

This PDF is a selection from an out-of-print volume from the National Bureau of Economic Research

Volume Title: The Channels of Monetary Effects on Interest Rates

Volume Author/Editor: Philip Cagan

Volume Publisher: UMI

Volume ISBN: 0-87014-235-6

Volume URL: <http://www.nber.org/books/caga72-1>

Publication Date: 1972

Chapter Title: Front matter, The Channels of Monetary Effects on Interest Rates

Chapter Author: Philip Cagan

Chapter URL: <http://www.nber.org/chapters/c3474>

Chapter pages in book: (p. -18 - 0)

---

# The Channels of Monetary Effects on Interest Rates

---

PHILLIP CAGAN  
Columbia University



NATIONAL BUREAU OF ECONOMIC RESEARCH  
New York 1972

Distributed by  
Columbia University Press  
New York and London

Copyright © 1972 by National Bureau of Economic Research

*All Rights Reserved*

Library of Congress card no. 77-187367

ISBN: 0-87014-235-6

Printed in the United States of America



**The Channels of Monetary Effects  
on Interest Rates**

NATIONAL BUREAU  
OF ECONOMIC RESEARCH

NUMBER

97

GENERAL SERIES





# NATIONAL BUREAU OF ECONOMIC RESEARCH

## OFFICERS

Arthur F. Burns, *Honorary Chairman*  
 Walter W. Heller, *Chairman*  
 J. Wilson Newman, *Vice Chairman*  
 John R. Meyer, *President*  
 Thomas D. Flynn, *Treasurer*  
 Douglas H. Eldridge, *Vice President-Executive Secretary*  
 Victor R. Fuchs, *Vice President-Research*

F. Thomas Juster, *Vice President-Research*  
 Hal B. Lary, *Vice President-Research*  
 Robert E. Lipsey, *Vice President-Research*  
 Edward K. Smith, *Vice President*  
 Joan R. Tron, *Director of Publications*  
 Charlotte Boschan, *Director of Data Processing*  
 Evan Stephens, *Controller*

## DIRECTORS AT LARGE

Atherton Bean, *International Multifoods Corporation*  
 Joseph A. Berne, *Communications Workers of America*  
 Arthur F. Burns, *Board of Governors of the Federal Reserve System*  
 Wallace J. Campbell, *Foundation for Cooperative Housing*  
 Erwin D. Canham, *Christian Science Monitor*  
 Solomon Fabricant, *New York University*  
 Frank W. Fetter, *Hanover, New Hampshire*  
 Eugene P. Foley, *James A. Reed & Co., Ltd.*  
 Eli Goldston, *Eastern Gas and Fuel Associates*  
 David L. Grove, *International Business Machines Corporation*  
 Walter W. Heller, *University of Minnesota*

Vivian W. Henderson, *Clark College*  
 John R. Meyer, *Yale University*  
 J. Irwin Miller, *Cummins Engine Company, Inc.*  
 Geoffrey H. Moore, *Bureau of Labor Statistics*  
 J. Wilson Newman, *Dun & Bradstreet, Inc.*  
 James J. O'Leary, *United States Trust Company of New York*  
 Alice M. Rivlin, *Brookings Institution*  
 Robert V. Roosa, *Brown Brothers, Harriman & Co.*  
 Boris Shishkin, *Washington, D.C.*  
 Arnold M. Soloway, *Jamaicaway Tower, Boston, Massachusetts*  
 Lazare Teper, *International Ladies' Garment Workers' Union*  
 Donald B. Woodward, *Riverside, Connecticut*  
 Theodore O. Yntema, *Oakland University*

## DIRECTORS BY UNIVERSITY APPOINTMENT

Moses Abramovitz, *Stanford*  
 Gardner Ackley, *Michigan*  
 Charles H. Berry, *Princeton*  
 Francis M. Boddy, *Minnesota*  
 Otto Eckstein, *Harvard*  
 Walter D. Fisher, *Northwestern*  
 R. A. Gordon, *California*  
 Robert J. Lampman, *Wisconsin*

Kelvin J. Lancaster, *Columbia*  
 Maurice W. Lee, *North Carolina*  
 Almarin Phillips, *Pennsylvania*  
 Lloyd G. Reynolds, *Yale*  
 Robert M. Solow, *Massachusetts Institute of Technology*  
 Henri Theil, *Chicago*  
 Thomas A. Wilson, *Toronto*

## DIRECTORS BY APPOINTMENT OF OTHER ORGANIZATIONS

Eugene A. Birnbaum, *American Management Association*  
 Emilio G. Collado, *Committee for Economic Development*  
 Thomas D. Flynn, *American Institute of Certified Public Accountants*  
 Nathaniel Goldfinger, *American Federation of Labor and Congress of Industrial Organizations*  
 Harold G. Halcrow, *American Agricultural Economics Association*

Douglas G. Hartle, *Canadian Economics Association*  
 Walter E. Hoadley, *American Finance Association*  
 Douglass C. North, *Economic History Association*  
 Charles B. Reeder, *National Association of Business Economists*  
 Willard L. Thorp, *American Economic Association*  
 W. Allen Wallis, *American Statistical Association*

## DIRECTORS EMERITI

Percival F. Brundage  
 Gottfried Haberler

Albert J. Hettinger, Jr.  
 George B. Roberts

Murray Shields  
 Joseph H. Willits

## SENIOR RESEARCH STAFF \*

Gary S. Becker  
 Phillip Cagan  
 Solomon Fabricant  
 Milton Friedman  
 Raymond W. Goldsmith

Daniel M. Holland  
 John F. Kain  
 John W. Kendrick  
 Irving B. Kravis  
 Jacob Mincer

Ilse Mintz  
 Geoffrey H. Moore †  
 M. Ishaq Nadiri  
 Nancy Ruggles  
 Richard Ruggles

Anna J. Schwartz  
 Robert P. Shay  
 Carl S. Shoup ‡  
 Victor Zarnowitz

\* Also includes President, Vice Presidents-Research, and Director of Data Processing.

† On leave.

‡ Special consultant.

## Relation of the Directors to the Work and Publications of the National Bureau of Economic Research

1. The object of the National Bureau of Economic Research is to ascertain and to present to the public important economic facts and their interpretation in a scientific and impartial manner. The Board of Directors is charged with the responsibility of ensuring that the work of the National Bureau is carried on in strict conformity with this object.

2. The President of the National Bureau shall submit to the Board of Directors, or to its Executive Committee, for their formal adoption all specific proposals for research to be instituted.

3. No research report shall be published until the President shall have submitted to each member of the Board the manuscript proposed for publication, and such information as will, in his opinion and in the opinion of the author, serve to determine the suitability of the report for publication in accordance with the principles of the National Bureau. Each manuscript shall contain a summary drawing attention to the nature and treatment of the problem studied, the character of the data and their utilization in the report, and the main conclusions reached.

4. For each manuscript so submitted, a special committee of the Board shall be appointed by majority agreement of the President and Vice Presidents (or by the Executive Committee in case of inability to decide on the part of the President and Vice Presidents), consisting of three directors selected as nearly as may be one from each general division of the Board. The names of the special manuscript committee shall be stated to each Director when the manuscript is submitted to him. It shall be the duty of each member of the special manuscript committee to read the manuscript. If each member of the manuscript committee signifies his approval within thirty days of the transmittal of the manuscript, the report may be published. If at the end of that period any member of the manuscript committee withholds his approval, the President shall then notify each member of the Board, requesting approval or disapproval of publication, and thirty days additional shall be granted for this purpose. The manuscript shall then not be published unless at least a majority of the entire Board who shall have voted on the proposal within the time fixed for the receipt of votes shall have approved.

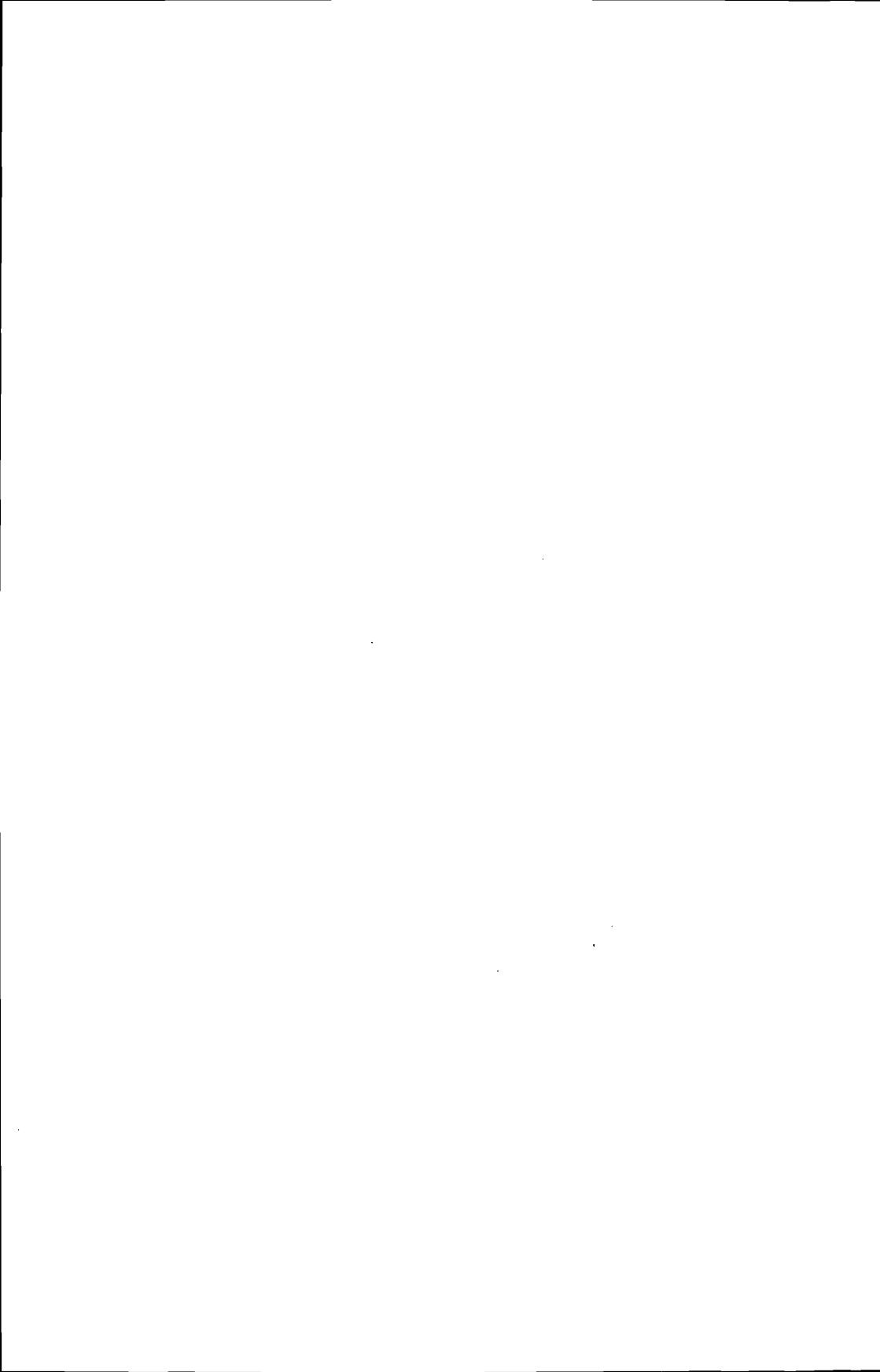
5. No manuscript may be published, though approved by each member of the special manuscript committee, until forty-five days have elapsed from the transmittal of the report in manuscript form. The interval is allowed for the receipt of any memorandum of dissent or reservation, together with a brief statement of his reasons, that any member may wish to express; and such memorandum of dissent or reservation shall be published with the manuscript if he so desires. Publication does not, however, imply that each member of the Board has read the manuscript, or that either members of the Board in general or the special committee have passed on its validity in every detail.

6. Publications of the National Bureau issued for informational purposes concerning the work of the Bureau and its staff, or issued to inform the public of activities of Bureau staff, and volumes issued as a result of various conferences involving the National Bureau shall contain a specific disclaimer noting that such publication has not passed through the normal review procedures required in this resolution. The Executive Committee of the Board is charged with review of all such publications from time to time to ensure that they do not take on the character of formal research reports of the National Bureau, requiring formal Board approval.

7. Unless otherwise determined by the Board or exempted by the terms of paragraph 6, a copy of this resolution shall be printed in each National Bureau publication.

*(Resolution adopted October 25, 1926, and revised February 6, 1933,  
February 24, 1941, and April 20, 1968)*

**To John, Laird, and David**



## Contents

Preface	xiv
1. Introduction	1
Three Monetary Effects on Interest Rates	1
Outline of the Study	5
2. The Revenue from Money Creation and Its Disposition—a Theoretical Analysis	9
The Revenue from Money Creation	10
Disposition of the Revenue: The Effect on Saving	29
Lags and Imperfect Foresight	37
3. The Statistical Association Between Monetary Growth and Interest Rates	40
Overview of the Time Series Evidence	40
Regression Analysis	45
An Alternative Interpretation of the Association	50
Conclusions	55
Appendix: The Use of Reference Cycle Stages in Regres- sion Analysis	56
4. A Test of the Credit and Portfolio Effects	61
Definition of Credit and Money	61
Regression Test of the Two Sources of Monetary Growth	66
Problems of the Data	67
Statistical Results	67
Separation of Government and Commercial Banks	76
Conclusions	77
5. The Components of Bank Credit	81

6. A Model of Monetary Effects on Interest Rates	85
Formulation of the Model	85
Solution of the Model	92
Description of the Solution	94
Appendix: Modification of the Model Using Permanent Income	97
7. The Lag in Monetary Effects on Interest Rates and Aggregate Expenditures	100
The Lagged Effect on Interest Rates	100
The Lagged Effect on Aggregate Expenditures	109
8. Summary and Implications	113
Two Traditions in Monetary Theory	113
Theoretical Analysis of the Credit Effect	115
Statistical Analysis of the Effects	116
The Sequence of Monetary Effects on Interest Rates	117
Some Implications for Policy Forecasts and Indicators	119
Appendix. Data Sources	123
Index	125

## Tables

3-1. Relation Between Interest Rates and Monetary Growth Rate, Various Periods, 1868-1966	46
3-2. Correlation Coefficients Between Interest Rates and Monetary Growth Rate, Changes Between Reference Cycle Stages, Various Periods, 1904-61	49
3-3. Correlation Coefficients Between Sources of Monetary Growth and Interest Rates, Changes Between Reference Cycle Stages, Various Periods, 1904-61	53
4-1. Condensed Balance Sheet of Monetary and Credit Items of Federal Reserve Banks, U.S. Treasury, and Commercial Banks	62
4-2. Relation Between Interest Rates and Two Sources of Monetary Growth, Consolidated Monetary System Including Treasury, 1919-66 and 1948-66	70
4-3. Relation Between Interest Rates and Two Sources of Monetary Growth, Consolidated Monetary System Excluding Treasury, 1919-66 and 1948-66	75
4-4. Relation Between Interest Rates and Three Sources of Monetary Growth, Consolidated Monetary System Excluding Treasury, 1919-66 and 1948-66	78
5-1. Relation Between Interest Rates and Two Components of Bank Credit, Consolidated Monetary System Excluding Treasury, 1919-61 and 1948-61	82
7-1. Regression of Commercial Paper Rate on Lagged Values of Monetary Growth Rate, First Differences of Monthly Data, 1910-65	103
7-2. Regression of Commercial Paper Rate on Lagged Monetary Growth Rate, for Three Definitions of Money, Various Post-World War II Periods, First Differences of Quarterly Data, 1948-69	106
7-3. Regression of Percentage Change in GNP on Lagged Values of Monetary Growth Rate, Quarterly Data, 1953-69	111

## Charts

3-1. Nonwar Cyclical Patterns of Commercial Paper Rate and Monetary Growth Rate, Reference Cycle Stages, 1904-69	41
3-2. Monetary Growth Rate and Commercial Paper Rate, Changes Between Successive Reference Cycle Stages (Special Periods Dated), 1904-66	44
4-1. Reference Cycle Patterns of Growth in the Money Stock and in Net Earning Assets of the Consolidated Monetary System, 1948-66	64
4-2. Comparison of Growth in the Money Stock and in Net Earning Assets of the Consolidated Monetary System, Changes Between Reference Cycle Stages, 1948-66	65
4-3. Growth in Net Earning Assets of the Consolidated Monetary System, Comparison Using Weekly Reporting Members and All Commercial Banks, Changes Between Reference Cycle Stages, 1948-66	68
7-1. Lag Distribution of Monetary Effects on Commercial Paper Rate, Various Periods, 1910-65	102

## Figures

2-1. Marginal and Average Cost of Deposit Services	18
2-2. Value of $s$ That Maximizes Net Profits	20
2-3. Average Cost and Maximum Profits	21
2-4. Marginal Revenue and Cost for One Bank in a System	24
2-5. Aggregate Demand and Supply for Real Deposits	25
3-1. Transformation of a Trendless, Perfectly Conforming Linear Series into Reference Cycle Patterns	58
6-1. Effect of Desired and Actual Balances on Interest Rate	88
6-2. Graphical Solution of Equation 14 with Increase in Monetary Growth Rate	95
6-3. Graphical Solution of Equation 14 for Temporary Spurt in Monetary Growth Rate	96

## Preface

[T]he paper currency in common use, being a currency provided by bankers, is all issued in the way of loans, except the part employed in the purchase of gold and silver. The same operation, therefore, which adds to the currency also adds to the loans: the whole increase of currency in the first instance swells the loan market. Considered as an addition to loans it tends to lower interest.

John Stuart Mill, *Principles of Political Economy*, New York, Kelley, 1961, p. 646 (in the original 6th edition, 1865)

Mill's explanation of monetary effects on interest rates, with its emphasis on bank loans, could be duplicated many times from earlier and later writers down to the present time. It is part of the tradition of monetary theory. Yet it has many points of conflict with other well-established theories of money. The present book is a theoretical and empirical analysis of the points of conflict.

This study originated in my earlier work on interest rates, in which examination of their historical movements revealed a significant inverse association with the rate of change of the money stock. This was not a surprising result, but it had not been analyzed statistically before. The association was shown to reflect a short-run monetary influence on interest rates. The ability to measure this relationship opened up the opportunity of testing the two reigning theories of how money affects interest rates in the short run. These two are the credit and the quantity theories of money, the former stressing the first-round effects of money creation through credit expansion and the latter stressing portfolio adjustments by the public to a change in its money balances. The test involves dividing monetary growth into two parts, one representing credit expansion and the other representing all remaining sources of monetary growth. A multiple regression then deter-

mines the contribution of each part to the total effect of monetary growth on interest rates.

Most of the statistical results came first, and to interpret them the theoretical analysis was done later. The results are not favorable to Mill's view, expressed above, and support instead the quantity theory. The two theories have important but conflicting implications for the proper conduct of monetary policy.

An earlier version of the statistical results of Chapters 4 and 5 was circulated in 1966 and elicited many helpful comments. I am most indebted to Milton Friedman, who encouraged me to expand the work and made many suggestions for improving it. A National Bureau staff reading committee consisting of Friedman, Robert Lipsey, H. Laurence Miller, and Anna J. Schwartz was also extremely beneficial. I wish to thank the members of the directors' reading committee, Francis M. Boddy, Maurice W. Lee, and Robert V. Roosa.

Parts of three other chapters have been previously published. Revised versions are presented here. Chapter 3 appeared in the *Review of Economics and Statistics*, August 1966, and was reprinted as *National Bureau Occasional Paper 100*. Chapter 6 was presented at a Brown University conference on monetary growth models and was subsequently published in the *Journal of Money, Credit, and Banking*, May 1969. I am grateful for the comments of the conference discussants of that paper, Carl Christ and James Tobin. The results of the first part of Chapter 7 were presented in collaboration with Arthur Gandolfi at the 1968 meetings of the American Economic Association and published in its *Proceedings*, May 1969.

Indispensable computational assistance was rendered at various stages of the study by Josephine Trubek Crouse, Jae Won Lee, and Irene Abramson. Martha T. Jones of the National Bureau's data processing department was continually helpful.

The text was greatly improved by the careful editing of Ester Moskowitz. The charts were expertly drawn by H. Irving Forman.

This study was financed by a grant from the Life Insurance Association of America, and their assistance is gratefully acknowledged. Their concurrence with the results is not to be assumed.

