



MICHIO MORISHIMA

Dorothy Hahn

Michio Morishima

1923–2004

MICHIO MORISHIMA was one of the most distinguished economic theorists of his generation. He taught in Japan at Kyoto and Osaka Universities and in the UK at the University of Essex and the London School of Economics where he spent the last thirty-four years of his very creative life. He was a Visiting Professor at the University of Essex 1968–9 and the Keynes Visiting Professor there 1969–70 and Professor of Economics, later the John Hicks Professor of Economics at the LSE. He was a Senior Visiting Fellow at All Souls College, Oxford, where his friend and mentor Sir John Hicks, FBA was the Drummond Professor of Political Economy. He also held a visiting position at the University of Siena in Italy for nearly thirty years from 1970. He was elected Foreign Honorary Member of the American Academy of Arts and Sciences (1975) and of the American Economic Association (1979).

Michio Morishima was born in Osaka on 18 July 1923, the son of Kameji and Tatsuo Morishima. He grew up in Kobe and during his teens would visit his parents in Beijing where his father worked in the airline sector. He joined Kyoto University where he read as an undergraduate, as an act of defiance against the then prevailing anti-British hysteria in Japan, Hicks's *Value and Capital*, the seminal book on economic theory published in 1939. He was conscripted into the Imperial Navy in 1943 but due to his shortsightedness was employed in wireless operations and code breaking. He continued his study of mathematics while in the Imperial Navy. He graduated from Kyoto in 1946, where he continued to teach and had a grant to pursue research. His report for the research grant was an innovative extension of some ideas in Hicks's classic work but did not appear in an English translation until well after his reputation was

established as a leading economic theorist in the West as much as in Japan. He began to publish articles from his thesis in leading English language journals in the 1950s.

From Kyoto he moved as an Assistant Professor to Osaka, whence he had the opportunity to visit Oxford on a Rockefeller Foundation grant in 1956 and meet his mentor John Hicks. Michio and his wife Yoko, whom he married in 1954, travelled by boat, that being his preferred mode of travel and spent a year at All Souls College where Hicks was a Fellow and the Drummond Professor of Political Economy. He visited Oxford again in 1963–4. His impatience with the conservatism of his Japanese colleagues and his love of Britain brought him to the University of Essex in 1968 as the Keynes Visiting Professor. He moved to the London School of Economics in 1970 and taught there till 1984 as Professor of Economics and then as the Sir John Hicks Professor of Economics 1984–8. He was awarded the Order of Culture (Bunka Kunsho) of Japan by the Emperor in 1976, the Fellowship of the British Academy in 1981 and an Honorary Fellowship of the LSE upon his retirement in recognition of his many contributions to the School. He was awarded honorary doctorates from the universities of Paris, X (1988), Siena (1991) and London (1995).

Morishima remained engaged with matters Japanese throughout his life, writing prolifically in Japanese on current issues. He also wrote *Why Has Japan 'Succeeded'?* in 1982 and then *Japan at a Deadlock* in 2000. His textbook for undergraduate economics, *The Economic Theory of Modern Society* (1976), was unlike any other economics textbook since it took a broad sociological and political as well as economic approach to the subject. He made it the basis of a very successful first-year undergraduate course he taught for many years at the LSE. Despite his insistence on rigour even at that level and his own way with the English language, undergraduates took to him. At a student Rag Festival, Morishima received thunderous applause when he rendered 'What Shall we Do with the Drunken Sailor?' all dressed up in a sailor's shirt and torn trousers, a pirate's patch across one eye and cutlass in hand. In each year he taught the course the students specially asked him to join in, and he was happy to play along.

Morishima was not just a distinguished economic theorist but he was also a research entrepreneur at a time when such a label would have been laughed at in academia. His role in directing the Institute of Economic and Social Research at the University of Osaka made it a world-class institution. At the LSE he was the pivotal fund raiser and creative brain behind the Suntory Toyota International Centre for Economics and Related Disciplines (STICERD). The grant of £2 million to the LSE by

the Japanese corporations Suntory and Toyota represented the first major donation any Japanese company had made abroad and it was at Morishima's behest that it came about. As a winner of the Emperor's Order of Culture, the highest civilian honour Japan confers on its citizens, he was able to seek an appointment with the Japanese Prime Minister while the latter was in London for a summit. Morishima argued that Japan's economic success had not been matched by a rise in international respect for the Japanese because the Japanese had not done what rich countries were meant to do—donate money abroad for charitable purposes. In the event, it was again Morishima who was able to persuade his school friend and the head of Toyota, Mr Saji, to make a contribution. He was willing, but did not want to be the sole donor. The cooperation of Suntory was soon forthcoming, and the result was the Suntory Toyota Centre. But it almost did not happen since the recipients at the LSE had their own suspicions of all this foreign business money invading British universities. Morishima had to be at his persuasive best in the LSE Academic Board to reassure his colleagues that there was no hidden agenda behind the donation. It was genuinely for research. That bit about 'related disciplines' was designed to placate the suspicions of his non-economics colleagues at the LSE that yet again the economists were going to aggrandise themselves. STICERD has proved an immensely useful resource for all social sciences at the LSE, and will remain the best memorial to Morishima's many talents as a researcher, persuader and a cultural ambassador for his home country.

Morishima was among the first generation of Japanese economists whose work became accepted in the international economics fraternity. Japan has a long tradition of economic thought which drew upon diverse Western sources such as the German Historical School, Marxism and classical political economy and neoclassical economics. But few Japanese economists wrote in English, and before the Second World War only Shigeto Tsuru, who had studied at Harvard, had gained international prominence. Post-war Japan saw well-trained Japanese economists ready and able to make a foray into the international arena. It was easier for these economists to communicate in the common language of mathematics with their fellow economists. An earlier era, when a lack of English language proficiency would have put the non-English-speaking economist at a disadvantage, was rapidly yielding to a phase where economic theorising had to be done in a mathematical idiom since rigorous arguments were difficult otherwise. It was Morishima's mentor Sir John Hicks along with Paul Samuelson who were the twin pioneers of this transformation in the mode of economic

theorising. Hicks's *Value and Capital* (1939, 1945) and Samuelson's *Foundations of Economic Analysis* (1947) heralded this approach.

The Econometric Society had been established in 1931 as an international society for the statistical and mathematical study of economics and its international meetings around the world became a forum for young economists of various nationalities to display their wares in a polyglot environment where everyone spoke algebra. Ichimura, Nikaido, Inada, Uzawa, Negishi were soon names among the speakers at such assemblies. Morishima was far and away the most prominent among them and became the first Japanese to be the President of the Econometric Society in 1965.

After his retirement from the LSE in 1988 he continued to play an active part in the research life of STICERD and continued to publish. In 1992 he published *Capital and Credit* which is the capping stone of his life's work and then in 1996 he published an English translation of his 1950 Ph.D. work as *Dynamic Economic Theory*, thus bringing his life's work into a closed circle. He wrote his book *Japan in a Deadlock* in 2000 to account for the change in Japanese fortunes. He died, aged 80, on 13 July 2004, leaving behind his wife Yoko and two sons and a daughter.

Contributions to economic theory

Introduction

Morishima's contributions to economic theory were many. He contributed to the areas of value theory, in particular the existence of equilibrium and stability, both static and dynamic; macroeconomic theory of growth and the theory of money and capital. It is rare for any one person to have attempted research in all these diverse areas but in Morishima's work there was also an underlying architecture which put his seemingly diverse contributions into an overall framework. It was a very ambitious research programme that he undertook and he came close to achieving it completely. To put this in context, one needs to understand the circumstances in which theorising was being carried out in the post-war period.

During the inter-war period, economics had undergone two major revolutions. One was the Keynesian Revolution wherein Lord Keynes had offered a general theory of the determination of aggregate output and employment along with a policy toolkit to prevent the recurrence of mass unemployment. The other revolution was the systematisation and analytical proof of the theory of general equilibrium of Leon Walras. Walras

had sketched the theory in his *Elements of Pure Economics*, published in 1874 (final and fourth edition in 1926), but a rigorous proof had been lacking. During the inter-war period, first the Swedish economist Gustav Cassel and then the German statistician Abraham Wald had offered rigorous proofs of the proposition that the markets for myriad commodities and services could be simultaneously in a market clearing equilibrium without the intervention of any outside agencies.

There were, however, many ruptures and fissures despite, and in some cases because of, these twin revolutions. A major rupture was the one between the classical—Adam Smith/David Ricardo—political economy which was founded on a Labour Theory of Value and whose orientation was economic growth and capital accumulation and the neoclassical theory of resource allocation in a static or steadily growing economy, inaugurated simultaneously by Carl Menger of Vienna, Stanley Jevons of Manchester and Leon Walras of Lausanne. The Labour Theory of Value had difficulty accommodating the influence of pure scarcity—non-reproducible commodities—on the value of a good, and, more seriously, of the contribution of durable capital to the formation of value. Capital, even when produced with previous labour inputs, could not be reduced to dated labour inputs in any simple fashion. There had to be a discounting/compounding role for the rate of interest. Thus the value of any commodity was determined not by the total labour embodied in it (as the simple classical model would have it) but also by the time pattern of the inputs and a rate of interest, which in its turn could not be explained by a Labour Theory of Value. This lacuna was important because it also raised the question of the relative contribution of labour and machinery (capital) in generating profits. Marx had attempted an explanation of profit based solely on the contribution of living labour and the surplus extraction process, which he claimed was unique to capitalism. But if dated labour was as important as living labour and the interest factor entered the determination of value crucially, profits could be as much due to machinery and its productivity as due to labour. There was also an unanswered question as to what explained the rate of interest. There was a technical as well as a moral/political issue here as to the origin and justification of profits.

Neoclassical theory proposed a marginalist calculus based on the utility of consumption and the opportunity cost of inputs expended to generate an explanation of value. It had no problem in explaining the value of rare objects. Its model of competitive equilibrium also eliminated profit as a separate category of income. In equilibrium there were zero

profits. Capital inputs were just like labour inputs and their reward was determined by their marginal productivity. There was no surplus value and no exploitation. An elaborate explanation of interest rates was given by the Austrian economist Eugen von Bohm-Bawerk in terms of a theory of productivity based on the 'roundaboutness of the process of production'. Thus the longer the time between initial input and final output, the longer that is 'the period of production', the more productive the process. But such processes could only be sustained by voluntary savings which released the resources required for the investment over the period during which no output appeared. The abundance of savings assured a low interest rate. The willingness of people to forgo immediate consumption had to be rewarded by the payment of interest on their savings. Productivity and the willingness to wait thus explained the role of interest rates.

This happy picture was, however, abstracted from trade depressions and business cycles, from the problems created by credit booms and busts and by the periodic bouts of rising and falling prices. Price inflation and deflation were explained solely at the aggregate level by the quantity of money; there was no micro theory of money nor did money seem to play any role in production or consumption in the neoclassical theory. Attempts to link credit growth and cycles were made by the Swedish economist Knut Wicksell and the Austrian economist Joseph Schumpeter. Wicksell traced the cyclical processes to the divergence between the money rate of interest at which firms could borrow and banks lend and the natural rate of interest which determined the basic profitability of investment. (Friedrich Hayek noted that the natural rate of interest was a surrogate name for the rate of profit since Marxist polemics had given profitability a bad name.) Schumpeter posited long cycles caused by innovations which permanently changed conditions of production by the introduction of a new product or process, e.g. railroads, which in their turn brought in imitators and by-products which created a boom and bust cycle of around fifty years.

Neither Wicksell nor Schumpeter dealt with the problem of the durability of capital. Capital generated a stream of income by its productivity. It eventually depreciated and had to be scrapped. The value of capital is merely the discounted sum of its prospective income stream. Yet the valuation of capital as it aged during the process of production required some arbitrary assumption as to how its productivity declined. This was also the case if a new invention made a piece of capital obsolete during its physical life. Only in a static world with no uncertainty could one predict the life time of a capital asset, its income stream and hence its value. Away from this, the valuation of old second-hand capital caused problems.

Karl Menger, the mathematician son of the economist Carl Menger, ran a seminar at the University of Vienna in the 1930s. It was at this seminar that Abraham Wald gave the solution to the problem of the existence of equilibrium in the Walrasian model of multiple markets. He allowed for prices to be non-negative rather than strictly positive and then applied a fixed point theorem to prove existence. A more significant paper was by J. von Neumann in which he posed the problem of growth in a multiple good economy in terms of linear equations. He treated capital goods as time dated and so a one-year old machine could be different from a two-year old machine; indeed a two-year old machine is part of the output of a process in which the one-year old machine along with labour and raw materials produces some output. This notion of joint production completely solved the problem of valuing durable capital by replacing a durable capital good by its sequence of time dated activities. The dual to the quantitative input output equations were the price cost equations. Von Neumann proved that an equilibrium growth rate of the primal problem matched the equilibrium profit rate of its dual.

Von Neumann's paper was not translated into English till 1945 but it had a profound effect on theorists, especially on Morishima. Wald's paper was also revived only in the post-war period. Before that John Hicks had tried in his *Value and Capital* to introduce English-reading economists to the Walrasian model. Hicks synthesised the Marshallian partial equilibrium theory of consumers with the Walrasian theory of multiple markets and went on to speculate on dynamics as well. It was to be profoundly influential for the post-war generation of economists.

Morishima's economic writings

It is against this general background of developments in economic theory that we can look at Morishima's contribution. I shall refer below to Morishima's research programme in the Lakatos sense.¹ Unlike many other economists, Morishima's lifetime work is designed around an architectural blueprint which is clear from the early days of his published work (those in Japanese, as *Dogakuteki Keizai Riron (DKR)*, later translated into English as *Dynamic Economic Theory (DET)*, 1950/1996.² (I shall refer to *DET* as an early work although it is the last to be published in

¹ Lakatos' idea of a Scientific Research Programme is discussed in I. Lakatos and A. Musgrave (eds.), *Methodology of Scientific Research Programmes* (Cambridge, 1970).

² Morishima's writings will be referred to by date of publication alone. See the list of them at the end of this memoir.

English thus far. It is very formative in the Morishima Research Programme.) In a sense it is a work of breathtaking scope not attempted during this century by many other economists. The work encompasses general equilibrium theory (Hicks's *Value and Capital* style) with heterogeneous capital, growth and money, much of it covered in the framework of a von Neumann linear technology. Along the way Morishima tried to include within his framework the economics of Ricardo, Marx, Walras and Keynes. These are not separate works; they are part of a coherent attempt to tackle one of the most intractable problems in economic theory, namely the construction of an adequate theory of a dynamic growing economy with heterogeneous capital and money as well as credit or, to put it another way, a theory of how the capitalist economy works.

Few have attempted this task. Marx in the nineteenth century was the first such economist. Walras did not deal with dynamics, except in some pregnant but not fully worked out remarks in the concluding chapters of his classic work, or with heterogeneous capital. Hayek was the first among the twentieth-century economists to attempt this. Hicks, Morishima's hero, was another. In his own special way, Paul Samuelson has done this, though scattered across a large number of papers rather than in books. Robert Lucas is another contemporary economic theorist who can be said to have consciously tried to emulate Hayek, though he has stayed clear of heterogeneous capital.

In what follows I shall first outline Morishima's writings in their chronological order and then pick up the central lineaments of the underlying architecture which in my view makes Morishima's work a research programme.

Morishima's first book was his thesis and this was published in Japanese in 1950 (*DKR*) and translated into English only in 1996 as *DET*. This is itself a bold and innovative piece of work, typical of a confident and talented 26 year-old. It is a project of 'the mathematization of *Value and Capital*'. It is concerned mainly with deriving the stability conditions for a tatonnement process with competition and no false trading (for the non-economist, tatonnement is the process of price fixing by higgling). Morishima does this for a linear and a non-linear case. He then goes on to discuss dynamic stability conditions. Along the way there is a running subordinate theme of a theory of money and the comparison of the loanable funds and the liquidity preference theories of interest. In several places, Morishima corrects his hero Hicks and derives more rigorous results. Chronologically this book belongs to the same generation of books as *Value and Capital* (second edition of 1946) and Samuelson's *Foundations of*

Economic Analysis (1948). It is mathematically advanced and theoretically sophisticated. Had it appeared in English in the early 1950s, it would have saved a lot of work which replicated Morishima's results.

Some of the results of *DET* were published in *Econometrica* and in the *Review of Economic Studies* (1952; 1957). But it was the publication of *Equilibrium, Stability and Growth (ESG)* in 1964 that brought Morishima's name to a much wider audience. By 1964, Morishima had added to his earlier heroes—Marx, Walras and Hicks, the name of J. von Neumann. Von Neumann's work on growth was to be the grammar of Morishima's work in the next two decades. All the major themes come together in this book. Linear production systems are treated in terms of stability of equilibrium and growth paths. Morishima is quite eclectic in covering Joan Robinson's *Accumulation of Capital* (1956) as well as the Turnpike theorems which were inspired by Hicks's work on growth in linear systems.

Morishima's next book was his first attempt at formulating his own growth theory. *The Theory of Economic Growth (TEG)*, 1969. It is in many ways within the mainstream of the 1960s growth theory except that it innovates in a number of ways. In one sense, Schumpeter's theory of innovations and growth was always an alternative theory to that of Marx when it comes to rationalising surplus value under capitalism. If Marx searches for surplus value in the contribution of living labour, Schumpeter locates it in innovations which generate surplus monopoly profits which are eaten away by competition. Marx was aware of the constant revolutionising of the technology under capitalism but he did not connect it with the periodic upsurges in productivity and profitability. Morishima tried to tame Schumpeter's somewhat fuzzy ideas into a linear technology mould. But that was to come much later after *TEG*.

Then there is a long detour in Morishima's work. It may be that he was disappointed by the reception of *TEG*, or that he needed to reconnect with the themes of his thesis. But the next three books present a mathematical treatment of the ideas of three leading economists of the nineteenth century—Marx, Walras and Ricardo, in the order in which they were dealt with by Morishima. (Morishima wrote other books as well, in 1976 and 1984, but as they deal with general issues rather than economic research. I want to leave them out of this account.) In all three books, Morishima did the double task of reintegrating the work of these economists in the modern economic mainstream using the 'grammar' of *ESG* but at the same time using their ideas to extend the span of modern theory. Thus his treatment of joint production in Marx and of the cash balances in Walras, or the bold attempt to marry

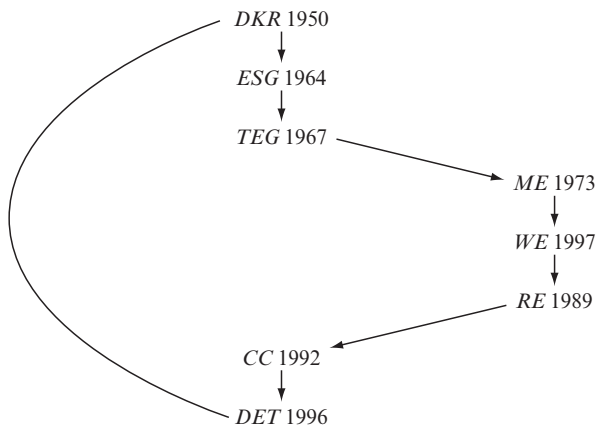
Ricardo, Keynes and Walras in one model in the Ricardo book readily come to mind.

It is then in *Capital and Credit* (CC) that Morishima came out with his own generalisation of all the various strands which had been moving in parallel in his work thus far. CC is subtitled *A New Formulation of General Equilibrium Theory*. This is an ambitious title and it proclaims in one sense the closure of the Morishima Research Programme. As he said:

In this volume, I complete this [i.e. escape from the narrow confines of General Equilibrium Theory] process and present the model which I finally reached and which I hope may serve as the analytical base for multi-disciplinary extensions of the general equilibrium theory on which economists must work in the future. This I consider may at least temporarily be regarded as the terminus of my long journey. (CC, p. 2)

Here the Walrasian theory is updated to take into account capitalist production (rather than petty commodity production without an entrepreneur and no finance constraint, as is usual in the standard theory) along with money and finance, innovation, equilibrium as well as disequilibrium. This is the complete Morishima with his formulation integrating all his favourites—Marx, Walras, Keynes, von Neumann, Hicks and Schumpeter—in a theoretically rigorous and mathematically tight framework.

It is then to fill out the map of his theoretical odyssey that Morishima had his 1950 work translated along with related papers published since then. Thus *Dynamic Economic Theory* is a coda to the entire *œuvre* and has to be consulted at various places to unravel the trajectory of Morishima's thinking. It stands at the beginning and at the end of his work. So a simple schema would be as follows:



Now it is time to turn to a theoretical discussion of the content of the Morishima Research Programme (MRP).

Themes in the Morishima Research Programme

There are five themes in Morishima's Research Programme. In one sense, they are separate because on any one of them one could spend a lifetime of research, and some economists have done so. But in Morishima's work, there is an attempt to synthesise these in one overarching framework. It is my contention that he was always conscious of such a possible synthesis. In his *Capital and Credit* (1996) he gives his answer. The themes are:

- Tatonnement Exchange: Existence of Equilibrium and Stability
- Non-Tatonnement Exchange: Existence of Equilibrium and Stability
- Dynamic Stability: Correspondence with above
- Growth with heterogeneous capital, innovations and money
- Money and Credit in a theory of capitalist economy: Growth and Cycles

These five themes span the comparative static and dynamic areas of economic theory as they also cover microeconomic and macroeconomic issues. It is along this grid of five themes that Ricardo, Marx, Walras, von Neumann, Schumpeter, and Keynes are arrayed. Of course there are gaps. Keynes has nothing to say on the exchange stability problems, but the whole issue of non-tatonnement trading is very relevant to the microfoundations of Keynesian economics because of the persistence of false trading which the Walrasians deny. (False trading is explained further below.) Early on in his work, Morishima was aware that Walras himself did not subscribe to the 'no false trading' rule. As he says in the preface to *DET*:

he [i.e., Walras] assumes that tatonnement is truncated so as to make effective transactions at a point in time when general equilibrium has not yet been realized. Then individuals' or firms' endowments change, which initiates a new tatonnement, thus contradicting the so-called Walrasians; the real Walras is a disequilibrium economist, at least in the field of dynamics. (*DET*, p. xiii)

This is the burden of the first of the eight articles added to the original thesis in *DET*. In the thesis itself, Morishima innovates in the theory of the firm by separating the production planning and supply planning periods in chapter 1. Then he surveys the stability conditions of tatonnement exchange as stated by Samuelson, Hicks and his teacher Sono. This was the real frontier of economic theory at the time Morishima was writing his

dissertation and his confidence in pointing out where his seniors are wrong is remarkable. The essence of the problem is as follows.

For any commodity, let there be demand and supply functions which are well behaved. Now the tatonnement theory says that if the market starts out at a price away from the equilibrium given by the intersection of the demand and supply curves, then the price must change until the equilibrium point is reached. But how? Walrasians posit an auctioneer who would call out prices and register demands and supplies at each price. No trades are made until the auctioneer is satisfied that demands and supplies balance, that is there is no false trading. This is patently unrealistic and yet this has been the workhorse of stability of equilibrium theory. Further, of course there are n commodities and there is complementarity/substitution between them. While the conditions of equilibrium in the n commodity case with complementarity/substitutability were being established by Samuelson, Hicks, Arrow, MacKenzie and Sono, and led to an extensive use of matrices in economics, the corollary of no false trading equilibrium is, for example, that there can be never be involuntary unemployment. This cannot be and was not comfortable for many Keynesians who cared about the consistency of micro and macro theories with each other.

Morishima makes it clear that he prefers the case in which trading takes place at each price, but the price changes if at that price after transactions are closed there is excess supply or demand. Thus, after each price is called out and trades are done (taking the case of excess supply), demands and supplies are revised at the new price. Thus, some traders may buy/sell at a price higher/lower than the equilibrium price. This non-tatonnement process was much less thoroughly explored at the time when Morishima wrote his thesis and he makes a contribution towards that later in *DET*.

But, apart from the non-tatonnement problem, even the stability proofs are not all they seem to be. Are we exploring the path of convergence of the 'groping' prices, i.e. virtual prices at which no trades are carried out and hence within 'the market day', or are we talking of the path of equilibrium prices arrived at, at the end of the tatonnement in each market day from one day to the next? This distinction was not made at all clear in the pioneering literature, as Morishima points out in a critique of Samuelson (*DET*, pp. 37–9). Morishima takes up the later problem in his dynamics sections which occupy the third chapter of *DET*.

One of Morishima's incidental contributions to economics has been to bring to light much analytical work written in Japanese in the 1940s, but

not known to an international audience due to the language barrier. Mathematics was the common language in these contributions. Morishima brings out the relevance of these articles and puts them into perspective. *DET* is full of references to such contributions by Professors Sono, Tanaka, Yasui and Yokoyama.

But stability of exchange equilibrium in either of the two forms was not enough. A further question arose of the sense in which one could talk about the stability of equilibrium. Within the Hicksian week, the groping process traces out a path of virtual prices which converge to equilibrium under certain well-known conditions. But what of the sequence over several weeks of the equilibrium price? What are the dynamics of the path itself? It is this question that Morishima picks up in *DET*, and pursues over his entire career. It is obviously connected to the stability of a growth path; each time period's income is solved out and we examine its stability. What for the microeconomist is a long week within which a price has to be arrived at is for the growth theorist just a point in time—a year or just 't'. So the path of income is analogous to the path of equilibrium, i.e. 'end of tatonnement' prices. Morishima's discussion of growth paths was therefore always concerned not only with the quantity variables such as income and the stock of capital but also with prices and interest rates.

In 1964 Morishima's first book in English, *Equilibrium, Stability and Growth (ESG)* was published. In some respects this is a drastic change of direction but only in terms of techniques rather than content or themes. Morishima adopted the mathematical techniques that von Neumann initiated by his classic article (1937/1945–6).³ This meant that linear technology with or without joint production forms the bulk of the themes of this book. Since von Neumann paths are maximal growth paths, albeit under stringent assumptions of free disposal etc., but the technology also allows one to treat many commodities at once so the normally macroeconomic growth theory could be cast in microeconomic terms opening up possibilities of a micro-macro synthesis.

In *ESG*, Morishima tries to integrate Walras into the growth story, which had not hitherto been attempted, and he also gave prominence to Marx's work on accumulation at the same time. In 1964 it was still bold to broach Marx's name in American academia but it was the beginning of a trend that was to catch on. (At that time Samuelson was the only other

³ J. Von Neumann, 'Über ein ökonomisches Gleichungssystem und sein Verallgemeinerung des Brouwer'schen Fixpunktsatzes', *Ergebnisse eines mathematischen Kolloquiums*, 73–83, translated into English as 'A Model of General Economic Equilibrium', *Review of Economic Studies*, 13 (1945–6), 1–9.

prominent mainstream economist who had discussed Marx.)⁴ Thus were born Walras–Leontieff and Marx–von Neumann models which became workhorses in Morishima’s Research Programme.

ESG is thus growth oriented with emphasis on linear technology and balanced maximal growth paths with fixed coefficients. But there is also a chapter on a spectrum of techniques. This is Morishima’s response to the then ongoing capital controversy between Cambridge, England, and Cambridge, Massachusetts. Morishima is able to start with discrete technologies as he has his linear techniques at hand. He is able to generalise the effects on changing coefficients due to change in factor prices. The jump along different factor combinations available in discrete terms traces out a surrogate production function which is not the neoclassical production function of the smooth variety but a close analogue. He does not yet discuss reswitching. This issue was to arise two years later.

ESG is even then a tidying up, synthesising book. Various results are derived and neatly put in relation to each other. What others had done, Morishima does with much greater generality. But very soon after *ESG*, Morishima came out with his, as yet, most ambitious work. This was *Theory of Economic Growth (TEG)*. Unlike *ESG*, *TEG* is both a new book setting out new results, and an advanced textbook, and was used as such by Morishima in his M.Sc. course on economic growth at the LSE. Here Morishima does more than most growth theorists of the day. He sets out in a rigorous multisectoral framework—the von Neumann model—and integrates Walras as well as Hicks and Malinvaud into this framework. Prices are solved out along with quantities throughout. Turnpikes are discussed under various assumptions. But he also deals with the issue of the optimality of the maximal growth paths. Now, while the Fundamental Theorem has been proved for timeless competitive economy or even its Arrow–Debreu version, Morishima was the first, I believe, perhaps the only theorist, to face up to the issue of Pareto Optimality of a variety of growth paths. Thus, consumption figures much more in *TEG* than in many other books on growth, and it is also modelled along class lines separately for workers and capitalists.

Yet *TEG* is also a major deviation from the high road of the Morishima Research Programme. It is much more mainstream than *ESG* or *DET*. It ignores money, Keynes, Marx and Schumpeter. It is the most non-monetary of all his books and issues of credit and capital are not

⁴ ‘Wages and Interest: A Modern Dissection of Marxian Economic Models’, *American Economic Review*, 47 (1957), 884–912.

engaged. To a large extent the apparatus of General Equilibrium Theory (GET) is too confining. Morishima was to acknowledge this in *Capital and Credit*: 'It is no exaggeration to say that I confined myself throughout my life in the narrow realm of GET.'

In his long escape from GET, he regarded *TEG* retrospectively as an experimental work. Yet as he says again in the Introduction to *CC*:

after 1964, I groped for a more satisfactory model of general equilibrium. At the same time I learned from great masters of the classical period, Ricardo, Marx and Walras, how to construct a dynamic model.

Morishima was not happy with the outcome of *TEG*. He says as much in his preface to *DET*. Thus started his long detour via Marx, Walras and Ricardo, until he could come back to his major concern. The Marx book came out at a time when the study of Marx as an economist was at its peak in academia. Samuelson had engaged in a debate with Baumol in the *Journal of Economic Literature* (1971), about the validity of the notion of exploitation. There was the background of Paris 1968, as well as the Prague Spring, the Vietnam War and the rise of a radical students' movement in the USA and Europe. Japanese economists had also been traditionally divided between Marxists and non-Marxist economists, as Morishima explains in the Preface to his book on Marx. While Marx's economics had been studied off and on since the first publication of *Volume III* of *Capital*, starting with Bohm-Bawerk, there had been no full treatment of all aspects of his economic work by economists. Joan Robinson's 1949 *Essay on Marxian Economics* is an introductory guide to Marx rather than an examination of his work using the tools of economics. Paul Sweezy's *Theory of Capitalist Development* (1942) was also introductory and omits many of the themes Morishima tackles. Morishima's book was the first book in English to introduce Marx to a new generation of economists using a language they would understand.

Yet in the context of the Research Programme, Marx is a distraction, or at least the Marx dealt with in the 1973 book. While Morishima deals with the statics and dynamics of Marx's growth and exploitation theory and tackles the joint production with innovative insights, there is no money and practically no technical progress in this book. This is partly because Marx's remarks on these two topics are much less systematic than his work on surplus value or accumulation. It was also these latter topics which were subjects of debate at that time. Yet given Morishima's interest in money and technical progress, it is surprising that he did not get into these aspects of Marx's economics. Marx's role in Morishima's Research

Programme is to set down the lines for multisectoral growth and propose a way in which heterogeneous capital can be consistently aggregated using labour values.

The crucial bridge in the escape from GET towards the completion of the Morishima Programme in *CC* is provided by Walras. This is obviously not the way Walras has been thought of in the literature. Walras is the fount of General Equilibrium, which is supposed to be neoclassical economics and is contrasted to Keynesian economics. Thus economists think that Walras provides consistent microfoundations for a full employment/all markets clearing theory of the macroeconomy. Morishima has a different Walras in his book which has the intriguing subtitle; the full title is *Walras' Economics: A pure theory of capital and money*. Now Walras is not associated with either of those two topics. But Morishima takes Walras beyond the conventional interpretation, both by reading the later chapters of the *Elements of Pure Economics* that others do not read, and by correcting and extending Walras where he is either incomplete or wrong.

The centre of attention is Say's Law. Morishima's purpose in the book is to see whether he can exploit Walras's work to provide the microfoundations of Keynesian macroeconomics. He focuses on the contrast between nominal demands (neoclassical) and effective demands (Keynes) as well as the doctrine that investments adjust to savings (neoclassical) and that investments are prior and savings adjust (Keynes). Walras had a four class model—landlords, workers, capitalists and entrepreneurs. But entrepreneurs have no income; they work on altruistic principles. Morishima thus adjusts the investment function as well as giving entrepreneurs an income (profits) which makes the model closer to real capitalism. But he also generates a lot of fruitful ideas on Walras's monetary theory especially as to why one needs a theory of accumulation and growth, i.e. a story with time and future in it in order to have a rationale for holding money in a Walrasian world. In a static general equilibrium, money can, and does, play no role. This simple and powerful result was ignored in much of the work on money in a general equilibrium model which was done in the 1960s and 1970s under the leadership of Frank Hahn but which never resolved the question of the essential role of money in a GET.⁵

Thus one has to have growth and accumulation to have money (Walras). But the world does not obey Say's Law and investment func-

⁵ The best reference here is J. M. Grandmont, *Money and Value* (Cambridge, 1983).

tions are central to a capitalist economy (Keynes). Capital is heterogeneous (von Neumann), but can be aggregated in labour time if one so wishes (Marx). But capitalism may be unstable and have cycles (Marx, again). At this stage the scene was set for Schumpeter or a full scale treatment of Keynes. But then instead we have a book on Ricardo. Why Ricardo? As Morishima says, in the preface to the Ricardo book, having worked on Marx and Walras and found common congenial elements among their theories, attention had to be paid to ‘their common guru Ricardo’.

But the real purpose is also to get back to the origins of Say’s Law in Ricardo and trace the story right up to Keynes and his denial of Say’s Law. To quote again from the preface:

I have given up my original idea to conclude the trilogy with Keynes. I have instead been concerned, in this volume, with transition from Ricardo (who highly appraises Say’s Law of markets as a ‘very important principle’) to Keynes (who rejects the law). Via this channel, a number of Keynesian problems, especially the problems of effective demand and unemployment, are introduced and discussed . . . Also I try and identify the epoch of Ricardian economics and those of Walrasian and Keynesian economics, in parallel with this transition. (*RE*, p. viii)

The heart of *Ricardo’s Economics (RE)* is in the final section entitled ‘Three Paradigms Compared’. Again, Say’s Law is at issue. Indeed I would argue that it was Morishima’s unhappiness about Say’s Law, reflected as far back as his thesis (*DKR*) which finally tore him away from balanced growth paths and stability of exchange equilibria and Turnpikes, and led him to make the detour he did. He describes Ricardo, Marx and Walras as ‘the first generation of scientific economics’, i.e. general equilibrium theorists who did not confine themselves to static models. Of these three, Ricardo established Say’s Law as a dominant mode of theorising about economics, Marx did not subscribe to Say’s Law but failed to dent its influence, and Walras confirmed it in the earlier parts of *Elements* but in later parts, on growth and money, needed, according to Morishima, to depart from it. It was Keynes who remained his hero, though a flawed one, since he did not provide sufficient microfoundations for his theory. So Walras is harnessed to the task of filling this lacuna.

The usual departures from Say’s Law involve a non-trivial role for money and/or a growth process via an active investment function. Ricardo has neither and so can subscribe to Say’s Law. Marx had both but his investment function was very restrictive and made no use of money or credit. Walras had money towards the end of *Elements* but his

growth theory lacked an investment function which led the way for savings to adjust to it. Keynes of course had money and investment functions, but he did not spell out why and how the general equilibrium properties of exchange equilibria and production equilibria are violated. Growth is not sufficient since von Neumann paths satisfy GE properties as *TEG* showed. Money is the real culprit or an investment function which has a role for entrepreneurs.

In *RE*, a model is set up in which excess demand and supply for labour and capital are modelled in a simple diagram (*RE*, fig. 6, p. 218). Here, around an equilibrium point, zones of excess supply and demand for the two factors are mapped out. The work is reminiscent of the almost exactly contemporary work of Malinvaud, *Theory of Unemployment Reconsidered* (1977), in which different concepts of unemployment—Keynesian, classical, etc.—were mapped out in a two quadrant diagram. But Morishima's axes are the real wage and the output capital ratio. (Morishima was later to discuss Malinvaud's work in *CC*). In figure 7, a Walras/Keynes version of the Ricardian diagram in figure 6 is produced. Within the same general model all the three paradigms are embedded. Again the investment function turns out to be the crucial relationship for the Anti-Say's Law result that Keynes established.

After *RE*, all the pieces were in place. The time had come for a new assault on the fundamental problem of economic theorising—a theory of how the modern capitalist economy works. But this had to be tackled with a modicum of realism, so the Arrow–Debreu story or even the von Neumann story were out. Money had to play an essential role, but not just in the consumer portfolio but in enabling investment. So it had to be credit with banks playing a crucial part, as they do in Schumpeter's model. For Morishima, Schumpeter's great contribution is not the notion of the entrepreneur, since that can be found in Walras, but the fact that bankers finance entrepreneurs and thus credit plays a crucial role in capitalism (*RE*, p. 202). Production was not the same as supply and production possibilities were not given; they were created by an entrepreneur. So entrepreneurs had to be given an active role. Above all equilibrium was not guaranteed at full employment since Say's Law did not always hold.

This is the background to *Capital and Credit: A new formulation of general equilibrium theory*. This is Morishima's escape from Hicks (*Value and Capital*) whom he continues to respect and admire. By now he is unhappy with GET since

In the purifying process, however, they have lost various ingredients which played essential roles in the pre war theory. When I was taught the principles

of economics, a first year undergraduate course by Professor Takata in 1942, stars were E. von Bohm-Bawerk, K. Wicksell, and F. A. von Hayek. All these names are not frequently mentioned in post war general equilibrium theory. (*CC*, p. ix)

Hence

In this volume I will try and formulate the type of general equilibrium theory which such economists as Bohm-Bawerk, Wicksell and Hayek were concerned with. I shall also try and extend their type of capital theory so as to make it compatible with Schumpeter's theory of money and credit. (*CC*, p. ix)

Then of course there is Keynes and Anti-Say's Law. Yet the old favourites are not ignored. Austrian capital theory with all its conundrums about time and the period of production is replaced by von Neumann's method. Hicks is there with his distinction between flexprice and fixprice. Then we come to the point early on:

in spite of the existence of involuntary unemployment, I describe the state obtained at the end of a period as an equilibrium, rather than a disequilibrium state. This is because conditions are realized in the economy at the end of a period, under which entrepreneurs have no incentive to change their scale of operations and workers do not propose an alteration of wages; hence there is no change in employment. (*CC*, p. 19)

The major change in *CC* is that banks play a crucial role in financing production. Thus how much entrepreneurs undertake to do depends on the availability of credit. This is Schumpeter rather than Keynes. While in Keynes's scheme entrepreneurs may underinvest because of expectations or a low marginal efficiency of capital relative to the rate of interest, Schumpeter allows for overshooting of credit creation by bankers (as do Hayek and von Mises and Wicksell). Thus inflation as well as underemployment is possible. But Schumpeter has an inbuilt tendency for his economy to revert to a long-run stationary equilibrium, while Morishima wants to allow for motion which does not terminate in a stationary state or a long-run Walrasian General Equilibrium of the Hicks's *Value and Capital* type.

Thus the core of *CC*, the last two chapters in effect, is concerned with innovations and their financing and monetary disequilibrium. Of course, there is much along the way. Thus the *DKR* distinction between production and supply is reintroduced. Production technology is not given but chosen by the entrepreneur. To allow for a general model, the device used in *WE* and *RE* of splitting the economy into Say's Law and Anti-Say's Law activities is introduced again. There is a scope for Anti-Say's Law if

production is financed by credit, and this of course requires that it is not instantaneous but has an input–output lag. With instantaneous production and investment adjusting to savings, Say’s Law is confirmed. But in any realistic capitalist economy, it breaks down due to the presence of credit. The amount of credit determines activity in the Anti-Say’s Law sector (manufacturing industry, in other words), and this, via the multiplier, determines the overall levels of activity and employment. This need not be full employment.

The classical and Walrasian dichotomy, of real economy, where relative prices equilibrate, and the nominal sector (quantity of money), where the absolute price level is fixed, is no longer valid.

[N]either of the subsystems is self contained. The real system presumes that the rate of interest determined in the monetary sector prevails in the real sector, and conversely, the price level of the monetary system adjusts the rates of profits such that the rate of profits of banks corresponding to it is equal to the general rate of profits of the industry determined in the real system. Therefore the dichotomy of the whole system is impossible. (CC, p. 151)

It is only by omitting banks and the financial requirements for production that the dichotomy is sustained.

In the last chapter on Monetary Disequilibrium, Wicksell’s cumulative process is examined from the point of view of von Neumann. The real system establishes the rate of profits (=rate of growth) but it leaves the price level indeterminate. We are in the Wicksell world here, not the Schumpeter/Keynes world. The credit creation by bankers determines the nominal level of interest with the natural rate given by the real system. Then the monetary side determines the price level by the intersection of the money demand function and the real growth rate. But it is not a stable equilibrium. It is a kind of IS–LM model, but with its axes as interest rate and price level rather than income. The Hicks/Walras world will be stable. You have to introduce the departures from the Wicksell/Hicks/Walras world to get the instability Wicksell wished to demonstrate. (Recall that Myrdal in his *Monetary Equilibrium* (1939) had shown that Wicksell’s proof of his equilibrium proposition was flawed.)

It is worth emphasising that the constancy of the natural rate of interest . . . is the most important premise of the Wicksellian theory of the cumulative process, otherwise the gap between [the natural rate] and the [money rate] would have reduced or expanded, rather than remained unchanged. This means that monetary equilibrium, where the [natural rate] is equal to the [money rate] and the price level is constant, may be stable or unstable rather than neutral. This conclusion however follows, even though the money rate of interest is kept constant, from the fact that the natural rate is revised due to the changes in the

real side of the economy. The Wicksellian thesis of monetary neutrality may not be the correct conclusion if the real economy is not assumed to be stationary. (*CC*, p. 180)

So we now enter a new development in monetary and growth theory. If the economy is growing and/or if the natural rate is a variable, then we need to extend Wicksell's analysis which assumed a constant natural rate. To model this Morishima goes back to the classic case of constant growth rate and that is the von Neumann path, which is of course the maximal growth path under certain assumptions. But the natural rate may be above or below the von Neumann rate, and, if the natural rate is also variable then the gap between the natural and the money rate is variable over the cycle. Thus if the natural rate is above the money rate and the von Neumann rate, then inflation follows but that may reduce the natural rate. If it then crosses over to being below the money rate, deflation follows and the natural rate may approach the von Neumann rate from above. Prices keep falling, and the economy may converge to the von Neumann rate.

In the converse case, the economy starts off with the natural rate below the money rate and below the von Neumann rate and then deflation comes first as the natural rate approaches the von Neumann rate from below. Once it crosses over the constant money rate then inflation follows and the economy approaches the von Neumann rate in an explosive inflationary situation (*CC*, fig. 3, p. 182).

This is the most sophisticated discussion of money and growth in the classical Wicksell framework that I know of. A variable natural rate is seldom modelled, and the deflation/inflation cycles enrich the Wicksell model greatly. But we are still in the world of Say's Law. What happens if we break away from it? The shortage of credit will restrict the economy below full employment as Keynes envisaged, and abundance of credit will start off an inflationary growth process as Schumpeter said. This then is the climax of the entire edifice of Morishima's work. He can now combine Anti-Say's Law with credit and disequilibrium. Credit creation determines the natural rate via the Anti-Say's Law sector which is often the most innovative and dynamic. To quote him again:

As I have sufficiently emphasized, the real sector and the monetary sector are bilaterally coupled under Anti Say's Law, and the bridging of these two is crucially important, in order for the economy to work smoothly and efficiently. The efficient use of money for the sake of development of the economy, nevertheless, has been almost entirely neglected by economic theorists, because the neoclassical general equilibrium theorists who support Say's Law have been

accustomed to the traditional method of dichotomizing the economy into two separate sectors, real and monetary. The linkage has been left for a long time in a state of being unexamined. (*CC*, p. 186)

No longer, after this book.

The final attack then is on the citadel of the classical and neoclassical monetary theory, and indeed the general equilibrium theory of Ricardo and Walras, we find in the textbooks. This is the Homogeneity Postulate by which nominal variables cannot have real effects and so money must be a veil. But of course the Homogeneity Postulate requires that a monetary shock be evenly spread across all agents (not only helicopter money, but each punter getting a proportionately equal amount to his/her initial, i.e. pre-shock, endowments). It also requires that the elasticity of demand with respect to money balances be identical across all agents. Morishima shows in the final pages of *CC* that neither of these assumptions is likely to be fulfilled in a monetary economy. Agents after all include households and firms and the Anti-Say's Law firms are much more credit sensitive than other firms for one thing. And if the Homogeneity Postulate falls, so does the Quantity Theory.

Conclusion

This has been an all too brief tour of the various theoretical writings of Michio Morishima. There is, as I argued at the outset, an architecture and there is progress towards a final vision set out early in his thesis. The challenge of integrating money and growth with general equilibrium but without Say's Law has been accomplished. There is much more to be gained from a careful study of these writings and one can only hope that future scholars will mine the rich source of theoretical insights in the decades to come.

MEGHNAD DESAI
London School of Economics

Michio Miroshima's Writings

Entries marked by * were published by Clarendon Press, Oxford. The rest were published by Cambridge University Press, Cambridge.

- (1950) *Dogakuteki Keizai Riron* (Kobundo, Tokyo) (*DKR*)
- (1964) *Equilibrium Stability and Growth** (*ESG*)
- (1969) *Theory of Economic Growth** (*TEG*)
- (1973) *Marx's Economics: A Dual Theory of Value and Growth* (*ME*)
- (1976) *Economic Theory of Modern Society*
- (1977) *Walras' Economics: A pure theory of Capital and Money* (*WE*)
- (1986) *The Economics of Industrial Society*
- (1989) *Ricardo's Economics: A general equilibrium theory of Distribution and Growth* (*RE*)
- (1992) *Capital and Credit: A new formulation of general equilibrium theory* (*CC*)
- (1996) *Dynamic Economic Theory*, an English translation of *DKR* above with additional articles (*DET*)

Books with co-authors not referred to in the essay above

- M. Morishima *et al.*, *Theory of Demand: Real and Monetary* (New York, 1973)
- M. Morishima and G. Catephores, *Value Exploitation and Growth* (London 1978)

