

## THE PURCHASING POWER OF MONEY



THE MACMILLAN COMPANY  
NEW YORK • BOSTON • CHICAGO  
SAN FRANCISCO

MACMILLAN & CO., LIMITED  
LONDON • BOMBAY • CALCUTTA  
MELBOURNE

THE MACMILLAN CO. OF CANADA, LTD.  
TORONTO

# THE PURCHASING POWER OF MONEY

ITS DETERMINATION  
AND RELATION TO CREDIT  
INTEREST AND CRISES

BY

IRVING FISHER

PROFESSOR OF POLITICAL ECONOMY IN YALE UNIVERSITY

ASSISTED BY

HARRY G. BROWN

INSTRUCTOR IN POLITICAL ECONOMY IN YALE UNIVERSITY

*NEW AND REVISED EDITION*

New York  
THE MACMILLAN COMPANY

1920

*All rights reserved*

COPYRIGHT, 1911,  
BY THE MACMILLAN COMPANY.

---

Set up and electrotyped. Published March, 1912.

Norwood Press  
J. S. Cushing Co. — Berwick & Smith Co.  
Norwood, Mass., U.S.A.

To  
THE MEMORY OF  
SIMON NEWCOMB  
GREAT SCIENTIST, INSPIRING FRIEND,  
PIONEER IN THE STUDY  
OF  
"SOCIETARY CIRCULATION"

## PREFACE TO THE FIRST EDITION

THE purpose of this book is to set forth the principles determining the purchasing power of money and to apply those principles to the study of historical changes in that purchasing power, including in particular the recent change in "the cost of living," which has aroused world-wide discussion.

If the principles here advocated are correct, the purchasing power of money — or its reciprocal, the level of prices — depends exclusively on five definite factors: (1) the volume of money in circulation; (2) its velocity of circulation; (3) the volume of bank deposits subject to check; (4) its velocity; and (5) the volume of trade. Each of these five magnitudes is extremely definite, and their relation to the purchasing power of money is definitely expressed by an "equation of exchange." In my opinion, the branch of economics which treats of these five regulators of purchasing power ought to be recognized and ultimately will be recognized as an exact science, capable of precise formulation, demonstration, and statistical verification.

The main contentions of this book are at bottom simply a restatement and amplification of the old "quantity theory" of money. With certain corrections in the usual statements of that theory, it may still be called fundamentally sound. What has long been needed is a candid reëxamination and revision of that venerable theory rather than its repudiation.

Yet in the voluminous literature on money, there seems to be very little that approaches accurate formulation and

rigorous demonstration, — whether theoretical or statistical.

In making this attempt at reconstruction, I have the satisfaction of finding myself for once a conservative rather than a radical in economic theory. It has seemed to me a scandal that academic economists have, through outside clamor, been led into disagreements over the fundamental propositions concerning money. This is due to the confusion in which the subject has been thrown by reason of the political controversies with which it has become entangled.

As some one has said, it would seem that even the theorems of Euclid would be challenged and doubted if they should be appealed to by one political party as against another. At any rate, since the "quantity theory" has become the subject of political dispute, it has lost prestige and has even come to be regarded by many as an exploded fallacy. The attempts by promoters of unsound money to make an improper use of the quantity theory — as in the first Bryan campaign — led many sound money men to the utter repudiation of the quantity theory. The consequence has been that, especially in America, the quantity theory needs to be reintroduced into general knowledge.

Besides aiming to set forth the principles affecting the purchasing power of money, this book aims to illustrate and verify those principles by historical facts and statistics. In particular, the recent rise in prices is examined in detail and traced to its several causes.

The study of the principles and facts concerning the purchasing power of money is of far more than academic interest. Such questions affect the welfare of every inhabitant of the civilized world. At each turn of the tide of prices, millions of persons are benefited and other millions are injured.

For a hundred years the world has been suffering from periodic changes in the level of prices, producing alternate crises and depressions of trade. Only by knowledge, both of the principles and of the facts involved, can such fluctuations in future be prevented or mitigated, and only by such knowledge can the losses which they entail be avoided or reduced. It is not too much to say that the evils of a variable monetary standard are among the most serious economic evils with which civilization has to deal; and the practical problem of finding a solution of the difficulty is of international extent and importance. I have proposed, very tentatively, a remedy for the evils of monetary instability. But the time is not yet ripe for the acceptance of any working plan. What is at present most needed is a clear and general public understanding of principles and facts.

Toward such an end this book aims to contribute: —

1. A reconstruction of the quantity theory.
2. A discussion of the best form of index number.
3. Some mechanical methods of representing visually the determination of the level of prices.
4. A practical method of estimating the velocity of circulation of money.
5. The ascertainment statistically of the bank deposits in the United States which are *subject to check*, as distinct from "individual deposits," as usually published.
6. An improved statistical evaluation of the volume of trade, as well as of the remaining elements in the equation of exchange.
7. A thorough statistical verification of the (reconstructed) quantity theory of money.

As it is quite impossible to do justice to some of these subjects without the use of mathematics, these have been freely introduced, but have been relegated, so far as



possible, to Appendices. This plan, which is in accordance with that previously adopted in *The Nature of Capital and Income* and *The Rate of Interest*, leaves the text almost wholly nonmathematical.

Most of the statistical results review and confirm the conclusions of Professor Kemmerer in his valuable *Money and Credit Instruments in their Relation to General Prices*, which appeared while the present book was in course of construction. I am greatly indebted to Professor Kemmerer for reading the entire manuscript and for much valuable criticism throughout.

My thanks are due to Professor F. Y. Edgeworth of All Souls' College, Oxford, and to Professor A. W. Flux of Manchester for kindly looking through the manuscript of the Appendix on index numbers and for suggestions and criticisms.

To Dr. A. Piatt Andrew, now Assistant Secretary of the Treasury, my thanks are due for his kindness, as Special Assistant to the National Monetary Commission, in putting the resources of that Commission at my disposal, and in working out, from the records of the office of the Comptroller of the Currency, the volume of deposits subject to check at various dates in the past. For coöperation in carrying out these same calculations, I am likewise indebted to Mr. Lawrence O. Murray, Comptroller of the Currency. These valuable figures are the first of their kind.

To Mr. Gilpin of the New York Clearing House, my thanks are due for his kindness in furnishing various figures asked for and cited specifically in the text.

To Mr. Richard M. Hurd, President of the Lawyers Mortgage Co., I am indebted for reading parts of the manuscript and for valuable criticism.

To Mr. John O. Perrin, President of the American National Bank of Indianapolis, I am indebted for statistics

of the "activity" of bank accounts in his bank, and for similar figures I am indebted to the officers of the National New Haven Bank and the City Bank of New Haven.

My thanks are due to the *Economic Journal* for permission to use unaltered some parts of my article on "The Mechanics of Bimetallism," which first appeared in that journal in 1894.

My thanks are due to the *Journal of the Royal Statistical Society* for similar permission with reference to my article on "A Practical Method for estimating the Velocity of Circulation of Money," which appeared in December, 1909.

A number of my students have rendered valuable service in gathering and coördinating statistics. I would especially mention Mr. Seimin Inaoka, Mr. Morgan Porter, Mr. N. S. Fineberg, Mr. W. E. Lagerquist, now instructor at Cornell University, Messrs. G. S. and L. A. Dole, Dr. John Bauer, now assistant professor at Cornell University, Dr. John Kerr Towles, now instructor at the University of Illinois, Dr. A. S. Field, now instructor at Dartmouth College, Mr. A. G. Boesel, Mr. W. F. Hicker-nell, Mr. Yasuyiro Hayakawa, Mr. Chester A. Phillips, and Mr. R. N. Griswold. Mr. Griswold performed the lengthy calculations involved in ascertaining an index of the volume of trade.

There are two persons to whom I am more indebted than to any others. These are my brother, Mr. Herbert W. Fisher, and my colleague, Dr. Harry G. Brown.

To my brother my thanks are due for a most searching criticism of the whole book from the standpoint of pedagogical exposition, and to Mr. Brown for general criticism and suggestions as well as for detailed work throughout. In recognition of Mr. Brown's assistance, I have placed his name on the title-page.

IRVING FISHER.

## PREFACE TO THE SECOND EDITION

THE second edition is a reprint of the first with the following changes:—

1. Correction of occasional misprints.
2. Addition of data for 1910, 1911, and 1912, in the tables on pages 304, 317, and the diagram between pages 306 and 307.
3. A change in Figure 1 (page 13) to make it conform to the facts for 1912.
4. Changes in the table on page 147 with accompanying text to make the data correspond to the facts for 1912.
5. The insertion of an addendum on pages 492–493, giving the revised figures for deposits subject to check as calculated by Professor Wesley Clair Mitchell.
6. An appendix to the second edition (page 494 ff.) on “standardizing the dollar.”

For corrections of misprints and various helpful criticisms of the first edition I am under great obligations to a number of friends and correspondents and particularly to Major W. E. McKechnie, of the Indian Medical Service, Etawah, United Provinces, India; Professor Warren M. Persons, Colorado College, Colorado Springs, Colo.; Mr. J. M. Keynes, Editor, *Economic Journal*, Kings College, Cambridge; Carl Snyder, author, New York City; James Bonar, Deputy Master of the Royal Mint, Ottawa, Canada; Professor Allyn A. Young, Washington University, St. Louis, Mo.; Professor Stephen Bauer, Director, International Office of Labor Legislation, Basle, Switzerland; Professor Wesley Clair Mitchell, New York City; Professor O. M. W. Sprague, Harvard University.

I have endeavored to avoid disturbing the plates of the first edition more than was absolutely necessary. Otherwise I should have been glad to incorporate some changes to make use of some valuable but general criticisms. In particular I should have liked to modify somewhat the statement of the theory of crises in Chapter IV and in Chapter XI to make use of the helpful criticism of Miss Minnie Throop England, of the University of Nebraska, in *The Quarterly Journal of Economics*, November, 1912; also to meet a criticism of Mr. Keynes' to the effect that, while my book shows *that* the changes in the quantity of money do affect the price level, it does not show *how* they do so. To those who feel the need of a more definite picture of *how* the price level is affected by a change in the quantity of money I refer the reader to my *Elementary Principles of Economics*, pages 242-247, and to other writers on this subject, particularly Cairns.

IRVING FISHER.

## SUGGESTIONS TO READERS

1. The *general reader* will be chiefly interested in Chapters I–VIII.

2. The *cursorial reader* will find the gist of the book in Chapter II.

3. *Objectors to the quantity theory* will find their theoretical and statistical objections discussed in Chapters VIII and XII respectively.

4. *Students of financial history* should read Chapter XII.

5. *Currency reformers* should read Chapter XIII.

6. The appendices are addressed mainly (though not exclusively) to *mathematical economists*, for whom the chief interest will probably lie with the Appendix to Chapter X, on Index Numbers, (which should be read as a whole,) and § 6 of the Appendix to Chapter XII, on the Method of Determining Velocity of Circulation.

7. The remainder of the Appendix to Chapter XII is supplied chiefly in order that *statistical critics* may be enabled to verify the processes described in the text.

8. Chapter X and its Appendix are of chief interest to *students of index numbers*, a subject as fascinating to some as it is dry to others.

9. The analytical table of contents, the index, and the running page headings have been constructed with especial reference to the varying needs of different classes of readers.

The book is, however, designed to constitute a complete whole, and it is hoped that as many as possible of those who approach it from special viewpoints may, in the end, read it all.

## SUMMARY OF CONTENTS

CHAPTER	PAGE
I. PRIMARY DEFINITIONS . . . . .	1 -
II. PURCHASING POWER OF MONEY AS RELATED TO THE "EQUATION OF EXCHANGE" . . . . .	8 -
III. INFLUENCE OF DEPOSIT CURRENCY ON THE EQUATION AND THEREFORE ON PURCHASING POWER . . . . .	33 -
IV. DISTURBANCE OF EQUATION AND OF PURCHASING POWER DURING TRANSITION PERIODS . . . . .	55 -
V. INDIRECT INFLUENCES ON PURCHASING POWER . . . . .	74
VI. INDIRECT INFLUENCES ( <i>Continued</i> ) . . . . .	90
VII. INFLUENCE OF MONETARY SYSTEMS ON PURCHASING POWER	112
VIII. INFLUENCE OF QUANTITY OF MONEY AND OTHER FACTORS ON PURCHASING POWER AND ON EACH OTHER . . . . .	149
IX. THE DISPERSION OF PRICES MAKES NECESSARY AN INDEX OF PURCHASING POWER . . . . .	184
X. THE BEST INDEX NUMBERS OF PURCHASING POWER . . . . .	198
XI. STATISTICAL VERIFICATION. GENERAL HISTORICAL REVIEW	234 -
XII. STATISTICAL VERIFICATION. RECENT YEARS . . . . .	276 -
XIII. THE PROBLEM OF MAKING PURCHASING POWER MORE STABLE	319 -
APPENDIX TO CHAPTER II . . . . .	349
APPENDIX TO CHAPTER III . . . . .	367
APPENDIX TO CHAPTER V . . . . .	370
APPENDIX TO CHAPTER VI . . . . .	372
APPENDIX TO CHAPTER VII . . . . .	376
APPENDIX TO CHAPTER VIII . . . . .	379
APPENDIX TO CHAPTER X . . . . .	385
APPENDIX TO CHAPTER XII . . . . .	430

# ANALYTICAL TABLE OF CONTENTS

## CHAPTER I

### PRIMARY DEFINITIONS

	PAGE
§ 1. Wealth and exchange . . . . .	1
§ 2. Exchangeable goods . . . . .	4
§ 3. Circulation of money against goods . . . . .	6

## CHAPTER II

### PURCHASING POWER OF MONEY AS RELATED TO THE EQUATION OF EXCHANGE

§ 1. The various circulating media . . . . .	8
§ 2. The equation of exchange arithmetically expressed . . . . .	14
§ 3. The equation of exchange mechanically expressed . . . . .	21
§ 4. The equation of exchange algebraically expressed . . . . .	24
§ 5. Conclusion and illustrations . . . . .	28

## CHAPTER III

### INFLUENCE OF DEPOSIT CURRENCY ON THE EQUATION AND THEREFORE ON PURCHASING POWER

§ 1. The mystery of circulating credit . . . . .	33
§ 2. The basis of circulating credit . . . . .	40
§ 3. Banking limitations . . . . .	42
§ 4. The revised equation of exchange . . . . .	47
§ 5. Deposit currency normally proportioned to money . . . . .	49
§ 6. Summary . . . . .	53

## CHAPTER IV

### DISTURBANCE OF EQUATION AND OF PURCHASING POWER DURING TRANSITION PERIODS

§ 1. Tardiness of interest adjustment to price movements . . . . .	55
§ 2. How a rise of prices generates a further rise . . . . .	58
§ 3. Extent of disturbances in equation . . . . .	61
§ 4. How a rise of prices culminates in a crisis . . . . .	64

	PAGE
§ 5. Completion of the credit cycle . . . . .	67
§ 6. Summary . . . . .	72

## CHAPTER V

## INDIRECT INFLUENCES ON PURCHASING POWER

§ 1. Influence of conditions of production and consumption on trade and therefore on prices . . . . .	74
§ 2. Influence of conditions connecting producers and consumers on trade and therefore on prices . . . . .	77
§ 3. Influence of individual habits on velocities of circulation and therefore on prices . . . . .	79
§ 4. Influence of systems of payment on velocities of circulation and therefore on prices . . . . .	83
§ 5. Influence of general causes on velocities of circulation and therefore on prices . . . . .	87
§ 6. Influences on the volume of deposits subject to check and therefore on prices . . . . .	88

## CHAPTER VI

INDIRECT INFLUENCES (*Continued*)

§ 1. Influence of foreign trade on the quantity of money and therefore on prices . . . . .	90
§ 2. Influence of melting and minting on the quantity of money and therefore on prices . . . . .	96
§ 3. Influence of the production and consumption of money metals on the quantity of money and therefore on prices . . . . .	99
§ 4. Mechanical illustration of these influences . . . . .	104

## CHAPTER VII

## INFLUENCE OF MONETARY SYSTEMS ON PURCHASING POWER

§ 1. Gresham's Law . . . . .	112
§ 2. Cases when bimetallism fails immediately . . . . .	115
§ 3. Cases when bimetallism fails after production overtakes consumption . . . . .	121
§ 4. The limping standard ; the gold-exchange standard . . . . .	127
§ 5. Bimetallism in France . . . . .	132



	PAGE
§ 6. Lessons of French experiment . . . . .	135
§ 7. The limping standard in India . . . . .	138
§ 8. The limping standard in the United States . . . . .	140
§ 9. General description of system in the United States . . . . .	143

## CHAPTER VIII

INFLUENCE OF QUANTITY OF MONEY AND OTHER FACTORS ON  
PURCHASING POWER AND ON EACH OTHER

§ 1. The equation of exchange implies no causal sequence . . . . .	149
§ 2. Effects of a change in money ( $M$ ). Quantity theory in causal sense . . . . .	151
§ 3. Quantity theory not strictly true during transition periods . . . . .	159
§ 4. Effects of a change in deposits ( $M'$ ) relatively to money ( $M$ ) . . . . .	162
§ 5. Effects of changes in velocities of circulation ( $V$ and $V'$ ) . . . . .	164
§ 6. Effects of changes in volume of trade (the $Q$ 's) . . . . .	165
§ 7. Can the price level be regarded as cause as well as effect? . . . . .	169
§ 8. Distinction between causation of individual prices and the price level . . . . .	174
§ 9. Summary . . . . .	181

## CHAPTER IX

THE DISPERSION OF PRICES MAKES NECESSARY AN INDEX OF  
PURCHASING POWER

§ 1. Some prices cannot respond readily to price movements . . . . .	184
§ 2. Consequently other prices must over-respond . . . . .	190
§ 3. Transformation of the right side of the equation of exchange from $\sum pQ$ to $PT$ . . . . .	194
§ 4. Summary . . . . .	196

## CHAPTER X

## THE BEST INDEX NUMBERS OF PURCHASING POWER

§ 1. Forms of index numbers . . . . .	198
§ 2. Various purposes of index numbers . . . . .	204
§ 3. An index number as a standard of deferred payments . . . . .	208
§ 4. Deferred payments based on total exchanges . . . . .	217
§ 5. Practical restrictions . . . . .	225
§ 6. Summary . . . . .	231

## CHAPTER XI

## STATISTICAL VERIFICATION. GENERAL HISTORICAL REVIEW

	PAGE
§ 1. The last thousand years . . . . .	234
§ 2. The last four centuries . . . . .	237
§ 3. The nineteenth century . . . . .	238
§ 4. Its five price movements . . . . .	240
§ 5. Retrospect . . . . .	246
§ 6. Outlook . . . . .	248
§ 7. Paper money . . . . .	250
§ 8. Paper money in France . . . . .	252
§ 9. Paper money in England'. . . . .	253
§ 10. Paper money in Austria . . . . .	255
§ 11. Early American paper money . . . . .	256
§ 12. The "greenbacks" . . . . .	258
§ 13. Confidence in the greenback . . . . .	261
§ 14. Confederate paper money . . . . .	263
§ 15. Deposit currency and crises . . . . .	265
§ 16. Particular crises . . . . .	267
§ 17. Velocity of deposits and crises . . . . .	270
§ 18. Summary . . . . .	274

## CHAPTER XII

## STATISTICAL VERIFICATION. RECENT YEARS

§ 1. Professor Kemmerer's statistics, 1879-1908 . . . . .	276
§ 2. New estimates for $M$ and $M'$ , 1896-1909 . . . . .	280
§ 3. New estimates for $M'V'$ and $V'$ , 1896-1909 . . . . .	282
§ 4. New estimates for $MV$ and $V$ , 1896-1909 . . . . .	285
§ 5. Estimates for $T$ and $P$ , 1896-1909 . . . . .	290
§ 6. $P$ directly and indirectly calculated . . . . .	292
§ 7. Correcting discrepancies . . . . .	298
§ 8. The final results . . . . .	304
§ 9. The comparative importance of price-raising causes . . . . .	307
§ 10. Influence of antecedent causes such as tariffs, etc. . . . .	311
§ 11. Results and by-products of Chapter XII. . . . .	315

## CHAPTER XIII

## THE PROBLEM OF MAKING PURCHASING POWER MORE STABLE

§ 1. The problem of monetary reform . . . . .	319
§ 2. Bimetallism as a solution . . . . .	323
§ 3. Other proposed solutions . . . . .	328
§ 4. The tabular standard . . . . .	332
§ 5. The writer's proposal . . . . .	337
§ 6. Summary and conclusion . . . . .	348

## APPENDICES

### APPENDIX TO CHAPTER II

	PAGE
§ 1 (to Ch. II, § 3). The concept of an average . . . . .	349
§ 2 (to Ch. II, § 5). The concept of velocity of circulation . . . . .	352
§ 3 (to Ch. II, § 5). "Arrays" of $p$ 's, $Q$ 's, and $pQ$ 's . . . . .	355
§ 4 (to Ch. II, § 5). "Arrays" of $e$ 's, $m$ 's, and $V$ 's . . . . .	358
§ 5 (to Ch. II, § 5). The coin-transfer concept of velocity and the concept of time of turnover . . . . .	362
§ 6 (to Ch. II, § 5). Algebraic demonstration of equation of exchange . . . . .	364
§ 7 (to Ch. II, § 5). $P$ must be a specific form of average in order to vary directly as $M$ and $V$ and inversely as the $Q$ 's, . . . . .	364

### APPENDIX TO CHAPTER III

§ 1 (to Ch. III, § 2). "Arrays" of $k$ 's and $r$ 's . . . . .	367
§ 2 (to Ch. III, § 4). Algebraic demonstration of equation of exchange including deposit currency . . . . .	368

### APPENDIX TO CHAPTER V

§ 1 (to Ch. V, § 5). Effect of time credit on equation of exchange . . . . .	370
--	-----

### APPENDIX TO CHAPTER VI

§ 1 (to Ch. VI, § 1). Modification of equation of exchange required by international trade . . . . .	372
--	-----

### APPENDIX TO CHAPTER VII

§ 1 (to Ch. VII, § 2). Money substitutes unlike other substitutes . . . . .	376
§ 2 (to Ch. VII, § 2). Limits for ratios within which bimetallicism is possible . . . . .	378

### APPENDIX TO CHAPTER VIII

§ 1 (to Ch. VIII, § 6). Statistics of turnover at Yale University . . . . .	379
§ 2 (to Ch. VIII, § 8). Four types of commodities contrasted . . . . .	382

## APPENDIX TO CHAPTER X

	PAGE
§ 1. Each form of index number for prices implies a correlative index number for quantities . . . . .	385
§ 2. Index numbers for prices occur in arithmetical pairs as also do index numbers for quantities . . . . .	390
§ 3. General meanings of $p$ 's and $Q$ 's . . . . .	392
§ 4. Review of 44 formulæ, heading table columns . . . . .	393
§ 5. Review of 8 tests, heading table rows . . . . .	400
§ 6. The interior of the table; column 11 in particular . . . . .	408
§ 7. The 44 formulæ compared . . . . .	418
§ 8. Reasons for preferring the median practically . . . . .	425
§ 9. Summary . . . . .	428

## APPENDIX TO CHAPTER XII

§ 1 (to Ch. XII, § 1). Professor Kemmerer's calculations . . . . .	430
§ 2 (to Ch. XII, § 2). Method of calculating $M$ . . . . .	432
§ 3 (to Ch. XII, § 2). Method of calculating $M'$ . . . . .	434
§ 4 (to Ch. XII, § 3). Method of calculating $M'V'$ for 1896 and 1909 . . . . .	441
§ 5 (to Ch. XII, § 3). Method of calculating $M'V'$ for 1897-1908 . . . . .	446
§ 6 (to Ch. XII, § 4). General practical formula for calculating $V$ . . . . .	448
§ 7 (to Ch. XII, § 4). Application of formula to calculations of $V$ for 1896 and 1909 . . . . .	460
§ 8 (to Ch. XII, § 4). Interpolating Values of $V$ for 1897-1908 . . . . .	477
§ 9 (to Ch. XII, § 5). Method of calculating $T$ . . . . .	478
§ 10 (to Ch. XII, § 5). Method of calculating $P$ . . . . .	486
§ 11 (to Ch. XII, § 7). Mutual adjustments of calculated values of $M, M', V, V', P, T$ . . . . .	488
§ 12 (to Ch. XII, § 8). Credit and cash transactions. Comparison with Kinley's estimates. . . . .	491
§ 13 (to whole Ch.). Addendum to second edition . . . . .	492
Appendix on "Standardizing the Dollar." . . . .	494