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Introduction to Collected Essays

by

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Biographical Introduction

List of Essays, Volume I. The General Equilibrium Theory

Introduction to essays collected in Volume I

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Born on April 2, 1933, I spent my early days in Tokyo, Shanghai, Kyoto and again in Tokyo. In my high school days, I was a science boy and interested in astronomy and meteorology. My major was social sciences, however, when I was admitted to University of Tokyo in 1952, because I thought that my mathematical ability was not enough to do natural sciences.

My first teacher in economics, Professor Shigeru Aihara, ordered his students in the freshman course of economics to study Adam Smith, Ricardo and Marx, i.e., to read <u>Wealth of Nations</u>, <u>Principles</u> and <u>Das Kapital</u>, by Japanese translations, rather than to study modern text books. At the age of sixty, now I can understand that such an introduction to economics is not necessarily unreasonable. But to me as a freshman, it was simply boring to read such books of classical economics. Among classics of economics, however, I found Cournot's <u>Recherches sur les principles mathématiques de la théorie des richesse</u>, though it was not recommended to read by Professor Aihara who is a Marxian economist. From Cournot, I learned that mathematics can be used very productively even in economics, and it is not so difficult as mathematics in natural sciences. I made up my mind to do mathematical economics.

In 1950's, the faculty of economics was dominated by Marxian economics in University of Tokyo. But I was very lucky to have Professor Yasuhiko Oishi as my undergraduate adviser, who was one of a few non-Marxian. He suggested me to read Hick's <u>Value and Capital</u> and Keynes's <u>General Theory</u> and taught me the theory of

linear programming. In his seminar, I wrote an essay entitled as "Macrotheory of Trade Cycles and Non-linear Differential Equations" (in Japanese), which is a survey of Keynesian macro dynamic models and some mathematical exercises based on such models. Being aware of the existence of an active group of Japanese mathematical economists, like Yasui, Morishima, Ichimura, Nikaido, Inada, and Uzawa, I decided to do graduate study on economic theory, wishing to join in the group, if possible.

When admitted to graduate school of University of Tokyo in 1956, I was advised by Professor Hiroshi Furuya to study general equilibrium and proved the local stability of gross-substitute case in my essay for Master's degree. Because of these studies, I was employed in Arrow's project in Stanford as a research assistant (1958-9) and a research associate (1959-60). At Stanford I wrote several articles on general equilibrium, including a joint article on non-tâtonnement stability with Hahn who was at Berkeley. I read a paper on monopolistic competition in Washington meeting (1959) and a survey paper on stability in Naples meeting (1960) of Econometric Society.

I returned to Tokyo in 1960, finished my graduate study in 1963 with the degree of Keizaigakuhakushi (Ph.D. in economics). After I served as a research associate for two years, I was appointed as an associate professor of economics in 1965, and began to teach at the University of Tokyo. My dissertation was published in 1965 under the title of <u>Kakaku to Haibun no Riron</u> (Theories of Price and Allocation). In 1964 I got married with Aiko Mori, who was an English literature major graduate student

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(She is now Professor at Bunka Women's University in Tokyo). In 1966, I was elected to a Fellow of Econometric Society.

In 1967-1968, I got two years' leave from Tokyo, and taught at the University of New South Wales and University of Minnesota. My interest began gradually to shift from the pure theory of general equilibrium to its application to international economics, partly because of M.C. Kemp's influences. While I was away from the University of Tokyo, its graduate school of economics was dissolved by students' riot with the result that compulsory courses and Master's degree are abolished. This is why many good students of us began to leave for U.S. to obtain degrees there.

After writing articles on the theory and applications of the general equilibrium in 1950's and 1960's, I published my first book in English, General Equilibrium Theory and International Trade, in 1972. The book won Nikkei Prize for Best Books of Economics in 1973. Between 1964 and 1969, I served as an associate editor for International Economic Review.

In 1975 I spent a year's leave from Tokyo to give lectures at London School of Economics. After returned to Tokyo, I was promoted to a professor of economics in the University of Tokyo in 1976. One of problems I tacked in 1970's was micro-foundations of macroeconomics, though I had felt already in my undergraduate days that something should be done to connect the world of Hick's Value and Capital and that of Keynes's General Theory. Another area I studied in 1970's was that of public economics, being partly influenced by environmental problems. I wrote articles mainly in these two areas in 1970's, and

published <u>Microeconomic Foundations of Keynesian Macroeconomics</u> in 1979.

In 1977, Matsunaga Science Foundation Prize for Social Science was awarded to me for my studies in the general equilibrium theory. I served as an associate editor for <u>Econometrica</u> in 1969-75 and 1979-84, and for <u>Journal of International Economics</u> in 1973-85. In 1973-75, I edited <u>Economics Studies Quarterly</u>.

In 1979 I was hospitalized and operated. At the age of 46, I felt I had to shift gears of my life. With my wife, I translated Viner's <u>The Role of Providence in the Social Order</u> into Japanese in 1980. It is my pleasant memory that I gave lectures in International Christian University in Tokyo for several years.

The study of Keynesian economics from the point of view of the general equilibrium theory led me to the strong recognition of the existence of different points of view in current economic theory, each of which has its own origin and predecessors. In 1980's my main interest was in the history of economic theory. Besides articles on the several topics in the history of economic theory, I published two books, i.e., <u>Economic Theories in a Non-Walrasian Tradition</u> in 1985 and <u>History of Economic Theory</u> in 1989. In addition, I wrote <u>Disequilibrium Trade Theories</u>, in 1987 with Motoshige Itoh, a former student and now a colleague of mine, who got his degree from Rochester.

Being elected to a member of Science Council of Japan in 1985 and engaged in editing a white book on scientific researches in Japan, I found an interesting fact that Japanese mathematical economists and econometricians regard the level of their works not high, though they know their works are internationally known,

while Japanese economists of other area complain that their contributions, which they insist to be at high level, remain internationally unknown. In 1985, I was also elected to the President of Japan Association of Economics and Econometrics. In 1989 American Economic Association elected me to a Foreign Honorary Member, while International Economic Association appointed me as a member of the Executive Committee.

In 1990 I was elected to Dean of the Faculty of Economics, and held the office for two years. While I was the Dean, the Faculty decided to strengthen our graduate school and to re-introduce Master's degree and the system of required courses for it. It is twenty years after the students riot that abolished compulsory courses in graduate school. Since 1965, I have been assigned mainly to lectures on price theory in the Faculty. My lecture note was published in Japanese in 1989. Now I am going to retire from the University of Tokyo in March 1994. The faculty already acquired Michihiro Kandori, A former student of mine who got his degree from Stanford, to replace me to give lectures on economic theory.

Currently, I am the First Vice President of Econometric Society, and a member of the Executive Committee of the Japan Society for the History of Economic Thought. In 1933, the Japan Academy awarded me for my studies on the history of economic theory.

I have published my books and articles in English or in Japanese. Forty seven essays of mine written in English are collected in Volume I and classified into six Parts, i.e.,

Equilibrium and Welfare, Stability, Monetary Economics, International Economics, Public Economics and Disequilibrium Theory. Volume II contains twenty one essays on the history of economics and is classified into two Parts, i.e., Classical and Marxian Economics and Marginal Revolution and After.

Part A. Equilibrium and Welfare

1. Welfare Economics and Existence of an equilibrium for a Competitive Economy, <u>Metroeconomica</u>, 12(1960), 92-97

2. Entry and Optimum Number of Firms, <u>Metroeconomica</u>, 14(1962), 86-96

3. Monopolistic Competition and General Equilibrium, <u>Review of Economic Studies</u>, 28(1961), 196-201

4. Monopolistic Competition and General Equilibrium, J. Eatwell, M. Milgate, P. Newman, eds., <u>The New Palgrave, General Equilibrium</u>, Macmillan, 1989, 194-201 (a different article from 3)

5. On Social Welfare Function, <u>Quarterly Journal of Economics</u>, 77(1963), 156-158

6. A Note on a Formation of External Economy, with Y. Murakami, <u>International Economic Review</u>, 5(1964), 328-334

7. Perceived Demand Curve in the Theory of Second Best, <u>Review of Economic Studies</u>, 34(1967), 315-316

Part B. Stability

8. Stability of a Competitive Economy, A Survey Article, <u>Econometrica</u>, 30(1962), 635-669

9. A Note on the Stability of an Economy where all Goods are Gross Substitutes, <u>Econometrica</u>, 26(1958), 445-447

10. On the Formation of Prices, <u>International Economic Review</u>, 2(1961), 122-126

11. A Theorem on Non-Tâtonnement Stability, with F. H. Hahn,

Econometrica, 30(1962), 463-469

12. On the Successive Barter Process, Economic Studies Quarterly, 12(1962), 61-64

13. Some Comments on Approaches to Stability Analysis, Economica 29(1962), 188-189

14. Stability of Exchange and Adaptive Expectations, International Economic Review, 5(1964), 104-111

15. Stability and Rationality of the Extrapolative Expectation, Econometrica, 32(1964), 649-651

16. A Model of Duopoly with Stackelberg Equilibrium, with K. Okuguchi, Zeitschrift für Nationalökonomie, 32(1972), 153-162

17. Tâtonnement and Recontracting, J. Eatwell, M. Milgate, P. Newman, eds., The New Palgrave, General Equilibrium, Macmillan, 1989, 281-296

Part C. Monetary Economics

18. Conditions for Neutral Money, Review of Economic Studies, 31(1964), 147-148

19. Money in Walrasian General Equilibrium Theory, Economie Appliquee, 30(1977), 599-615

20. Market Clearing Processes in a Monetary Economy, Hahn and Brechling eds., Theory of Interest Rates, Macmillan, 1965, 152-163

21. The Supply of Money, Innovations and the Business Cycles in Japan, Journal of Finance, 23(1968), 875-886

Part D. International Economics

22. Foreign Investment and Long-run National Advantage, Economic

Record 41(1965), 628-632

23. Equilibrium and Efficiency in International Trade with Costs of Transportation, Economic Studies Quarterly, 16(1965), 74-77

24. Protection of the Infant Industry and Dynamic Internal Economy, Economic Record, 34(1968), 56-67

25. Infant Industry Protection, A Reply and A Further Reply, Economic Record, 51(1975), 263-264, 267

26. Approaches to the Analysis of Devaluation, International Economic Review, 9(1968), 218-227

27. Domestic Distortions, Tariffs and the Theory of Optimum Subsidy, with M.C. Kemp, Journal of Political Economy, 76(1969), 1011-1013

28. The Customs Union and the Theory of Second Best, International Economic Review, 10(1969), 391-398

29. Marshallian External Economies and Gains from Trade between Similar Countries, Review of Economic Studies, 36(1969), 131-135

30. Increasing Returns, Imperfect Competition and international Trade, Economic Studies Quarterly, 20(1969), 15-23

31. Variable Returns to Scale, Commodity Taxes and their Implications for Trade Gains, A Clarification, with M. C. Kemp, Swedish Journal of Economics, 73(1971), 257-258

Part E. Public Economics

33. Dynamics of Public Expenditure in a Two-Party System, Zeitschrift für Nationalökonomie, 31(1971), 323-330

34. Public Expenditure Determined by Voting with One's Feet and Fiscal Profitability, Swedish Journal of Economics, 74(1972), 452-458

35. The Excess of Public Expenditures on Industries, Journal of Public Economics, 2(1973), 231-240

36. Stability of Markets with Public Goods, Horwich and Samuelson eds., Trade Stability and Macroeconomics, Academic Press, 1973, 259-268

37. Excess Burden and the Voluntary Theory of Public Finance, Economica, 42(1975), 177-181

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39. Advertising and the Social Imbalance between Private and Public Goods, Rivista Internationale di Scienze Economiche e Commerciali, 32(1985), 64-70

Part F. Disequilibrium Theory

40. Involuntary Unemployment and Market Imperfection, Economic Studies Quarterly, 25(1974), 32-41

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42. Price Rigidity, Full Employment and Inflation, Homage a Perroux, Presse Universitaires de Grenoble, 1977, 555-565

43. Existence of an Underemployment Equilibrium, Schwodiauer ed., Equilibrium and Disequilibrium in Economic Theory, Reidel, 1977, 497-510

44. Marketing Costs and Unemployment Equilibrium, T. Fujii and R. Sato eds., Resource Allocation and Division of Space, Springer, 1977, 23-32

45. Employment, Wages and Trade Unions, with A. Walters, T.

Bajiotti and G. Franco eds., <u>Pioneering Economics</u>, Cedam, 1978,
721-728

46.   Foreign Exchange Gains in Keynesian International Trade
Model, <u>Economie Appliquee</u>, 32(1979), 623-633

47. From Samuelson's Stability Analysis to Non-Walrasian
Economics, G. Feiwel ed., <u>Samuelson and Neoclassical Economics</u>,
Kluwer-Nijhoff, 1982, 119-125

Introduction to essays collected in Volume I

The General Equilibrium Theory

Part A. Equilibrium and Welfare

The existence and optimality of a general equilibrium was one of the topics I was first interested in when I was a graduate student at Tokyo. Essay 1 (Welfare Economics and Existence of an equilibrium for a Competitive Economy, 1960) was, therefore, the first product of my study in economics, though the publication was slightly delayed. It started in my second year at the graduate school of University of Tokyo and a final touch was added at Stanford. The method of proof used in this essay has been found useful also for such problems as equilibrium in infinite dimensional space and computation of equilibria. The role played by this essay have been recognized by such text books and survey or review articles as Arrow and Hahn (1971, p.127), Diewert(1970), Ginsburgh and Waelbroeck(1976), Hahn(1990), Kahoe(1991), Mas-Colell and Zame(1991), McKenzie(1989), and Varian (1978, p.157).

In my study of general equilibrium theory, I always tried, not so much to generalize theory mathematically, as to enrich it with economic significance, so that it can be applied to the problems of the real world economy. An example is Essay 3 (Monopolistic Competition and General Equilibrium) in which the assumption of perfect competition is replaced by more realistic one of monopolistic competition and each firm is assumed to have a reasonably realistic perceived demand function. As will be seen in Part F, this subjective demand function can also be used in

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the study of Keynesian problems. Like Essay 1, this essay has also been cited very often in the literature, including such text books and survey or review articles as Arrow and Hahn (1971, pp. 167 - 8), Blad and Keiding (1990, pp. 223 - 231), Benassy (1991), Hahn(1977), (1989) and Hart(1984). Essay 4 was written on the same problem almost 30 years after Essay 3, when I was invited, perhaps because of Essay 3, to contribute it to The New Palgrave Dictionary of Economics, 1987.

Part B. Stability

In my early graduate days, I was also interested in the stability of a general equilibrium. Essay 9 (A Note on the Stability of An Economy where all Goods are Gross Substitutes, 1958) was my first publication in economics, in which I proved the local stability of tâtonnement process under the assumptions of the gross-substitutability and the homogeneity of excess demand functions. Almost simultaneously it was also proved by Arrow and Hurwicz (1958) and Hahn (1958) under the assumptions of gross-substitutability and Walras' law.

Then I turned to the study of non-tâtonnement processes (Essays 10 - 14). In view of Sonnenshein (1973, 1974), it is important to study processes, of which the stability does not depends on the nature of excess demand functions like the gross-substitutability (see, however, Grandmont 1992). An example of such processes is the one studied in the often cited Essay 11 (A Theorem on Non-Tâtonnement Stability, 1962), which is co-authored with F. Hahn.

Essays 8 (Stability of a Competitive Economy, A Survey Article, 1962) which can be considered as an introduction to other essays collected in this Part B was recently studied intensively by Weintraub (1991) from the point of view of a new research programme in the history of economic theory. Essay 17 (Tâtonnement and Recontracting) was written almost 30 years after Essay 8, when I was invited, perhaps because of Essay 8, to contribute it to The New Palgrave Dictionary of Economics, 1987.

Evaluations of my contributions to stability problem can be seen in Arrow and Hahn (1971, pp. 322, 346), Fisher(1983) and Hahn(1982). Recently Essay 15 (Stability and Rationality of the Extrapolative Expectation) is recognized by Darity, McGillivray and Young (1992).

Part C. Monetary Economics

Since the general equilibrium theory has been mostly developed by the use of the real models of an economy, it is natural that the problem of money was considered firstly from the point of view of the classical dichotomy between real and monetary theory. Essay 18 (Conditions for Neutral Money) is a brief report of the conclusion of my study of this problem and suggests a slightly different concept of dichotomy from that of Patinkin. The details of my studies on the classical literature are summarized in Negishi (1972, pp. 247 - 63). The role of money is, however limited in such a dichotomized system. Essay 19 (Money in Walrasian General Equilibrium Theory) concludes,

therefore, that the problem of money should be considered, not in equilibrium theory, but in disequilibrium theory, with which essays in Part F are concerned.

Part D. International Economics

Among my contributions in this field, those which are most often discussed in the literature are perhaps essays on the problems of infant industry protection, the customs union and variable returns to scale.

In Essay 24 (Protection of the Infant Industry and Dynamic Internal Economy), I emphasized lumpy investment in learning period due to the finite cost differential between domestic infant and foreign matured industries. Corden (1974, pp. 256 - 7) extended my discussion by using the concept of the pecuniary external economies while Kemp(1974) and Woodland (1982, pp. 471 - 2, 494) argued that it is the problem of the optimal tariff, though in the latter, Essay 22, instead of Essay 24, was wrongly refereed to (p. 494). I would insist, however, that the protection of infant industry for the world efficiency is a different problem from the so-called optimal tariff argument, which is concerned merely with national optimality.

The approach of Essay 28 (The Custom Union and the Theory of Second Best) was followed and extended in Woodland (1982, pp. 350, 51, 60) and Kemp (1969b, pp. 8, 148), while Essay 29 (Marshallian External Economies and Gains from Trade between Similar Countries) and Essay 30 (Increasing Returns, Imperfect Competition and International Trade) are discussed,

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respectively, by Helpman and Krugman (1885, p. 39) and by
D'Agata (1990). As for other contributions, particularly those
to the problem of gains from trade, co-authored with M. Kemp, see
Corden (1984), Helpman and Krugman (1985, p. 51), Kemp (1969a,
pp. 274, 281, 311, 339) and Helpman (1984).

Part E. Public Economics

Relatively speaking, Essay 34 and Essay 35 are cited often in
the literature. In these articles I was interested, not in the
normative economics of public goods as such, but in the positive
economics of how various types of public goods are likely to be
supplied, and whether such supplies are optimal or in excess from
the point of view of social welfare. My studies are,
unfortunately, still very abstract, and I feel more resources
should be spent in the positive economics of public goods. See
also Negishi (1979, pp. 167 - 203) for my contributions not
collected in this volume.

Part F. Disequilibrium Theory

Essays collected in this part deals with topics called under
various names like microfoundations of Keynesian macroeconomics,
disequilibrium analysis, general disequilibrium theory, fixprice
theory, non-Walrasian economics, and rationed equilibria. Basic
essays of my contributions are Essay 40 (Involuntary
Unemployment and Market Imperfection) and Essay 43 (Existence
of an Underemployment Equilibrium). The model discussed in

these essays is that of a kinked demand curve, which is developed on the basis of the perceived demand curve discussed in Essay 3 in Part A. The reason why a kink is perceived is perhaps explained best in Essay 46 (Foreign Exchange Gains in a Keynesian International Trade Model).

Discussion attached to Essay 41 is an example of criticism given to the disequilibrium analysis from the point of view of the equilibrium theory. My rejoinder to the discussion was given detailedly in Negishi (1979, pp. 237 - 246). The critical issue is whether, for example in Figures 3 and 4, shifts in demand are absorbed by changes in the level of output without the price of the product being affected by them, if firms perceive kinked demand curves. Nevertheless, the discussion was excellent and very useful in suggesting the possibility of alternative approaches.

My contributions are evaluated in such text books and survey or review articles as Blanchard and Fischer (1989, pp. 417, 418), Benassy (1986, p. 245), (1991), Cuddington, Johansson and Löfgren (1984, pp. 40 - 44), Hahn (1977), Malinvaud (1985, p. ix), Reid (1981, pp. 65 - 6) and Silvestre (1989).

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Part A. Classical and Marxian Economics

1. Expenditure Patterns and International Trade in Quesnay's Tableau Economique, R. Sato and T. Negishi, eds., <u>Developments in Japanese Economics</u>, Academic Press, 1989, 85-97

2. The Role of Demand in Adam Smith's Theory of Natural Price, <u>Seoul Journal of Economics</u>, 1(1988), 357-365

3. The Labor Theory of Value in the Ricardian Theory of International Trade, <u>History of Political Economy</u>, 14(1982), 199-210

4. Ricardo and Morishima on Machinery, <u>Journal of the History of Economic Thought</u>, 12(1990), 146-161

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7. On Equilibrium and Disequilibrium, <u>History of Political Economy</u>, 21(1989), 593-600

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12. Studies of von Thünen in Japan, <u>Japan and the World Economy</u>, 2(1990), 199-210

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15. Bertrand's duopoly considered as an Edgeworth's game of exchange, <u>Osaka Economic Papers</u>, 40-3, 4(1991), 55-62.

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17. Wicksell's Missing Equation: A Comment, <u>History of Political Economy</u>, 12(1982), 310-311

18. Wicksell's Missing Equation and Böhm-Bawerk's Three Causes of Interest in a Stationary State, <u>Zeitschrift für Nationalökonomie</u>, 42(1982), 161-174

19. Economic Structure and the Theory of Economic Equilibrium, M. Baranzini and R. Scazzieri eds., <u>The Economic Theory of Structure and Change</u>, Cambridge University Press, 1990, 47-63

20. On the Non-existence of Equilibrium, G. Feiwel ed., <u>Arrow and</u>

the Ascent of Modern Economic Theory, Macmillan, 1987, 361-374

21. Comment, Minisymposium, The History of Economics and the History of Science, History of Political Economy, 24(1992), 227-229.

Introduction to essays collected in Volume II

History of Economics

The essays collected in this volume are concerned with problems of the history of economic theory and economic thoughts. The common feature of these essays is the study of past theories and thoughts in the light of, or from the point of view of, the modern economic theory. Why should we do such studies ?

The answer is obvious, if we follow Lakatos's theory that the history of science has been a history of competing research programs, or if you prefer, paradigms, but it has not been a succession of periods of the monopolies of a single research program. Even a currently hibernating research program can make a trimphal return without changing its core, if some new auxiliary theories are added properly. But, to make such a return possible, however, there must always be some scientists who are seeking to develop it while it is in a state of hibernation. In other words, it is necessary to study theories that are regarded as past ones from the point of view of other research programs (Negishi, 1989, pp. 1-5). Good examples are Sraffa's study of Ricardo and Pasinetti's formulation of a mathematical model of Ricardo's economics, which gave foundations of Neo-Ricardian research program, one of the most active competitors of the mainstream neo-classical research program.

Even those who do not believe in Lakatos, furthermore, cannot but admit that the historical development of economic theories

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is not a unidirectional progression toward the truth and the currently influential theory is not necessarily superior, in every respect, to past theories. In economics it is rather rare that a theory is rejected empirically as a false one by carefully controlled experiments. A new theory often replaces old one simply because the former seems to be more general, or more elegant or simpler than the latter. Such a progress often means sacrificing something old which is not necessarily useless. To make sure that we are going in the right direction, therefore, it is always necessary to see in the mirror of the history whether we have not sacrificed something in error.

To study old theories in the light of modern ones, we often translate old arguments into mathematical models, though they were originally literary or given in terms of numerical examples, at best. This is partly because, as Frisch(1952) admitted, nowadays economists in general are not induced to spend time and trouble discussing problems in theory unless the details of the problems are rigorously formulated in mathematical terms. It cannot be denied that, by studying such mathematical models, we can understand more easily what economists in earlier times really meant, see their historically celebrated and still interesting problems in a new light and solve using modern techniques easily the problems they could not solve by their techniques. But, translation is treason. We must admit that something of the original content is always lost by the mathematical translation of the classical works of past economists. We have to, therefore, study carefully and

critically such mathematical models, by always referring to the content of the original literature.

Part A   Classical and Marxian Economics

Essay 1, Expenditure Patterns and International Trade in Quesnay's Tableau Economique. R. Sato and T. Negishi, eds., Developments in Japanese Economics, Academic Press, 1989, 85-97

   Quesney's Tableau Economique is the first complete description of economic circulation, in which he considered a country where the agriculture is mostly developed, commercial competition prevails and the ownership of private capital in agriculture is guaranteed. It has a long history of interpretations. It is not easy to interpret simple tables of numbers consistently. Besides, there is a problem whether it can explain the physiocratic theory of growth that expenditures on agricultural products make the economy grow while those on manufactured goods not. Essay 1 showed that the recent interpretation to introduce international trade makes it possible to interpret Tableau Economique consistently, but that the possibility of international trade makes the physiocratic theory of growth entirely untenable. Introduction of the large country assumption does not help, since it merely leads to terms of trade arguments that domestic expenditures on the exportables, not necessarily agricultural products, possibly manufactured goods, make the economy grow (Negishi, 1989, p.64).

   Besides Essay 1, I have some other works on pre-Smithian

economists, Locke, Hume and Quesnay, which were not published in English, but they are summarized in Negishi (1989, pp. 31-59).

Essay 2, The Role of Demand in Adam Smith's Theory of Natural Price, Seoul Journal of Economics, 1(1988), 357-365

Natural prices are equilibrium prices which are realized when the suppliers' expectations of demands are correct so that supplies are just equal to demands, while market prices diverge from natural ones and fluctuate around them when suppliers' expectations are not correct. Unlike Ricardo, Adam Smith considered that natural, not market, price of labor is higher in a growing economy than the subsistence level. In view of literature like Hicks (1965, pp. 37-42), Blaug (1985, p. 44), Ekelund-Hébert (1990, p. 115) and Eltis (1975, pp. 437-8), however, Smith's system of natural prices has not been well recognized so far in the profession. In spite of Hicks's statement that Smith was writing before Malthus (1965, p. 39), Smith clearly argued that "the reward of labour must necessarily encourage in such a manner the marriage and multiplication of labourers, as may enable them to supply that continually increasing demand by a continually increasing population" (1776, p. 98).

In this article, we construct a small von-Neumann type balanced growth model and confirm that the ratio of the natural wage to the subsistence wage is equal to the rate of growth, that an increase in the labor productivity increases the rate of growth,

the natural rate of profit and the natural wage, and that an increase in saving ratio increases the rate of growth and the natural wage and decreases the natural rate of profit. In other words, any shift of demand between consumption goods or unproductive labor and productive labor have effects on the relative prices of commodities through its effects on the natural wage and the natural rate of profit. (Incidentally, in this article, page 359, line 19, he footnoted should read he mentioned).

This balanced growth model with constant labor productivity may also represent Malthus's position, since he emphasized the importance of the regulating principle against the limiting principle in his theory of profit and in his defence of Smith against Ricardo on the falling rate of profit. To do justice to his theory of motives to production, however, we have to regard the labor productivity as an increasing function of the rate of profit. Then we may reply to Malthus's problem of the optimal propensity to consume by choosing the saving ratio which maximizes the rate of growth (Negishi, 1993).

Another possible modification is to consider the labor productivity as a function of the level of output. This is either because it is an increasing function of the division of labor, which "is limited by the extent of the market" (Smith 1776, p. 31) or because in agriculture the land is a limiting factor of production. With such a modification, unless effects of division of labor and land are cancelled each other (Negishi,

1989, p. 88), generally it is impossible to consider the balanced growth of output and labor population. While Reid (1987) suggests disequilibrium models, it is still possible to have a system of natural prices, with the rate of growth of output and that of labor population different. Then, it can be easily shown that, given the current level of output and that of population, the ratio of the natural wage to the subsistence wage is equal to the rate of growth of labor, and that an increase in saving ratio increases the rate of growth of labor and the real natural wage and decreases the real natural rate of profit.

Essay 3, The Labor Theory of Value in the Ricardian Theory of International Trade, History of Political Economy, 14(1982), 199-210

I challenged the neo-classical interpretation of Ricardo's famous numerical example of comparative costs that labor is the single factor of production and that the rate of wage which should be at the subsistence level is lower in the advanced country England than in the less advanced Portugal. Since England has more capital and labor relative to land, the marginal labor productivity is lower even if her technology is not less advanced than Portugal's. If England's subsistence level is not lower than Portugal's, furthermore, it is the rate of profit which is lower in England than in Portugal. I also challenged the view that the terms of trade cannot be determined in Ricardo's model unless, as was suggested by J.S. Mill, the reciprocal demands are taken into consideration. Ricardo as a labor value theorist can

determine the international relative price without considering demands, since relative rates of profit are given from the classical implicit assumption of capital mobility through the activity of exporters and importers.

Though Samuelson (1972, p. 679) insisted that economic geography of Ricardo is odd, what is really odd is the interpretation that in the heyday of England's industrial revolution Ricardo had selected Portugal as the superior of England in every respect, having a real per capita GNP greater. Since a lower marginal productivity of labor implies a greater land rent income, there is no contradiction between Ricardo's numerical example of comparative costs and the fact that England had a larger per head GNP. Because you forget the existence of land (Ricardo never did !), Ricardo's numerical examples are interpreted to show the average productivity of labor and are blamed as unrealistic numbers.

Grandolfo (1986, p. 1-24) referred to this essays's argument that Ricardo can determine the terms of trade without having recourse to demand factors, but only by using cost-price relation, i.e., by making use of the classical theory of wages, the rate of profit, and the role of exporters and importers. After careful examination, Grandolfo (1986, p. 1-31) concluded that it will be possible to determine the terms of trade satisfactorily within the context of the Ricardian model, without introducing demand factors, though further studies are necessary on how we can determine the risk premium for foreign investment

(i. e., _a_ in Essay 3). He even admitted, however, it may be simply considered as a historico-institutional datum, like the level of subsistence wages.

Burgstaller(1986), who also referred to Essay 3, considered Ricardo's numerical example at the stationary solution of a two country version of Pasinetti(1969)'s Ricardo model and pointed out that the terms of trade can be determined independently from demands. The difference is that the rates of profit are exogenously given in Burgstaller(1986) at the stationary state with no capital accumulation, while they are endogenously determined in Essay 3 at what Pasinetti(1960) calls natural equilibrium in Which population is stationary but capital is not. To limit the consideration of comparative costs only to the stationary state is to make the story unnecessarily uninteresting. For example, it is then impossible to argue, like Ricardo, that the rate of profit is not affected by the foreign trade, unless cheaper wages goods are being imported.

The lesson from this study on Ricardo's theory of comparative costs is that the study of the classical theory from the point of view of modern theory should not be a cutting or stretching of the former theory in a Procrustean Bed of the latter theory. I should be a mirror in which the modern theory can find the importance of what it forget to succeed from the former, in this case, the role of exporters and importers in international trade and investment. One example of how to learn this lesson was given in Essay 46 in Volume I.

This article was developed from my review of Morishima's <u>Ricardo's Economics</u>, although the latter was published later than the former. "<u>Ricardo's Economics</u> is the newest version of Morishima's economics. · · · · As a book on Ricardo himself, furthermore, the book is also highly worth reading since the author grasped the essence of Ricardo firmly and suggested several new and useful interpretations of Ricardo, which mediocre historians of economic thoughts could never image. · · · · This does not mean, however, that the author is always right in his new interpretations of Ricardo. An example of such possible misinterpretation is perhaps the case of Ricardo's famous chapter on machinery" (Negishi 1991). I think that Morishima considered his own problem which is different from the one Ricardo had in mind. Nevertheless, I am highly grateful to Morishima for letting me pay attention to Ricardo's numerical examples, behind which Ricardo intuitively worked out general equilibrium problems beautifully.

Perhaps I may take advantage of this occasion to make a following change in the article: <u>production of the raw materials</u> should read <u>gross products</u> in page 155, line 19 up. This is a part of my quotation from Mangoldt, which I did originally in German, since I thought readers of a journal of the history of economic thoughts can, at least, read German. An editorial staff of the journal was, however, kind enough to translate it into

English but unfortunately I was not informed of it before publication. German <u>Roherzeugnisse</u> can be translated in most cases as production of the raw materials, but in this context it should be gross products, which is related to the demand for labor. German <u>Roh</u> has the meaning of gross as well as raw, crude, etc. The editor of the journal was kind enough to publish a note of correction in one of the subsequent issues (Vol. 15, 1993, p. 173). You might think that it is a very minor point for my article. In the western world, perhaps you are right. In Japan, however, where translation has been regarded as the jobs for qualified scholars, such a mistranslation is considered as a shame. Many scholars have been discredited by mistranslations. This is why for the above correction.

<u>Essay 5</u>, Comments on Ekelund - Mill's Recantation of the Wages Fund -, <u>Oxford Economic Papers</u>, 37(1985), 148-151

While the long-run wage theory of classical economics is that of the natural wage, i.e., the subsistence wage adjusted by the rate of growth, its short-run wage theory is the wages fund doctrine to explain market wages. Wages fund doctrine is also the essence of the classical theory of capital, as we can see in Ricardo's consideration of the machinery problem and his theory of economic growth (Pasinetti, 1960, Findlay, 1974). In Mill's <u>Principles</u>, we can confirm this, i.e., "Demand for commodities is not demand for labor," and wages "depend mainly upon the demand and supply of labor; or, as it is often expressed, on proportion between population and capital" (Mill, 1848, pp. 79,

343). Mill(1869), however, recanted this corner stone of classical economics. It is generally believed that it shook the foundations of classical theoretical system and is an important factor in explaining the decline and fall of classical economics (Ekelund-Hébert, 1990, pp. 190, 197).

If it is so, we should consider under what conditions we can find "the wage-fund doctrine, properly stated, not 'wrong' logically" (Schumpeter, 1954, p. 669) and which of such conditions is abandoned by Mill in his recantation. A set of assumptions which are sufficient conditions for the unitary elasticity of demand curve for labor is given by Ekelund(1976)'s short-run model of wages fund. Two assumptions which may be called, respectively, the annual harvest assumption and the wage good assumption are most important necessary conditions for the unitary elasticity of labor demand and it is the latter assumption which was abandoned by Mill in his recantation to admit that the elasticity may be zero.

Since these two statements are given in this essay as comments on Ekelund(1976), however, there is a reply to them from Ekelund(1985).

As for the first point that the annual harvest assumption is made not necessary for wages fund doctrine by Ekelund (1976, p. 74), Ekelund(1985) replied that it was made clear in p. 79 of his original paper(1976), where he clearly stated that harvest discontinuity is not required for the short-run determinacy of

a wages fund. If harvest (output) is continuous and there is a finite period of production, however, input is also continuous. Then, as I showed in my essay, wages fund cannot be predetermined, since capitalists may let a part of their capital be idle when the rate of wage is high.

Ekelund(1985) seems to admit the second point that Mill's recantation of the wages fund doctrine may have stemmed from abandonment of the wage good assumption. But he still insists what is more likely is that it stemmed from "a failure to work out and utilize the full ramifications of the classical dichotomy." He is right if the wages good assumption was not abandoned. What seems most likely is, however, Mill abandoned the assumption and utilized the dichotomy of real and monetary economies skillfully to discuss in monetary terms the allocation of real funds.

It might be argued that the annual harvest assumption and the wage good assumption, prerequisites for the predetermined wages fund, are not very unrealistic in a certain stage of economy where agriculture is predominant and the rate of wage is at a level not far from that of subsistence. It might also be argued that these assumptions have lost their relevancy as the economy developed, so that manufactures predominate agriculture, agriculture itself is highly artificialized, and distinct consumption patterns between classes are not observed. Wages fund doctrine surely played some historical roles, but now it almost played them out.

In his recantation, Mill not only denied the predetermined wages fund but also argued that the rate of wage may be indeterminate. This is a strong case "in which there is nothing to restrain competition; no hindrance to it either in the nature of the case or in artificial obstacles; yet in which the result is not determined by competition, but by custom or usage; competition ・・・・・ producing its effect in quite a different manner from that which is ordinarily assumed to be natural to it" (Mill, 1848, p. 239). The wage once raised by a well-organized strike remains unchanged even if laborers returned thereafter to competitive suppliers. The wage changed exogenerously is supported by endogenous decisions of competitive demanders and suppliers.

Essay 6, Thornton's Criticism of Equilibrium Theory and Mill, History of Political Economy, 18(1986), 567-577

Essay 7, On Equilibrium and Disequilibrium, History of Political Economy, 21(1989), 593-600

Essay 8, F.D. Longe and Refutation of Classical Theory of Capital, Revue d'économie politique, 102(1992), 915-924

Mill's recantation of the wages fund doctrine constitutes one of the most difficult problem in the history of economics, since he did not revise his Principles in this respect, after he recanted the doctrine in his review (Mill, 1869) of a book of Thornton, On Labour (1869). Thornton attacked the equilibrium theory in general and the wages fund doctrine in particular, by using several examples. In his recantation, Mill interpreted one

of such examples that demand cannot be increased by the reduction of the price so that there is no unique equilibrium price which equate demand with the given supply. Mill admitted that such a case may be conceivable in labor market, and wages fund doctrine is wrong, as we discussed in Essay 5.

In Essay 6, we tried to solve the question why Mill left the doctrine of wages fund unchanged in his 1871 edition of his Principles, by referring to a hitherto unnoticed fact that, in the second edition of his On Labour (1870), Thornton denied Mill's interpretation of his example in 1969. Thornton did not assume an inelastic demand in his example and insisted not the possibility of the interminancy of equilibrium price but the fact that the bulk of the goods is sold at disequilibrium prices. Certainly Mill recognized in 1871 that his interpretation of Thornton's example on which his recantation in 1869 was based was wrong and that Thornton's attack on equilibrium theory was based on the possibility of trades carried out at disequilibrium prices. While Mill was ready to admit the possibility of multiple equilibria and to deny the validity of the classical doctrine of wages fund in 1869, it is impossible for Mill the equilibrium theorist to accept Thornton's disequilibrium theory, since the latter is a theory of an entirely different paradigm, which was still unmatured as was pointed out in the preface to 1871 edition of Mill's Principles (Mill, 1871, p. xciv).

This essay seems to have succeed, at least, to remind the profession that Mill, in the 1871 edition of the Principles,

retracted some of his earlier enthusiasm for Thornton, in effect rejected the idea that disequilibrium trades in any way undermine the importance of the principle of the equality of demand and supply, and cautioned that it was too early to adduce any firm conclusions from the discussion engendered by Thornton's book (de Marchi, 1988, p. 157).

Essay 7 is my reply to comments of Ekelund-Thommesen(1989) on my disequilibrium interpretations of Thornton in Essay 5.

After all, how should have John S. Mill the equilibrium economist replied to W.T. Thornton the disequilibrium economist, who argued that the equilibrium theory is a truth of small significance since it does not explain disequilibrium prices at which the bulk of the goods offered for sale are actually sold ? J.S. Mill the classical economists could not but express his hope that only a small portion of goods may be sold at disequilibrium. After the marginal revolution, however, we can reply to Thornton that the equilibrium theory is of great significance even if only a small portion of goods are sold at the equilibrium price which is finally established after the bulk of goods are sold at disequilibrium. This is because the marginal rates of substitution are equalized among buyers and sellers through such trades at equilibrium price so that a Pareto efficient allocation of goods is established. The effect of disequilibrium transactions is limited to changes in income distribution among buyers and sellers.

As a matter of fact, it was Longe(1866) who was the first to refute wages fund theory, though he was ignored by both Thornton and Mill. In Essay 8, we found that Longe refuted not only wages fund theory, but also the essence of the classical theory of capital that wages must be advanced by capitalists. It is no wonder that the name of Longe was not mentioned by Thornton and J.S. Mill. They never dreamed to deny the existence of the wages fund itself. Whether it is a fixed fund or not was their concern. In this respect, Longe is the predecessor not to Thornton, but to Walras (Eagly, 1974, pp. 7-8).

Essay 9, Marx and Böhm-Bawerk in the Theory of Interest, Economie et Societes 14(1980), 287-304

Essay 10, Marx and Böhm-Bawerk, Economic Studies Quarterly, 37(1986), 2-10

Essay 11, Samuelson, Saigal and Emmanuel's Theory of International Unequal Exchange, Shri Bhagwan Dahiya ed., Theoretical Foundations of Development Planning, 4, Concept, 1991, 37-49.

Although a western economist can proudly insist that "without Marx economic theory would be as it is now" (Krelle, 1991), Marx is still an important figure in Japan where Marxian economics is the strongest competitor of the neo-classical economics. As a non-Marxian economist, I feel I have to explain why I cannot accept Marx, at the same time I am willing and ready to learn from my Marxian colleagues if possible.

Essay 9 is the oldest one collected in this volume. Here "interest" should be understood rather as profit, since it is the translation of German word Kapitalzins. The crux of Marxian economics is to explore the social relation between those who exploit and those who are exploited. Marx's theory does not, however, make sense so far as it is concerned with the exploitation of labor by capital, since, as was pointed out by Böhm-Bawerk, it is based on an unwarranted supposition that the embodied labor value of an output can be compared with that of an input without any discounting, even though they are located at different timed. Unless labor is mobile through time, larger value of output in terms of labor in the future compared with smaller labor value of wages paid in the past does not necessarily imply that those who advanced wage costs exploit wage earners.

Marx also argued, however, that a rich country exploits a poor one through the exchange of one day's labor of the former and three days' labor of the latter. As is argued in the first half of Essay 10, this argument of Marx does make sense, even though labor is not mobile internationally, since in Marxian economics labor is an intermediate good produced by the consumption of consumers' goods, which are, directory or indirectly, mobile internationally, so that we can compare labors of different countries. As for the second half of Essay 10, which is concerned with Böhm-Bawerk's theory of interest, see the explanation of Essay 18 below.

According to Marx's plan of economics, <u>Das Kapital</u> he left us covers only a small part of the first part of the plan, and many important problems including that of international trade are located in the second part of the plan and left to be done by his successors. In view of the north-south economic relations of the present world, what is most interesting to us may perhaps be the problem of international value, which is the foundation of Marxian theory of international trade and international exploitation. Essay 11 is a critical review of some of recent theories of international trade of neo-Marxian economics, a competing research paradigm of neo-classical economics.

As for Marx, I have several other points which I discussed in my essays written in Japanese. They are (1) the dichotomy between Volume I and Volume III of <u>Das Kapital</u>, (2) the falling rate of profit, and (3) market values, which are summarized in Negishi (1989, pp. 213-237).

Part B Marginal Revolution and After

<u>Essay 12</u>, Studies of von Thünen in Japan, <u>Japan and the World Economy</u>, 2(1990), 199-210

It is difficult to decide whether this essay should be placed in Part A, or Part B of this volume. Von Thünen is, of course, a pioneer of the marginal revolution, who first utilized the concept of marginal productivity extensively in his writings. He is, however, a very faithful follower of Adam Smith in all

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other respects. This essay surveyed studies of von Thünen in Japan and proved his famous formula of the natural wage (the geometric mean of the marginal productivity of labor and the subsistence wage). The lesson from this essay is that it is difficult to understand von Thünen fully unless one notes firmly that von Thünen is basically a classical economist. It is no wonder that one fails to derive the natural wage formula as the optimal wage in the sense of neo-classical economics.

Essay 13, A Note on Jevons's Law of Indifference and Competitive Equilibrium, Manchester School, 50(1982), 220-230

Essay 14, Competition and the Number of Participants - Lessons of Edgeworth's Theorem -, G. Feiwel ed., The Economics of Imperfect Competition and Employment; Joan Robinson and Beyond, Macmillan, 1989, 212-224

Essay 15, Bertrand's duopoly considered as an Edgeworth's game of exchange, Osaka Economic Papers, 40-3, 4(1991), 55-62.

These three essays are studies based on a famous theorem of Edgeworth. As is emphasized in Essay 13, the Jevons's view of market equilibrium is quite different from that of Cournot and Walras, though the outcome is shown to be equivalent by Edgeworth in the case of a large economy where the number of participants are infinitely large. While Cournot and Walras presuppose the existence of a single market price for each single commodity and consider the equality of supply and demand as the equilibrium condition, it is the law of indifference (one price for one commodity) that plays the role of the equilibrium condition for

Jevons and Edgeworth. Demand equals supply trivially, since the quantity of a commodity given by a person A is equal to the quantity received by another person B. From a point of view of emphasizing the significance of the law of indifference, a slight attempt is made to extend the Edgeworth's theorem.

Essay 14 and 15 considered the possibility of a duopoly model which is different from Cournot's model. In the latter model, only firms are active players of the game and consumers are passive as a part of the environment of the game. Edgeworth's theorem can be applied if not only two firms but also infinitely many consumers are active players of the game of exchange. It is shown in Essay 14 that such a game can be considered as the so-called Bertrand's duopoly, though recently Magnan de Bornier(1992) objected to call such a duopoly as Bertrand's.

Essay 16, Non-Walrasian Foundations of Macroeconomics, G. Feiwel ed., Issues in Contemporary Macroeconomics and Distribution, Macmillan, 1985. 169-183

One might wonder why this essay is not placed in Part F of Volume I, judging from the title of the essay. The reason why it is here is that it contains my study of Menger as one of the first non-Walrasian economists. Menger's theory of the marketability of commodities is a first attempt at non-Walrasian economics. While Walras assumed well organized markets where all commodities have high marketability, Menger considered theory of commodity for which the market is poorly organized and for which

marketability is not high. From the point of view of the short-side principle, it may be said that a commodity is highly marketable when its suppliers are on the short-side of the relevant market and it is not so marketable when they are on the long-side of the market. Menger explains the origin of money on the basis of his theory of the marketability of commodities. Money is the commodity which has the highest marketability. It is no wonder the role of money is limited in Walrasian economics, since money as a medium of exchange presuppose the low marketability of other commodities. This confirms the conclusion of Essay 19 and Essay 47 of Volume I.

Essay 17, Wicksell's Missing Equation : A Comment, History of Political Economy, 12(1982), 310-311

Essay 18, Wicksell's Missing Equation and Böhm-Bawerk's Three Causes of Interest in a Stationary State, Zeitschrift fur Nationalökonomie, 42(1982), 161-174

Wicksell, following Böhm-Bawerk, developed a stationary state model in which the existence of a positive rate of interest is explained by the marginal productivity of the period of production. In such a one-sided productivity model, however, there is one equation missing. Sandelin(1980) suggested that the model can be made closed by the introduction of a variable return production function. As was pointed out in Negishi (1985, p.104), however, there must be an implicit factor of production besides labor, say, land, if the production function is not linear with respect to labor. Because of a new unknown variable,

say, land rent, then, an equation is still missing. Essay 17 is a comment on Sandelin(1990) and argues that such an equation should be supplied from a theory of saving behavior.

A recent challenge to the missing equation problem is Kompas(1992, pp. 13, 92) who insists that Wicksell "recognized the need and set out the required conditions, in terms of saving behavior or intertemporal preferences, to close all of his systems of equations properly," against the common "belief that Wicksell treats the aggregate value of capital as a datum." Even so, however, as Kompas (1992, pp. 137, 154) himself admitted, Wicksell (1934, p. 209-18) could not make the rate of interest positive in a stationary economy, since he considered the second ground of Böhm-Bawerk as inappropriate in a stationary economy. In other words, in spite of Kompas, we can still say that an equation is missing in Wicksell's model of a stationary economy, which closes the model so as to make the rate of interest positive.

Essay 18 argued that the missing equation should be supplied by the consideration of the first cause among Böhm-Bawerk's three causes of interest and showed the possibility of the positive interest by the use of a stationary two-period life-cycle model in which younger savers can have larger consumptions when they are old. In the case of such a circulating capital model as the one used in this essay, however, we have to assume stringent conditions on the relation between the period of production and the life span of individuals, and on the pattern of consumptions

of individuals. While a more roundabout method of production implies a longer period of production in the circulating capital model, it implies, among others, a higher capital-labor-ratio in the case of fixed capitals, as in Böhm-Bawerk's examples of the use of a boat and net in fishing and of a sewing machine in tailoring. The fixed capital model used in the second half of Essay 9 in above, therefore, needs less stringent assumptions to explain the positive interest by the first cause, since not the durability of capital alone is related to the round about method of production.

Essay 19, Economic Structure and the Theory of Economic Equilibrium, M. Baranzini and R. Scazzieri eds., The Economic Theory of Structure and Change, Cambridge University Press, 1990, 47-63

The neo-classical economic theory that is currently predominant should, to be precise, be referred to as Walrasian or neo-Walrasian economic theory, to distinguish it from the Marshallian tradition that was originally designated neo-classical economics. Though Walrasian and Marshallian approaches are different in many respects, they share an identical view of market against Jevons-Edgeworth approach.

Essay 19 is a comparative study of structures of equilibrium theory of Walras, Marshall and Edgeworth. While the comparison of Walras and Marshall follows the standard view, our original view on Marshall's equilibrium of industry with disequilibrium

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firms is emphasized through the construction of life-cycle theory of firms. It also emphasizes the difference in the communication structure between Walras-Marshall model of non-cooperative market games and Jevons-Edgeworth model of cooperative market games.

As for Marshall, I have an article on Marshallian tax-bounty policies which cannot be included in this volume, since its publication in a festschrift is being delayed. Marshall's proposition is that diminishing returns industries should be taxed and increasing returns industries should be subsidized. It has been misunderstood by modern scholars that Marshall forgot to consider the changes in producers' surplus. This is partly due to their failure to see that variable returns are considered by Marshall to be caused by external economies and diseconomies and to their confusion of particular expenses curve and supply curve, which Marshall correctly made distinction of.

Essay 20, On the Non-existence of Equilibrium : from Thornton to Arrow, G. Feiwel ed., Arrow and the Ascent of Modern Economic Theory, Macmillan, 1987, 361-374

This essay plays the role of a bridge between two volumes of collections of my essays. It reviews the other side of the history of the problem of the existence of an equilibrium, the problem which some essays in Part A of Volume I are concerned. Thornton, whose attack on equilibrium theory was discussed in Essay 6 and 7, gave also some examples of the case where no equilibrium of demand and supply is possible. Arrow plays, of

course, the central role in the modern proofs of the existence of a general equilibrium. Arrows' comment on this essay is as follows.

"Negishi offers a small but important history of examples of non-existence of equilibrium going back to W.T. Thornton, in 1869. Thornton, as is well known, had a great influence on John Stuart Mill in one of his last essays. The examples are, of course, all characterized by discontinuous demand curve; as is well known, continuous demand and supply curves, with Walras' law, must inevitably lead to the existence of equilibrium. Negishi has an interesting wrinkle: he points out that exchange out of equilibrium can frequently converge to a determinate conclusion which nevertheless is not an equilibrium in the strict sense" (Feiwel, 1987, p. 685).

Essay 21, Comment, Minisymposium, The History of Economics and the History of Science, History of Political Economy, 24(1992), 227-229.

This is a comment in a symposium on Schabas(1992) who insists that historians of economics should break free from economics and belong to history of science in general. The point is, I think, the history of economics should be studied by both historians of sciences and economic theorists.

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