weekly salaries and net proceeds per visit (solo general practitioners) 182
- 9-6. Average weekly patient visits, practice hours, and number of aides per physician 183
- 9-7. Distribution of office-based physicians by group affiliation, selected years, 1969–1984 185
- 9-8. Number and average size of physician groups, selected years, 1969-1984 186
- 10-1. Selected data on U.S. hospitals, 1985 215
- 10-2. Distribution of community hospitals, by size, 1965, 1975, and 1985 216
- 10-3. Selected characteristics of community hospitals, 1965-1985 217
- 10-4. Measures of hospital costs and percentage rates of increase, 1950-1985 218
- 10-5. Characteristics of multihospital systems, 1986 244
- 11-1. Estimated in patient savings from hospital closure: a hypothetical example $\,$ 277 $\,$
- 11-2. The impact of rate regulation on the annual percentage increase in total expense per admission for community hospitals, 1971–1985 293
- 12-1. Comparison of HMO and fee-for-service plans according to imputed expenditures and use of services 331
- 12-2. Growth in HMO enrollment, 1981-1986 332
- 12-3. Year-end enrollment and number of HMOs by age of plan, profit status, and model type, 1986 333
- 13-1. Internal rates of return to male college graduates, physicians, and dentists and ratios of internal rates of return of physicians and dentists to male college graduates, United States, 1939, 1949, and 1956 361
- 13-2. Internal rate of return, all physicians and general practitioners, 1955-1980 361
- 13-3. Number of physicians and physician/population ratios, United States, 1950–1985 364

- 13-4. Ratio of applicants to acceptances, 1947-1948 to 1985-1986 366
- 15-1. Patterns of support for general operations of public and private medical schools, 1968–1969, 1973–1974, 1979–1980 and 1984–1985 (millions of dollars) 390
- 15-2. U.S. medical school enrollment, first-year students and graduates, 1946–1947 to 1985–1986 393
- 15-3. Average family incomes, average higher education subsidies received, and average state taxes paid by families, by type of California higher education institution, 1964-1965 399
- 15-4. Family income of medical students, all U.S. families, by control of medical school, $1974\!-\!1975-400$
- 16-1. Vacancy rates in hospitals for general-duty nurses 407
- 16-2. Number and distribution of active registered nurses by place of employment, 1984 411
- 16-3. Percentage increase in nominal incomes of registered nurses, teachers, female professional, technical, and kindred workers, and licensed practical nurses 412
- 16-4. Ratio of all registered nurses' and hospital general-duty registered nurses' salaries to those of teachers and female professional, technical, and kindred workers 413
- 16-5. Ratio of LPNs' to RNs' and the ratio of LPNs' to RNs' salaries in nonfederal short-term general and other special hospitals 415
- 16-6. Nursing graduates by type of nursing school program 423
- 16-7 $\,$ Cost of an alternative Federal subsidy program to increase the number of active RNs $\,$ $\,$ 426 $\,$
- 17-1. Death rates per 100,000 population, 1920–1985 438
- 17-2. Personal expenditures on drugs and personal health care expenditures, 1950–1985 (billions of dollars) 439
- 17-3. Selected average consumer price indices, calendar years 1950–1985 440
- 17-4. Concentration of sales in the U.S. ethical drug industry, by the rapeutic markets, $1968\,-\,443$
- 17-5. Schnee's distribution of drug discoveries, 1935–1970 445
- 17-6. Percentage distribution of discoveries of important new drugs introduced in 1950–1962 and 1963–1970, selected by FDA $\,$ 445 $\,$
- 17-7. Average accounting and corrected rates of return on net worth, 1959–1973 (percentages) 454
- 19-1. Major federal government expenditures on health services, 1977 52.
- 20-1. Medicare reimbursements for covered services under the supplementary medical insurance program and persons served by income, 1968 and 1977 534
- 20-2. Persons served and Medicare reimbursement per person served by race, 1968 and 1977-535

- 20-3. Average physician visits for the elderly by health status and family income, adjusted for other determinants, 1969 and 1977 536
- 20-4. Employer contributions to health benefit plans and employee tax benefits, 1983 549
- 20-5. An income-related national health insurance plan with varying deductibles, copayments, and maximum liabilities 553
- 21-1. Percent of the U.S. population needing personal care, 1977 56.
- 21-2. Percent increases in the U.S. population for 10-year intervals by age groups, selected years and projections, 1950–2010 562
- 21-3. Percent distribution of helper days, by sex and relationship to individuals 65 years of age or over with limitations to activities of daily living 563
- 21-4. Percent distribution of personal health care expenditures per capita for people 65 years of age or over, by source of funds and type of service, United States, 1984 564
- 21-5. Estimates of disposable income for elderly families and individuals in 1984 (1984 dollars) 565

Figures

care 130

1-1. Marginal benefit curves of a commodity 6

1-2. The quantity-quality trade-off in medical care 13
2-1. The relationship between total output and program size 18
2-2. Marginal effects on health with a change in program size 19
2-3. Average and marginal benefits from alternative health programs 21
3-1. An overview of the medical care sector 38
3-2. An economic model of the medical care sector 41
3-3. The effect on prices and medical services of an increase in demand when there are different supply elasticities 42
3-4. Alternative demand and supply policies to achieve a redistribution of medical care 44
5-1. Need versus demand as the basis for planning in medical care 78
5-2. Changes in the supply and demand for beds 88
5-3. Demand creation with an increase in the number of physicians 90
5-4. The effect of coinsurance on the demand for medical care 104
5-5. Insurance as a shift in the aggregate demand for medical care 104
5-6. The effect of coinsurance on the aggregate demand for medical care with a rising supply curve 105
6-1. The expected distribution of family medical expenses with different types of copayments 112
6-2. The relationship between total utility and wealth 116
6-3. The amount above the pure premium an individual is willing to pay for health insurance 119
6-4. The relationship between price of insurance and quantity demanded 120
6-5. Adverse selection 127
6-6. The demand for medical care under conditions of moral hazard 129

6-7. The effect of coinsurance and deductibles on the demand for medical

- 6-8. The effect of health insurance on the expected distribution of medical expenses among families 133
- 6-9. The allocative inefficiency of Blue Cross' service benefit policy 136
- 6-10. Fringe benefits versus money income 138
- 6-11. The effect on hospital utilization of insuring out-of-hospital services 141
- 7-1. The effect of different supply elasticities on the price, quantity, and cost of national health insurance 150
- 9-1. The market for physician services 173
- 9-2. The impact of insurance on physician fees 187
- 9-3. An illustration of the target income hypothesis 190
- 9-4. Physician decision whether to accept Medicare assignment 196
- 10-1. The effects of Medicare on hospital use, by age group 224
- 10-2. Price and output policies of a profit-maximizing hospital 226
- 10-3. The effect on hospital costs of increases in hospital quality 229
- 10-4. A production function for medical care 232
- 10-5. The relationship between hospital size and average cost 239
- 10-6. Variations in average cost between hospitals 239
- 11-1. Variations in hospital costs as a result of product and size differences 281
- 11-2. Rate regulation when patients in the same classification have different treatment costs 288
- 12-1. The effect of advertising on the elasticity of demand and on the firm's pricing strategy 321
- 12-2. The effect of advertising on average prices and price dispersion 322
- 13-1. Alternative policy prescriptions based upon a normative shortage of health manpower 349
- 13-2. A shortage created by a restriction of supply 351
- 13-3. An economic shortage 352
- 13-4. The market for physician services and for an individual physician firm 353
- 14-1. Determination of price and output by a profit-maximizing monopolist
- 14-2. Determination of prices and outputs by a price-discriminating monopolist 375

374

- 15-1. The excess demand for a medical education 389
- 15-2. An illustration of external benefits in medical education 395
- 16-1. The market for registered nurses 408
- 16-2. A dynamic shortage in the market for registered nurses 409
- 16-3. An illustration of a monopsonistic market for registered nurses 433
- 16-4. Collective bargaining and a monopsony market for registered nurses 434
- 19-1. Externalities in production and consumption 515
- 20-1. Demand curves of different income groups 528

- 20-2. Equal treatment for equal needs through a system of negative prices 530
- 20-3. The cost of different demand subsidies when supply of medical care is relatively inelastic 531
- 20-4. The burden of a tax on labor is the same regardless of who pays the tax 540
- 20-5. The burden of a tax on labor according to different elasticities of demand for labor 540
- 20-6. The burden of a tax on labor according to different elasticities of labor supply 541
- 21-1. A model of pricing and output for private pay and Medicaid patients by a proprietary nursing home 575
- 21-2. An increase in private pay demand in a nursing home serving private pay and Medicaid patients 577