A Study of Aggregate Consumption Functions

Robert Ferber
University of Illinois

Technical Paper 8
National Bureau of Economic Research, Inc. 1953
OFFICERS
1953
Harry Scherman, Chairman
C. C. Balderston, President
Percival F. Brundage, Vice-President
George B. Roberts, Treasurer
W. J. Carson, Executive Director

DIRECTORS AT LARGE
Donald R. Belcher, Westfield, New Jersey
Wallace J. Campbell, Director, Cooperative League of the USA
Albert J. Hettinger, Jr., Lazard Frères and Company
Oswald W. Knauth, Beaufort, South Carolina
H. W. Laidler, Executive Director, League for Industrial Democracy
Shepard Morgan, New York City
C. Reinold Noyes, Princeton, New Jersey
George B. Roberts, Vice-President, National City Bank
Beardsley Ruml, New York City
Harry Scherman, Chairman, Book-of-the-Month Club
George Soule, Bennington College
N. I. Stone, Consulting Economist
J. Raymond Walsh, New York City
Leo Wolman, Columbia University
Theodore 0. Yntema, Vice President-Finance, Ford Motor Company

DIRECTORS BY UNIVERSITY APPOINTMENT
E. Wight Bakke, Yale
C. C. Balderston, Pennsylvania
Arthur F. Burns, Columbia
G. A. Elliott, Toronto
Frank W. Fetter, Northwestern
H. M. Groves, Wisconsin
Gottfried Haberler, Harvard
Clarence Heer, North Carolina
R. L. Kozelka, Minnesota
Paul M. O'Leary, Cornell
T. W. Schultz, Chicago
Jacob Viner, Princeton

DIRECTORS APPOINTED BY OTHER ORGANIZATIONS
Percival F. Brundage, American Institute of Accountants
Frederick C. Mills, American Statistical Association
S. H. Ruttenberg, Congress of Industrial Organizations
Murray Shields, American Management Association
Boris Shishkin, American Federation of Labor
Donald H. Wallace, American Economic Association
Frederick V. Waugh, American Farm Economic Association
Harold F. Williamson, Economic History Association

RESEARCH STAFF
Solomon Fabricant, Acting Director of Research
Geoffrey H. Moore, Associate Director of Research

Moses Abramovitz
Harold Barger
Morris A. Copeland
Daniel Creamer
David Durand
Milton Friedman
Millard Hastay
W. Braddock Hickman
F. F. Hill
Daniel M. Holland

Thor Hultgren
Simon Kuznets
Clarence D. Long
Ruth P. Mack
Frederick C. Mills
Raymond J. Saunier
Lawrence H. Seltzer
George J. Stigler
Leo Wolman
Herbert B. Woolley
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. To this end the Board of Directors shall appoint one or more Directors of Research.

3. The Director or Directors of Research shall submit to the members of the Board, or to its Executive Committee, for their formal adoption, all specific proposals concerning researches to be instituted.

4. No report shall be published until the Director or Directors of Research shall have submitted to the Board a summary drawing attention to the character of the data and their utilization in the report, the nature and treatment of the problems involved, the main conclusions and such other information as in their opinion would serve to determine the suitability of the report for publication in accordance with the principles of the National Bureau.

5. A copy of any manuscript proposed for publication shall also be submitted to each member of the Board. For each manuscript to be so submitted a special committee shall be appointed by the President, or at his designation by the Executive Director, 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 summary and report described in paragraph (4) are sent to him. It shall be the duty of each member of the committee to read the manuscript. If each member of the special committee signifies his approval within thirty days, the manuscript may be published. If each member of the special committee has not signified his approval within thirty days of the transmittal of the report and manuscript, the Director of Research shall then notify each member of the Board, requesting approval or disapproval of publication, and thirty additional days shall be granted for this purpose. The manuscript shall then not be published unless at least a majority of the entire Board and a two-thirds majority of those members of the Board who shall have voted on the proposal within the time fixed for the receipt of votes on the publication proposed shall have approved.

6. No manuscript may be published, though approved by each member of the special committee, until forty-five days have elapsed from the transmittal of the summary and report. 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 of the special committee, have passed upon its validity in every detail.

7. A copy of this resolution shall, unless otherwise determined by the Board, be printed in each copy of every National Bureau book.

(Resolution adopted October 25, 1926 and revised February 6, 1933 and February 24, 1941)
ACKNOWLEDGMENTS

A study such as this could not have been carried out without a great deal of assistance and counsel from others. In both of these respects, I have been most fortunate. The assistance was provided initially by the National Bureau of Economic Research and later by the Bureau of Economic and Business Research of the University of Illinois. Counsel came from a number of eminent sources. In their capacity as faculty advisers, Professors H. Gregg Lewis and Jacob Marschak of the University of Chicago were instrumental in shaping the course of the original study, which was written in part as a doctoral thesis. Further valuable suggestions regarding the content and organization of the study were provided by Arthur F. Burns and Geoffrey Moore. I am indebted to the latter in particular for his painstaking review of the manuscript in its various stages. The manuscript was also read by, and further useful suggestions obtained from Millard Hastay, Harry Eisenpress, Ruth Mack, Leonid Hurwicz, Lawrence Klein, and Gottfried Haberler.

Millard Hastay and Harry Eisenpress were very helpful on technical matters, and the latter supervised some of the checking of the calculations. As the reader will note, these calculations comprise the heart of the study, and for assisting me in carrying them out, I should like to express my appreciation to Frances Dotson, Phyllis Barnard, and Carole Voss. The charts were skilfully designed by H. Irving Forman. The editing of the manuscript was in the capable hands of Mary Phelps and Louise Cooper. To all of these people and organizations, my sincere thanks.

Robert Ferber
CONTENTS

Chapter I  REVIEW OF PAST STUDIES  
Introduction  3  
Notation  5  
The basic classification of consumption functions  6  
Variables entering into the consumption function  6  
Price effects  7  
Time trends and adjustment for population changes  12  
Income effect  14  
Selection of income variable  15  
Relevance of income distribution  17  
Cyclical considerations and lag variables  22

Chapter II  EMPIRICAL EVALUATION OF PAST STUDIES  25  
Method of approach  25  
Revised estimates of past consumption functions  27  
Effect of change in data  31  
Systematic design of computations  35  
Results of systematic computations  36  
Accuracy of postwar forecasts  37  
Effect of business fluctuations: the period of observation  45  
Past income and income distribution  48  
Goodness of fit and predictive accuracy  50  
Adjustment for price changes  56  
Adjustment for population changes  56  
Reliability of results  57  
Summary of findings  59

Appendix A  THE UTILITY MAXIMIZATION APPROACH  61
### LIST OF TABLES

1. Classification of Aggregate Consumption Functions  
   Page: 8-9
2. Goodness of Fit of Aggregate Savings Functions and Accuracy of Their Postwar Predictions  
   Page: 28
3. Difference in Estimates of Parameters of Aggregate Savings Functions Due to Revisions in Basic Data  
   Page: 32-33
4. Goodness of Fit of Selected Aggregate Savings Functions and Accuracy of Their Postwar Predictions  
   Page: 38-39
5. Relative Errors of Prediction of Selected Functions when Consumption Rather than Savings Is Treated as Dependent  
   Page: 41
6. Marginal Propensity to Save of Systematically-Computed Savings Functions  
   Page: 47

**B-1** Basic Data Used in Computations  
Page: 64

**B-2** Regression Functions Used in Analysis of Predictive Accuracy and Goodness of Fit  
Page: 65-69

### LIST OF CHARTS

1. Accuracy of Selected Consumption and Savings Functions  
   Page: 40
2. Actual Savings and Postwar Savings Estimates from Six Selected Functions  
   Page: 42
3. Actual Postwar Savings and Savings Estimates from Two Functions by Alternate Methods  
   Page: 44
4. Relation between Coefficient of Determination ($R^2$) and Predictive Accuracy  
   Page: 49
5. Actual Minus Estimated Savings in Period of Observation and in Postwar Period  
   Page: 52-53
6. Relation between Average Errors in Savings Estimates in Period of Observation and in Postwar Period  
   Page: 54
Ferber, Robert.


1. Consumption (Economics) 1. Title: Aggregate consumption functions.

HB801.F46 MATERIAL SUBMITTED BY PUBLISHER 53-11148