Economic dynamics as a succession of equilibria: the path travelled by Morishima
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Abstract

In the paper I bring to the attention of the economists and historians of economic thought the idea of economic dynamics that one can found in the first book by Morishima published in 1950 but totally overlooked. It has a great interest not only because there it appears for the first time the application of new mathematical concepts ("structural stability") but also because he pursues a way of dynamizing general equilibrium theory that has been neglected in the postwar developments that appears to have been inspired by Samuelson. The paper has three parts. In the first and second parts I outline the development of economic dynamics and its applications to general equilibrium elaborated by Morishima; in the third part a comparison between the prevailing idea of economic dynamics as originally put forward by Samuelson and that elaborated by Morishima is developed and discussed.

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1. Introduction

At the beginning of the XX century it was presumed that a complete and definitive static version of the general equilibrium theory had been produced by Walras and Pareto. It was left to the followers of this approach to develop a thorough dynamic version that could equal the generality and the elegance of the static model.

Pareto (1906) himself suggested a distinction between two different types of dynamic analysis. The first is concerned with the study of the “movement of the economic phenomenon” and the other with “successive equilibria”. As it was made clear from his examples he thought that the first type concerns the process of adjustment towards the equilibrium, whereas the second concerns the movements of the economic system when data (either exogenously or endogenously) change. However it is also well known that Pareto did not pursue this line of thought¹ and his conception of dynamics as a succession of equilibria was entertained by a few economists only. Among these we find in Italy La Volpe (1993) who produced earlier (in 1936) than Hicks a full dynamic general temporary equilibrium model² and Masci (1934) who elaborated in a methodological fashion such a concept of dynamics, and in Sweden Lindahl (1939) who discussed (in 1929-30) the Wicksellian cumulative process. Other general equilibrium theorists to a large extent and with inessential modifications, repeated the static version of Walras and Pareto and the distinction made by Pareto waned. To me this was one of the results of the efforts made during the 30’s by Frisch to develop a new definition of dynamics based on formal properties, a conception that was subsequently developed in a codified approach to dynamics by Samuelson in the second part of his *Foundations* that was to become for future generations the *locus classicus* of economic dynamics.³
The aim of the paper is to show that a dynamic general equilibrium analysis along the lines Pareto suggested is possible and indeed was accomplished by Morishima (hence M.) in a contribution in 1950. In what follows I will first outline the main contents of Morishima’s book published in Japanese (Morishima 1950) and translated a few years ago (Morishima 1996). I will then interpret the method he employs to conduct dynamic analysis and finally compare his method with the one generally used today by economists in the Frisch Samuelson tradition.

2. First Phase of the Analysis: Dynamic and Structural Stability of Temporary Equilibrium

The book is extremely rich and M. has supplemented the English translation with appendices, new mathematical notes and addenda (including unpublished material written in subsequent years). Of particular interest is the last paper “The dilemma of durable goods” which can be considered the final theoretical thought of M. on general equilibrium theory together with his Capital and Credit (1992). I will only concentrate on some methodological aspects of the book and overlook many interesting aspects such as the analyses of households and firms behaviour included in chapter two.

The starting point of M.’s analysis is Hicks’ concept of temporary equilibrium as the appropriate concept for developing a dynamic analysis in the spirit of Walrasian general equilibrium. He also adopts Hicks’ device of dividing time into weeks. The evolution of the economic system over time is described as a series of temporary equilibria. As a natural
consequence the analysis is split into two parts: one related to stability analysis of the equilibrium point, the other related to the succession of equilibria as data change. How do we arrive at temporary equilibrium prices? According to M. these are determined through an auction procedure within the week at the end of which a single price is established and exchanges can finally take place (M1996, 2). Needless to say these prices are such that the plans by all individuals can be simultaneously carried out. These are also called effective prices to mark the difference with groping prices that are those prices that change during the process of arriving at the equilibrium prices at the end of the week. Groping prices are important for determining the stability of temporary prices as they give indication of the direction of change of effective prices under alternative conditions (M1996, 5 fn 3).

Economic dynamics, as already hinted at, includes two main parts, the first has the aim of establishing the stability of temporary equilibrium through a discussion of changes in groping prices within the week and the second has the aim of discussing changes in effective prices over weeks. Following Lange (1944), the latter changes derive mainly from changes in the quantity of money, but other possibilities are explored too. In carrying out the stability analysis within each period M. employs Samuelson’s approach (Samuelson 1947) to mend Hicks’ weakness on this point. It is in the discussion of the various stability conditions that M. introduces (as a mathematical note III in the original Japanese edition) the Frobenius theorem on non negative matrices. The model employed by M. is embedded with the assumption of perfect competition, closed economy, spot markets for commodities and short term borrowing and lending; as already hinted at, temporary equilibrium prices are determined through auction.
The stability analysis can be carried out by assuming that the differential equation that expresses the dependence of changes in the price of the i-th commodity on the excess demand for that commodity is either linear or non-linear. M. in two different chapters analyzes both cases. In so doing M. argues that Liapounoff’s stability definition is not appropriate from the economic viewpoint but the asymptotic definition has to be employed: market forces have to push the price to its equilibrium value, although for t tending to ∞. The determination of temporary equilibrium prices requires the fulfillment of asymptotic stability conditions.

The first feature to notice is that, following Lange (1944), the speed of adjustment is not taken to be equal in all markets but is specific to each, reflecting the degree of price flexibility peculiar to that market. It is frequently observed that in some markets prices are more flexible than in others and general equilibrium theory has to take this element into account. It is worth stressing that the stability analysis as just explained can only be used for prices that are determined through the auctioneer and not through actual exchanges among consumers. Reasons for this are twofold. First Walras has no way of determining actual prices in disequilibrium; second even if one can determine how exchanges are carried out in a disequilibrium situation then one has to consider that the initial conditions of an actor are going to change after each transaction and therefore the differential equation that expresses price variations should include other variables. It is also pretty clear that, within this construction, the stability analysis cannot deal with the time evolution of temporary equilibrium prices. Indeed, according to M., (and his conception of successive equilibria), the latter evolve over time without any excess demand being different from zero, a hypothesis that conflicts with the differential equation that describes the change in prices within the week.
Let us now come to the concept of structural stability that, to the best of my knowledge, appears in this book for the first time in economics. It is interesting to replicate the argument M. advances to get to the concept. The speed at which a price changes depends not only on the magnitude of the excess demand but also on the degree of price flexibility of that particular market. The excess demand on the other hand depends on the prices of all commodities. The relation between the excess demand for the i-th commodity and the price of the j-the commodity can be either positive or negative reflecting a relation of substitution or complementarity between the two commodities. The absolute value of this coefficient is an indicator of the substitution (complementarity) of the two commodities. As it is well known the roots of the differential equations (and therefore the stability of the solution) depend in a continuous way on the coefficients of the matrix of the system, each coefficient being the product of the degree of flexibility and the degree of substitution (complementarity).

One can ask how the characteristics of the solution vary with respect to a change in the coefficients that reflect economic assumptions. For example in a stable position where all commodities are substitute the equilibrium can become unstable if the degree of substitutability becomes greater than a certain value. This is a case where the change from stable to unstable occurs for non infinitesimal changes of the degree of substitutability.

On the other hand there can be cases where the equilibrium is such that an infinitesimal change in the value of a parameter makes the sign of the real part of the roots change: this is an example of (so called) critical stability and can happen, for example, when some prices which were rigid become flexible. This case leads, by a direct economic argument, to the concept of structural stability introduced by Andronov and Pontryagin and made accessible to English speaking readers via Andronov & Chaikin (1949). On the basis of
the analysis developed there M. states that necessary and sufficient conditions for a system to be structurally stable is that none of the characteristic roots of the system be zero or an imaginary number and that all roots be simple (M1996, 62). In the two equation case M. gives a compact diagrammatic representation of these conditions.20

After this M. examines the nonlinear case, namely when the excess demand is a nonlinear function of prices. In this case if we find that the linearized system is locally unstable we could think that prices will diverge for ever: this will overlook the influence that the terms of order higher than the first has on the overall behaviour.21 Here the hypothesis of structural stability (SS) comes into play. Indeed if the system has the SS property, then the conditions for the local stability of the nonlinear system reduces to the condition that the real part of the characteristic roots of the linearized system be negative (M1996, 79). In other words SS ensures that the linear approximation is a good approximation of the nonlinear system.22 But why should one be interested in a nonlinear system?

The reason is that M. wishes to give his position in the long and never ending controversy for the determination of the interest rate between “loanable funds” and “liquidity preference” theories. The proof given by Hicks (1939, chapt. XII) of the equivalence of the two approaches is not convincing according to M (M1996, 86). One has to investigate the behaviour of the interest rate outside equilibrium and more precisely one has to find out whether the changes in the interest rate that equilibrate savings and investments (according to the “loanable funds” theory) have the effect of equilibrating demand for and supply of money (and viceversa). This however will not be true in general as the repercussions in the other markets of either adjustment equation are different in the two cases (M1996, 87-9). M. then advances his own theory (M1996, 90-1) which is a synthesis of the two approaches and gives
rise to a nonlinear system: hence his analysis which is not dictated by a sheer desire for
generalization but by a necessity stemming from finding a solution to a problem in economic
theory.

3. Second Phase of the Analysis: the Evolution of the Economy as a Succession of
Equilibria

Let us now summarize how M. conducts the second part of the dynamic analysis according to
the division mentioned in sect. 1. This part in turn is split into two steps. The first is
concerned with comparing different prices for each commodity within a single week
depending on alternative scenarios; the second with the intertemporal relation that exists
among prices over different weeks. The first is called by M. comparative statics, the second
comparative dynamics. Most economists have dealt with the problems of price fluctuations
over time by using the first method only (M1996, 93). Indeed, M. argues, the comparison
between two alternative positions within a single week as a means for understanding the
evolution of prices over weeks cannot exhaust the whole dynamic analysis. One cannot
restrain the analysis to the observation of two different equilibrium points (the solutions of the
equations) but one has to analyze the whole process of formation of prices (comparing the
appropriate differential equations). M. shows how this more complete analysis is particularly
relevant when the system is nonlinear and there are multiple solutions (M1996, 94).

Let us now concentrate on the first subpart. The parameters entering the differential
equations that define the excess demands are the initial distribution of the stocks of
commodities and money across actors, expectations, tastes and the state of technology. In a
more general model the stock of money and the value of public expenditure are also included
among the parameters. M. starts from elaborating a system of differential equations that includes \( \alpha \), a term which embodies all the parameters other than prices that affect the position of demand and supply curves. In other words it explains how prices will change when the public’s demand and supply shift. From these equations one can derive a taxonomy of results depending on how demand and supply curves shift and how the degree of substitutability varies as a result of changes in \( \alpha \).

It can be stressed, following M., that comparative statics refers to the comparison between two systems of equations (whose equilibria have to be stable)\(^{24}\) whereas comparative dynamics refers to the comparison between two systems of differential equations. In the latter case we are able to discuss also the possible change in stability conditions as a result of a parameter change. In other words comparative statics is restricted to the analysis of changes under the assumption of stability, dynamic and structural. Moreover comparative statics as described by M. cannot be extended to the case of intermittent parameter variations (M1996, 112-3): on the contrary this case can well be tackled by comparative dynamics.

M. now enters the second subpart of dynamic analysis developing it as to include several weeks. And in this connection it is appropriate to separate two different types of parameters: those whose values depend on what happened in the previous week and those whose values are only loosely connected, if at all, with the previous week. Among the latter we have expectations, tastes, technology, liquidity preference, bank credit, government expenditure. Among the former the stock of money and of durable goods. M. examines the effects of changes in some of the parameters and in particular of the stock of money: interesting results are derived with respect to the validity of the quantity theory of money in a situation where unemployment is present (M1996, 110).
Let us start from analyzing what happens when the latter kind of parameters are assumed to change. It is simple to find the new equilibrium values of next week as we know that the value of the stocks of goods and money has been carried over from the previous week and therefore is also the initial value of the present week. So we can derive a whole series of successive equilibria. This however, and it is an extremely important point, does not entail a stationary (or semistationary) equilibrium unless we make other assumptions (on the stationarity of stocks, etc.). Please note that in this analysis we link price determination and stocks changes.

The next step is to consider changes in the other types of parameters, say, tastes and, later on (M: 126-32), bank credit and government expenditure. The result, given certain simplifying assumptions, is a path over time of temporary prices which is given an intuitive economic interpretation (M1996, 119-21).

What about stability properties of this sequence? Whereas to implement comparative statics we need equilibrium to be stable, comparative dynamics need not. We can, if we so wish, look for conditions that guarantee stationary prices over weeks (M1996, 117). But, M. argues, this is just one possibility among many others. What is interesting is what M. labels stability of motion: the latter is concerned with elaborating conditions such that a sequence of equilibria after a change in a parameter follows more or less closely the sequence of equilibria that would have been otherwise. And indeed M. elaborates the counterpart of Liapunoff stability for this case (M1996, 122): but even if a motion can be shown to be stable this, in principle, has nothing to do with stationarity.

4. An Interpretation of Morishima’s Analysis and a Comparison with Samuelson’s
Therefore we can interpret M.’s analysis as a natural way of performing dynamics out of an interpretation of the nature of the Walrasian general equilibrium as a temporary equilibrium along Hicksian lines. The evolution of the economic system through time can then be described as a succession of temporary equilibria each of which, being stable, can be taken as a representation of the state of the system within a period. So that at the end of each period a change (in both kinds of parameters as described before) can easily be considered: there will be a new equilibrium with different prices and quantities, a potentially different time pattern over time. However a (semi)stationary equilibrium can or cannot occur: one can impose conditions for that to be true but this is not to be mistaken with a description of the actual evolution of the system. In other words this approach is, in my opinion, a way for dispensing with the centrality of the idea of stationarity or semistationarity: these concepts were not considered to be heuristically valid as the evolution of an actual system is continually characterized by changes in prices and quantities in the various sectors. Of course a price is paid in exchange for this approach and it is that of considering the system to be nearly always in equilibrium (although not in a steady state). It is remarkable to observe, as Donzelli (1986) long ago pointed out, that in this framework one can have that the temporal evolution depends on exogenous as well as endogenous factors.

How does this analysis compare with the traditional way of doing dynamic analysis? The latter, stemming from Frisch’s (1935) and Samuelson’s (1941, 1942, 1943, 1947) contributions, is conducted on the basis that the economy is in a stationary (or semistationary) state. Then a change in a parameter occurs. By performing a comparative statics exercise we compute which will be the new equilibrium. If in addition the equilibrium is stable then we
conclude that the system will reach the new point. In between the system will be in a
disequilibrium situation. In addition Samuelson (1947, 258-83) showed that there is a close
connection between comparative statics and stability conditions (the so called correspondence
principle): assuming that the equilibrium is stable we gain additional information useful in the
comparative statics analysis. In practical terms dynamics comes to identify itself with stability
analysis. The equilibrium is conceived as a point where the system tends after a displacement
that starts a disequilibrium situation. The latter is conceived in such a way that no changes in
the exogenous parameters do occur during the period of adjustment. Changes in the
exogenous parameters occur from time to time: if we supplement stability analysis with
comparative statics a unified approach based on semistationary equilibrium is built to describe
the evolution of the system over time.

We can therefore recapitulate the way in which dynamics is usually developed. Let us
start from a model characterized by a unique equilibrium point. If this model has to possess a
heuristic validity the equilibrium has to be (asymptotically) stable. The economic system is hit
by shocks that push it away from equilibrium:25 hence the existence of a period during which
there is disequilibrium. It is therefore necessary to postulate how the endogenous variables
change outside equilibrium. As it is possible to imagine different hypotheses in this respect
we face the situation described as “relativity of dynamic stability conditions”.26 An analogous
procedure is set up when the economic system is hit by a change in a parameter or in an
exogenous variable. In this case we are interested to know at least in which direction the
system is going to move and, hopefully, which will be the new equilibrium. To perform such
an exercise in a correct way the equilibrium has to be stable as Samuelson observes when
stating his correspondence principle. The comparative statics methodology is a useful
instrument in ascertaining the new equilibrium and therefore the tendency of the economic system following a change in a parameter or in an exogenous variable.

Summarizing: both the analysis of a disturbance and that of a change in a parameter are analyzed in pretty much the same way. However as we hinted at the beginning the two aspects are treated differently by Pareto: The first aspect was labeled by him (Pareto 1896-7) as Dynamics of the first kind whereas the second Dynamics of the second kind. In other words stability was originally conceived to be a study of attaining a given equilibrium when for some reasons the agents are not in that position and not for the analysis of what follows after a change in an exogenous variable or parameter.

M. has a different approach and is closer to Pareto. First of all equilibrium is not conceived as stationary equilibrium to which the system eventually tends, but as an instantaneous or temporary equilibrium in the spirit of Walras, Pareto and Hicks. Secondly, the evolution of the system is described as a succession of temporary equilibria and again there is no stationarity implicit in this approach: the path is totally open (M1996, xii). Indeed one can find in Hicks too a perception that dynamics cannot be reduced to Samuelson stability analysis. In the Additional Note C27 to the II edition of *Value and Capital* referring to Samuelson (1941, 1942, 1944) Hicks writes:

Professor Samuelson’s work thus represents an important advance in our knowledge of the mechanics of related markets: his ‘dynamizing’ of static theory is a notable achievement. But I still feel that something is wanted which is parallel to my dynamic theory and I miss this in Professor Samuelson’s work.

However it has to be noted that Samuelson in his *Foundations* has a very articulated position. He writes (1947, 262-3):
The equations of comparative statics are then a special case of the general dynamic analysis. They can indeed be discussed abstracting completely from dynamic analysis. In the history of mechanics the theory of statics was developed before the dynamical problem was even formulated. But the problem of stability of equilibrium cannot be discussed except with reference to dynamical considerations, however implicit and rudimentary. We find ourselves confronted with this paradox: in order for comparative-statics analysis to yield fruitful results we must first develop a theory of dynamics. This is completely aside from the other uses of dynamic analysis as in the studies of fluctuations, trends, etc.

inducing one to think that dynamic analysis can go beyond the comparative statics exercise.

In the following pages Samuelson (1947, 315) elaborates a four class scheme for dynamic systems: static and stationary; static and historical; dynamic and nonhistorical; dynamic and historical. The latter would be the correct tool for analyzing many situations (business cycle, technological change, etc.); however a few lines later he states that “(..) every historical system is to be regarded as an incomplete causal system”. Even if only in exceptional cases a causal system has stationary equilibria and even if a causal system can have no stationary equilibrium at all, Samuelson (1947, 320) concludes: “It is desirable, (..), to consider the manner in which a stationary equilibrium can be generalized” to historical systems. Therefore Samuelson appears to be aware of the exceptionality of a tool that is built on an extension of stationary equilibrium, yet he seeks to generalize it assuming that it would be impossible to renounce that concept for the study of the evolution over time of the economic system.
Although Samuelson has a very elaborate vision and is full of hints, it appears that he does not want to give up the stationary notion of equilibrium. Towards the end of his book he argues in favour of a method geared to “cultivate dynamics for its own sake” analyzing the movement of the system as a mere result of the passage of time. He advances the idea of comparative dynamics that reduces to examining the effect of a change not on an equilibrium point but on the whole movement of the economic system. This stems from the idea that such changes can induce very different effects depending on the time span of the analysis (the short run being different from the long run). However these extremely innovative observations are not developed and do not prevent him from closing the *Foundations* with a full confidence in the validity of the comparative statics method (Samuelson 1947, 355): “Of course if we confine our attention to the behavior of long period stationary equilibrium positions, the methods of comparative statics come into their own again.” Maybe, and this is really a conjecture, this position is due to having overlooked the possibility that beyond the stationary equilibrium one can conceive the instantaneous or temporary equilibrium that can suggest a different path to dynamics. But is it is well known Samuelson had never been sympathetic to Walrasian General Equilibrium.

4. Concluding Notes

I have followed M. original treatment of dynamic general equilibrium as exposed in his first book. Dynamic analysis is split into two main parts: the first is concerned with stability of the temporary equilibrium; the second concerns the description of the evolution of the economy as a succession of temporary equilibria over time. In so doing M. introduces the concept of structural stability, criticizes Liapunoff’s concept of stability, uses Frobenius’s
theorem on non negative matrices, gives a new solution to the problem of the determination of the interest rate. This approach is then compared to Samuelson’s that has been prevailing after the publication of his *Foundations* and has become a unified way of treating dynamics as a part of stability analysis. The paper has been written to attract the attention of scholars to a different way of performing dynamic analysis, a way that has been submerged by the advent of the Frisch-Samuelson approach. The aim, rather, is to show that the approach followed by M. is capable of getting interesting results and looking at the economic system from a different perspective.

However, it is apparent the weakness of a method of pure equilibrium that assumes a very quick process of adjustment to equilibrium. On the other hand it should also be clear the weakness of an approach, the dominant one, that in the analysis of the evolution of the economic system over time limits itself to a comparison between two stationary equilibria following a change in a parameter actually confining the disequilibrium to an inessential role. A possible, real alternative to both these views is that offered by a development of the Swedish school method of sequential analysis and a rejection of the equilibrium concept altogether in search for an approach that actually follows the evolution of the economic system over real (chronological) time. This approach is actually pursued by a minority of scholars: among them one can single out Amendola & Gaffard (1988, 1998, 2007), Godley (1997) and Godley & Lavoie (2006).
References


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1 He actually moved to sociology.

2 For an analysis of La Volpe’s subsequent attempts in the field of dynamics see Di Matteo (1993). See also Pomini & Tusset (2009).

3 From a different perspective, though, I agree with Weintraub’s remarks (1991, 37-8) on the background of Samuelson’s book and the problems that the *Foundations* leave with us.

4 Of the book, already in 1980, one could find at the LSE library a translation in a booklet with a green cover.

5 By the way this meets the dissatisfaction Weintraub (1991, 159) expressed with reference to the 1980 edition.

6 “I have expressed my own present view in *Capital and Credit*. When comparing this, the reader will find outlined a number of shortcomings [of the present book]; it is in fact no more than a book which has to be criticized in *Capital and Credit* together with those other books with which I disagree” (M 1996, xii-iii).

7 Here the analysis follows *Value and Capital* but with some differences, the most important being the inclusion of inventories in the analysis of the behaviour of the firm and a different analysis of the demand for money and bonds.

8 As definitely shown by Donzelli (1986) the equilibrium concept adopted by Walras and Pareto was that of a instantaneous equilibrium.

9 For a short description of M.’s background see Ikeo (1993, 1994), Wakatabe & Dimand (2009), and Asada (2009). M.’s approach is certainly due to the reading Aoyama made of *Value and Capital* as referred to by Ikeo (1994, 586-7). However from what she reports it seems wrong the interpretation that Aoyama gave of Frisch (1992) as advancing the concept of momentary dynamic equilibrium. In fact Frisch argues that “Certain authors (e.g.Walras in his *‘Elements d’économie politique pure’* ) have stated that it should be possible to go from the static to dynamic theory simply by imagining the static equilibrium as changing with time. […] However this is a complete misunderstanding of the nature of dynamic equilibrium. The putting together of a series of static equilibria can never provide the picture
of the very flux of events that is the object of dynamic theory.”

10 This leads to a classification of temporary equilibria into several different types (M1996,5-6).

11 Actually as Ikeo (1994, 588) reports, M. became interested in the stability problem through Samuelson (1941).

12 According to Ikeo (1994, 590) Yasui in a paper published in Japanese in 1948 became aware of the results of Frobenius Theorem. Let us also notice that in the same period in his reply to Chipman, Goodwin (1950) mentioned the Frobenius theorem.

13 “If we want to analyze prices by the use of equilibrium conditions between demand and supply we must inevitably assume the market of price determination by auction” (M1996,6).

14 “Therefore to determine prices and the rate of interest by competitive trading it is requisite that the temporary equilibrium should be strongly stable or neutral” (M1996,36) where strongly stable is equivalent to asymptotic.

15 This is implicit in Walras’ treatment of tatonnement.

16 For M. the Japanese rice market was the analogous of Walras’ bourse.

17 I owe this point to Donzelli.

18 M(1996, 37-9 & 1996, 6 fn 4) criticizes Samuelson (1947) also because the latter’s method cannot be used as an explanation of real world prices if the latter are the result of bargaining processes.

19 I think this meets the skeptical argument advanced by Weintraub (1991, 157).

20 Cfr. the diagram 13 in (M1996, 65).

21 Without mentioning the obvious argument that for a starting point far away from the equilibrium local analysis is meaningless.

22 “Our next task is to remove this assumption and to find conditions for a temporary equilibrium to be stable. This problem, however, is not dealt with in the present volume” (M1996, 83).
23 Assumed to be a continuous function of current prices and the rate of interest.

24 And unique, I add.

25 A change in initial conditions that induces a relaxation of functional equations as Samuelson (1947, 262) puts it.


27 And this passage is quoted by M. in his Foreword to the English translation of La Volpe’s pathbreaking book (La Volpe 1993).

28 See Donzelli (1993). And this is no accident given the original purpose of stability analysis.

29 This is not inconsistent with the view expressed by Donzelli (1986, chapt.v, fn. 74)