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THE WORKING OF ECONOMETRIC MODELS

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Contents

Preface vii

PART I: A dynamic analysis of the American economy, 1902–1952
by M. Morishima and M. Saito

1. Introduction *page* 3
2. The structural model 5
3. Short-run properties of the model 25
4. Long-run properties of the model 47

PART II: Input–output analysis of the effectiveness of fiscal policies for the United Kingdom, 1954
by M. Morishima and T. Nosse

1. Introduction 73
2. An interindustrial model with endogenous consumption 76
3. Impact multipliers and efficient budget of the government 96
4. Generation of income through reduction of taxes 117

PART III: A general equilibrium analysis of prices and outputs in Japan, 1953–1965
by M. Saito

1. Introduction 147
2. Theoretical model 149
3. The estimation of the model 156
4. Comparative statics of general equilibrium 181
5. A factor analysis of price and output changes 216

PART IV: An input–output analysis of disguised unemployment in Japan, 1951–1965
by M. Morishima and Y. Murata

1. Introduction 243
2. Disguised unemployment in a re-interpreted input–output model 256
3. Data and estimates of the parameters 270

4. Factor analysis of disguised unemployment *page* 288
APPENDIX: An estimation of international trade multiplier, 1954–1965
by M. Morishima and Y. Murata
1. Introduction 303
2. A modified Metzler model 306
3. Estimation of parameters and multipliers 318

Bibliography 330
Index 337

1. *Introduction*

Once upon a time, there was a Japanese priest named Noh-in, who was notorious for his eccentricities. After having sat at a window of his hermitage in Kyoto for several months and acquired a suntan, he pretended to have come back from the Far North of Japan, and published poems singing of the journey. We are like Noh-in, in that we are writing a story about the American economy, although deriving the formula of the Turnpike theorem was all one of us did in a sunny bungalow when he was in California, while the other, now in the United States, had never been there when he engaged in this econometric study. We are, however, much emboldened by the historical fact that even the greatest traveller, Marco Polo, wrote about Japan without having been there.

We have constructed a log-linearized macroeconomic model of the Keynesian type on the basis of time series data for the United States over the period 1902–52. Our system consists of seven stochastic and two definitional equations, one of the smallest Keynesian models which has ever been subjected to econometric treatment. Compared with the monumental Brookings model of Duesenberry, Fromm, Klein, Kuh and others, the present model may be called a midget. But the world was not made only for giants.

In Chapter 2 the theoretical foundations of the model are given, and our estimates of the structural parameters are compared with those obtained by other econometricians. The model is examined from two points of view, short-run and long-run. Chapter 3 is devoted to evaluation of monetary and fiscal policies as two short-run measures for achieving a satisfactory level of employment. Chapter 4 deals with long-run properties of the model such as the existence and stability, or instability, of growth equilibrium, and the contradiction between price–wage stability and the maintence of full employment of labour.

In Chapter 3 we estimate various multipliers: fiscal and monetary multipliers for income and employment, and impact and dynamic multipliers. It may be conjectured, as it was by Keynes, that the multipliers at a high level of economic activity are different from the multipliers at a low level, so that the effectiveness of the alternative policies varies with phases of business cycles as well as with stages of economic development. We therefore compute the multipliers for each year in the sample period, from which we

conclude that an empirical law operates, namely that the effect on employment of an increase in investment becomes smaller as the employment ratio becomes greater, while the effect of an increase in real cash balances on employment is almost independent of the employment ratio; and hence the excess of the former over the latter becomes larger as the employment ratio decreases. The Keynesian idea that in depressions public investment policy has an advantage over traditional monetary policy as a measure to promote full employment is thus confirmed econometrically.

In Chapter 4 we present an empirical analysis both of the state of long-run economic growth maintaining full employment and also of the state of balanced growth with constant prices, the former having recently received much attention from neoclassical economists such as Solow, Uzawa, and Meade and the latter having been discussed by many von Neumannians, including Joan Robinson and Sir John Hicks. Our econometrics show that price stability and perpetual full employment cannot be achieved simultaneously unless we have powerful anti-inflation policies. That is to say, price stability produces severe unemployment, while a serious inflation accompanies full employment. This is one of the dilemmas of present-day capitalism.

Another dilemma concerns the stability of growth equilibrium. Sir Roy Harrod has argued that a reasonable investment function of an acceleration-principle type would imply the instability of long-run equilibrium, so that a capitalist economy could at best proceed along an unstable path of equilibrium growth. On the other hand, neoclassical economists insist that the Harrodian instability disappears when the price–wage–interest mechanism works, if there is sufficient scope for substituting labour for capital in production and the entire saving is automatically invested. Chapter 4 deals with this controversy also. Our econometric investigation shows that so long as the capital–labour ratio is flexible and investment is adapted to savings, neoclassical forces may work to bring the economy towards growth equilibrium, but the forces are so weak that a deep depression may easily occur with a reasonable investment function, once flexibility of the capital–labour ratio is lost or limited. A simulation of the instability process is made; it is found that it may be comparable with the Great Depression experienced in the thirties.

Finally, it should be noted that all conclusions drawn in Chapters 3 and 4 are based on coefficients which are subject to sampling errors.