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A STARTING-POINT FOR THE DYNAMIZATION OF ECONOMICS PANTALEONI'S INFLUENCE

TAMOTSU MATSUURA

Preface

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I. PREFACE

T. W. Hutchison states in his book, *A Review of Economic Doctrines, 1870-1929*, that in the period covered by this work, "One fundamental theme in this logical development was the gradually increasing importance of the distinction between static and dynamic analysis resulting from the increasing precision and narrowness of the definition of 'statics'."⁽¹⁾ and called the second part of this book "From 'Static' to 'Dynamic' Analysis."

There is no question that one of the important things which characterize the modern current of economic doctrines is the perception of economics as something dynamic. It is, therefore, by no means useless for the students of the history of economics to look into how dynamic economics has come to its present being.

It is, however, very difficult to trace the course of development in the genealogical process of economics, for it is not such a simple one as one may suppose; it gathers all sorts of ideas along, especially in its incipient period. One thing, however, can be said for certain. The dynamics of economics exhibits its initial symptom, vague as it is, in a sort of formative way, and comes to take a distinct style which the economic analysts of today take as one of their generally recognized intellectual properties.

For example, many economic theorists at the time, when dynamic economics was budding, confused the method of analysis with the

(1) T. W. Hutchison: *A Review of Economic Doctrines, 1870-1929*, 1953, p. 279.

object of analysis, and often took the theories to analyze the dynamic phenomena of economics as the dynamics of economics. Of course, even in this stage of development, some were dimly aware of the difference between them, it was not well systematized, but it was only suggestively discernible. The dynamic was of thought, started in this way, gradually came to settle into a definitely determined concept. By the time Ragnar Frisch, Paul A. Samuelson and John R. Hicks appeared⁽²⁾, dynamics was clearly defined as the following statement: "Dynamics means exclusively analysis that links quantities pertaining to different points of theoretic time and not the theory of evolutionary processes that run their courses in historic time." At present, this is the common basis for the theoretical study of dynamics.

It may be futile to seek the starting-point of the history of economic theories, for to search into the origin of anything which was instrumental in the analysis of a concept is very difficult, as it is often obscured. Also, the starting-point, if discovered, may not develop into the form which will be definitely settled later, or it will often become involved with alien elements or errors. For all that, it is an important thing for a student in the history of economic theories to examine its starting-point, for it is indispensable for a person engaged in the genealogical study of anything to be informed of its origin. As a matter of expediency, the beginning of an idea is often attributed to the scholar who first discerned its existence, or to the scholar who resembled him the most.

Maffeo Pantaleoni (1857-1924) is the economist who directed in many ways the course of Italian economics to its present condition. Also, it was he who led Vilfredo Pareto and Enrico Barone to come closer to Walrasian theory of general equilibrium, and enhanced the academic brilliancy of the Lausanne school. Joseph Anoi Schumpeter points out Pantaleoni's several contributions to economics, one of which is the way he formalized economics into dynamics.⁽³⁾

The object of this essay is to represent the Pantaleoni's concept of dynamics as one of the important starting-points for the development of modern economics. In other words, this work examines how his stand has come to be accepted as one of the starting-points of dynamic economics, as well as what influence it exerted on his contemporaries.

(2) Refer especially to P. A. Samuelson: "Dynamic Process Analysis" in *A Survey of Contemporary Economics*, 1949, edited by Ellis.

(3) J. A. Schumpeter: *History of Economic Analysis*, 1954, pp. 857-8.

I. THE CONTENTS OF PANTALEONI'S DYNAMIC ECONOMICS (dinamica economica)

Pantaleoni published in 1910 the essay, "Some Phenomena of Economic Dynamics (Di alcuni fenomeni di dinamica economica)"⁽⁴⁾, in which are discussed some of their types. Here we are to examine them so as to be familiar with his thought.

Since Adam Smith published his *Wealth of Nations*, Pantaleoni thought, it was customary to look upon the development of economics as proceeding from the "science of laws on wealth" to the "science of laws on value" and then to the "science of laws on economic equilibrium." Pareto has succeeded in establishing the general system of static economics, but concerning dynamic economics, we seem to be still at the beginning.

Pantaleoni, taking static economics only as a special case of dynamic economics, thought that static economics will be absorbed into dynamic economics, if the latter should succeed in the construction of its theories. In the past, there existed no such thing as dynamic economics for two reasons: one was that some people were ignorant of it, and the other was that some thought it too complicated to be managed, even if it has been brought to their knowledge.

Pantaleoni classified the dynamic phenomena into three different types: (1) the economic system which reverts to the same point of equilibrium as it had in its initial period, (2) instead of reverting to its initial condition of equilibrium, the economic system takes an entirely new position of equilibrium. Pantaleoni thought (1) and (2) are basically the same as they both stand on the common premise: the necessary convergence to an equilibrium, although (2) is different from (1) in that it takes a new position in equilibrium.

To illustrate, he cites the following example. An individual apporitions his income so as to have the marginal utility of his consumption obtain a right proportion to relative value, and he exercises some sort of restrictive consideration on demand and supply before such an equilibrium is reached. So long as individuals act in this way, there will be set an equilibrium between demand and supply.

Pantaleoni considers the third type of dynamics to be more important than (1) and (2). This is essentially different from the other two.

(4) "Di alcuni fenomeni di dinamica economica," *Scritti varii di economia*, Roma, 1910. This essay was reproduced in *Erotemi di economia*, Laterza, Bari, 1925, Vol. II.

This essay was also read at the meeting of the Society for the Progress of Science at Padoa in September 1909. Its English translation was put in the *International Economic Papers*, No. 5, 1955.

It is the case where an economic system, once disturbed, never tends toward a stable equilibrium. He thinks this case should be fully studied. He classifies this type of dynamic phenomena into 4:

(1) one that occurs through the change of the margin between the economic field and the noneconomic field;

(2) One that occurs through the change in the ratio between the indirect and the direct cost;

(3) One that occurs through the increase of birth control;

(4) One that occurs through the general conditions for the increase of return.

In any of these case, economic system converges neither at the former nor a new point of equilibrium.

According to his contention, let me explain more in detail.

(1) This change occurs in the economic field, where "homo oeconomicus" is active and when a noneconomic field encroaches on an economic field, or when a noneconomic system is led into a super economic system on account of a continuous disturbing factor. Pantaleoni states: "Homo oeconomicus is not the same, not even qua homo oeconomicus, in different combinations with homo ethicus and homo religiosus and with different species of homo ethicus and homo religiosus. (. . . è che l'homo oeconomicus non riesce il medesimo, neanche quale homo oeconomicus, a seconda che sia impastato di piu o di meno di homo ethicus e di homo religiosus, e a seconda della specie di homo ethicus e di homo religiosus che entra nell'impasto:)"⁽⁵⁾

Suppose a private railway company or any other public utility body turns into a governmental enterprise, the price of its service which had been determined through free competition would come to bear a different aspect. For it would be subjected to a moral or a political standard. Whenever a man should try to place his economic activity under a moral standard or a political influence, there occurs a dynamic phenomenon. Let me cite another example. We find a dynamic phenomenon occurs when we try to replace a freely determined economic price with a policy price (*prezzi politici*) or a "just price,"—the "just price" in the sense that it sets an equal price for all the members of a society or it proposes a price which is generally recognized by a group or a class of society, necessitating the provision of some sort of artificial restriction to free competition or the free movement of capital and labor. This means a deviation from an equilibrium. There is no question that any change like this in the field of economics, creating a sudden change in social organization, gives birth

(5) *Ibid.*, p. 60 (English translation, p. 34)

to a dynamic phenomenon.

(2) As a necessary result of a change in the scale of an enterprise, that is, in connection with the dynamic phenomenon due to a gradual alteration in the relationship between the direct and the indirect cost, all the enterprises fall within the confines of the two extremities: the enterprise which has indirect cost only and that which has direct cost only. As the ratio between the indirect cost and the direct cost is determined in accordance with the enterpriser's estimation of the maximum profit relative to the scale of his work, there is no chance by any enterprise of increasing its indirect cost more than its direct cost in the first stage of its development. The increase of direct cost only will be continued until the profit will reach its maximum. (For example, factory tries to secure the maximum profit by procuring a large amount of raw material, extending labor hours and depending on the enlargement of labor force.) Coming into the second stage of development, however, the enterprise will begin to increase its indirect cost, creating the situation which calls for a large scale alteration in the enterprise, extending its dimensions far beyond its past scheme.

(3) With the introduction of Neo-Malthusianism, the population structure gets remodelled, and the income distribution undergoes a change. Birth rate and income interact on each other. An increase in income raises the birth rate and lowers the death rate. Also, the low birth rate often brings about an increase of income per head, which in turn exerts an influence on income distribution, savings and personal taste.

(4) This happens as a result of the diminishing cost curve in relation to economic equilibrium. This is the effect noticeably marked in the industry which produces the goods of primary necessity. Let us consider here the case of grain cultivation or cow raising on a new land. With the land like this, labor cost diminishes continuously for a certain period of time. On the contrary, an old land, where prevails a low productivity, requires an increasingly large amount of cost.

The production with diminishing cost stimulates the movement of labor and goods from other places, and with the transportation expenses being reduced, the possibility of marketing the products there becomes improved. Further, a large production makes it possible to draw people from an old land to a new one, thus further diminishing the production cost. This happens, for instance, with a new land that has accepted a group of immigrants.

These are the four cases which never converge to an economic equilibrium.

In addition, Pantaleoni discusses the social dynamic phenomena in the essay "Cinematographic Vision of the Progress in Economic Science (1870-1917) (*Visione cinematografica del progresso della scienza economica*)"⁽⁶⁾. In this work, he takes up the question of social progress; for example, the change in taste, the technical invention and competition, may bring forth an economic change and also an opposition to it, thus producing instability among the people. He says that the majority of the people prefer to remain in a static and secure condition of life. They do not want to change their tastes either. But the society, which is placed in a severely dynamic condition, is most likely to attain a very high productivity, if considered as a long term proposition, enabling the people fully to satisfy their economic aspiration.

Such is the dynamic view of economics held by Pantaleoni, and with which he attempted to establish the principles of economics on the basis which is far more comprehensive than Walras and Pareto who stuck to a static concept of equilibrium. It should also be mentioned here that Moore's theory of dynamics, that is, the theory of price fluctuation which he published in an essay in 1926, derived its foundation from a valuable suggestion from the Pantaleoni's view on dynamics.⁽⁷⁾

II. DYNAMICS OF PANTALEONI'S CONTEMPORARY ECONOMISTS

Before the appearance of Pantaleoni's dynamic economics, the matter had been discussed by some of his contemporary economists. Here are taken up two representatives of them: E. Barone and John B. Clark.

Barone published the essay "Concerning the Treatment of Dynamic Questions (*Sul trattamento delle questioni dinamiche*)" in the *Giornale degli Economisti*, 1894, stating: "The theory of equilibrium supplies a method for dealing with dynamic problems; because given a market in equilibrium and a disturbing force, the latter may be studied simply by determining the equilibrium towards which the market gravitates after that force began to act; comparison between this and the preceding equilibrium will reveal the nature of those effects and their quantitative measurement. (*La teoria dell'equilibrio offre un modo di trattamento delle questioni dinamiche; giacche, supposto un mercato in*

(6) "Visione cinematografica del progresso della scienza economica (1870-1917)."

(7) It served as a suggestion for the establishment of a price fluctuation theory by making use of the price elasticity of demand. This will be explained in detail later. See III. Moore's Dynamic Theory and the Influence from Pantaleoni.

equilibrio, e supposto poi l'intervento di una causa perturbatrice di cui si vogliono studiare gli effetti, non si ha che da determinare il nuovo equilibrio a cui il mercato tende dopo che la causa perturbatrice e entrata in azione, per ottenere, dal confronto con l'equilibrio precedente, la specificazione degli effetti che cercavano e la loro misura quantitative."⁽⁸⁾

As can be seen in the citation above, Barone's dynamics did not go beyond the confines of comparative statics. So, Barone's thought can not be called adequate, as it failed to take into consideration the third case of Pantaleoni's thought on dynamics, that is, he was unable to grasp the significance of the type of economic dynamics which never converges to equilibrium.

Next, we take up J. B. Clark. He discussed the problem of dynamics in his *Essentials of Economic Theory*, 1907.⁽⁹⁾ He thinks an economic society is in a static condition, when there prevails no incentive to the movement of capital and labor, and the enterprise's profit is zero, in other words, when economic activities remain unaltered either in scale, form or type, in spite of the fact that the prices of various goods equal to the marginal cost and the movement of capital and labor is left completely free. A society should be judged dynamic, if it is otherwise than as above described. The society as such is characterized by the 5 dynamic features as follows: (1) continuous increase in labor supply, (2) continuous increase in capital supply, (3) change in productive technique, (4) change of business organization, (5) changing taste of consumers.

Compared with Pantaleoni's, Clark's definitions of dynamic economics and static economics are more ambiguous. As will be explained later,⁽¹⁰⁾ the method of analysis and the object of analysis were not distinguished in those days, resulting in taking economic statics as the same as "stationary state." In other words, the method of analysis and the object analysis were confused in use.

Pantaleoni's dynamic economics was highly valued by many economists in his days. They constantly referred to him in their works.

Here we take up another economist who immediately followed Pantaleoni in the study of dynamic economics, Simon Patten.⁽¹¹⁾ He treated

(8) "Sul trattamento delle questioni dinamiche, *Giornale degli Economisti*, 1894, p. 407.

(9) J. B. Clark: *Essentials of Economic Theory*, Macmillan, 1907, ch. VIII, pp. 130-131, ch. XII, pp. 195, 197, 202, 203, 204.

(10) Refer to IV. *Evaluation of Pantaleoni's Dynamic Economics*.

(11) Simon Patten (1852-1922), former Professor at the University of Pennsylvania, U.S.A.

the problem of the protective tariff in his book *Theory of Dynamic Economics*,⁽¹²⁾ and thought the conditions derived from this policy resembled in many ways Pantaleoni's third case of dynamic phenomena, that is, the dynamic event which never converges to equilibrium, thus enabling him easily to understand the essentials of Pantaleoni's thought.

Patten states in his *Theory of Dynamic Economics*: "The paper of Professor Pantaleoni is an earnest attempt to give difiniteness to the contrast between the static and dynamic in which I find many valuable suggestions. I am not, however, convinced that he has solved the difficulties, for it is not easy to separate economic problems into two classes for which distinct groups of laws may be formulated. I was the first economist to use the contrast between the static and dynamic and I am also the first to abandon it. My success and failure are, I think, typical of what other have done or will do, and hence to speak of it may have more value than a direct criticism of the plan before us."⁽¹³⁾

After briefly surveying his own original stand and Clark's tentative theory, Patten presents his conclusive view, reproduced in the following paragraphs. This concept of his is representative of the generally attained or the average level of the knowledge in dynamics at his time. It will be carefully examined here as it reveals many characteristic weaknesses if judged from the standard knowledge on the subject possessed by us now.

Patten states: "We can investigate the various kinds of equilibrium earlier and more readily than we can the phenomena of a whole society. Valuable as this work is, we should remember that it is only particular functions or parts that are at equilibrium and not a whole nation. There are no such things as static forces or static societies, but there are static functions in many if not in all societies. That a given part or function is out of equilibrium does not imply a static society but only a waste in its forces, while an equilibrium means economy. . . . If every function of society were at an equilibrium, that is, its forces were so adjusted that there was no waste, the whole world would be intensely dynamic and would move forward with a vigor that as yet no nation has realized. If we keep in mind that static laws relate to social progress, the unity of economic science will be seen at a glance.

There are no dynamics of functions: they are either at equilibrium or out of it. There are also no statics of social progress. Societies

(12) *Theory of Dynamic Economics*, 1915.

(13) *Ibid*, pp. 127-28.

either progress or decay: they do not tend toward a state of stable equilibrium. . . .

Dynamic changes are so largely extra-economic in their origin that they cannot be ignored: but when definite economic groups of functions are under consideration there is a gain in regarding the non-economic as a disturbance that may be ignored. The formulation of economic laws demands this, while a statement of the law of progress is more effective only when the points of equilibrium are in turn neglected and society is viewed as a flow of events rather as a group of stable condition."⁽¹⁴⁾

This concept of Patten's, being entirely different from ours in its origin and approach as well as in terminology, is very difficult to understand. Summarized, however, it comes to this. A society can never be static, but it is possible for its function to be static. The function of a society in equilibrium means that all the social elements are properly distributed without any misapplication or wasting. The disequilibrium of a society is the result of its function being uselessly worked. So, a dynamic society will make progress most when its function is in a well-equilibrated condition. Here is derived the idea that competition which is indispensable for the establishment of equilibrium is a requisite condition for social progress.⁽¹⁵⁾ We shall criticize later these Patten's ideas in the sense of the dynamics now generally accepted by academic circles.

The reason why Barone, Clark and Patten were mentioned here is that we wanted to compare their concepts with Pantaleoni's. We find his concept far better systematized and a step nearer than that of any of his contemporary economists to the level of accomplishment that has been attained in the present world. In other words, Pantaleoni's concept was considerably closer to ours in the analysis of the relationship between dynamics and statics, as well as in the elucidation of the non-convergence case.

Thus, it was by no means a mere chance that Moore gave a high credit to Pantaleoni and succeeded in formalizing his own theory of dynamics by further developing on Pantaleoni.

(14) Ibid, pp. 129-30.

(15) Frank A. Fetter (1863-1949): *Principles of Economics* 1914, See pp. 134-45 on the subject.

III. MOORE'S DYNAMIC THEORY AND THE INFLUENCE FROM PANTALEONI

Moore published his great work, *Synthetic Economics*, in 1929.⁽¹⁶⁾ Comprehensive of various subjects at issue, this is a difficult book to understand. Here are presented only a summary of the important points in his thought on dynamic economics. They are:

- (1) A study of the oscillation near an equilibrium;
- (2) The case where equilibrium occurs discontinuously, and a study of the oscillation in its vicinity;
- (3) A study of the continuous function of time element, and the advice that it will serve as scheme in the analysis of an economic fact;
- (4) A study of continuous function, the oscillation factors and noneconomic factors working through time path;
- (5) A study of the sociological interaction in economics.

The studies (1) and (2) do not go beyond the scope of comparative statics, the same as the case of Barone's.⁽¹⁷⁾ So, we pass them over with a mere mention. But (3) and (4) should be significantly attended, as time element is introduced in them, enlightening us on dynamics. Pareto had referred to the matter, though inadequately.⁽¹⁸⁾ Moore, however, perceived it possible to make dynamics of economics by taking in time function as an application of dynamics in physics. This is certainly a significant approach, but it does not follow that he succeeded in the establishment of dynamic economics well equipped with time element, as will be seen with the "theory of price fluctuation" presented in the following paragraphs. In (5) is explained the importance of the social factor in practical dynamic economy, that is, what kind of social factor is involved and in what way it affects economics.⁽¹⁹⁾

On the basis of the dynamic economics as described above, Moore made public his *Theory of Price Fluctuation* in 1926, that is, his discussion on "Pantaleoni in the Theory of Price Fluctuation."⁽²⁰⁾ This work was commended by Schumpeter as the first endogenous theory in his *History of Economic Analysis*, 1954.⁽²¹⁾

(16) *Synthetic Economics*, 1929.

(17) "Sul trattamento delle questioni dinamiche," *Giornale degli economisti*, 1894.

(18) "Appendice: Se equazioni dell'equilibrio dinamico," *Giornale degli economisti*, 1901.

(19) It is important to give a fuller discussion on this subject, but it is only lightly treated here, as the emphasis is rather put on the problem of the theory of price fluctuation.

(20) "Pantaleoni's Problem in the Oscillation of Price," *Quarterly Journal of Economics*, 1926.

(21) J. A. Schumpeter: *History of Economic Analysis*, 1954, p. 857.

In the *Theory of Price Fluctuation*, Moore renders a high tribute to Pantaleoni and admits that his theory of price fluctuation was derived from Pantaleoni's dynamic thought.

Pantaleoni published an essay⁽²²⁾ in the *Giornale degli Economisti*, writing as follows: "The field in which the idea of elasticity of demand is not exploited is this: the correlation of prices of distinct commodities is a function of the elasticities of their curves of demand: if one price varies, the correlations of the other prices will vary according to the elasticity of demand of the commodity that initiates the change: until this field is adequately explored it will not be possible to have an economic semiology. (Il campo in cui l'idea elasticita di domanda non e sfruttata e questo: la correlazione dei prezzi di merci distinte e una funzione della elasticita delle loro curve ai vari prezzi di cui le curve sono il locus. Le correlazioni mutano assai radicalmente se varia un prezzo, a seconda della variazione dell'elasticita della curva della merce il cui prezzo e variato. Non sara possibile una semiologia economica prima che questo campo non sia stato adeguatamente perlustrato.)"⁽²³⁾

Enlightened by the above, Moore studies the partial elasticity of demand⁽²⁴⁾, and formed his theory of price fluctuation on that basis:

(i) First, by approaching the general demand function:

$$1) \log y_p = \text{constant} + \alpha_{p1 \cdot 23 \dots n} \log x_1 + \dots + \alpha_{pn \cdot 12 \dots (n-1)} \log x_n.$$

$$2) \log x_p = \text{constant} + \beta_{p1 \cdot 23 \dots n} \log y_1 + \dots + \beta_{pn \cdot 12 \dots (n-1)} \log y_n.$$

The signs in these equations mean:

y_p is the trend-ratio of the price of commodity p ;

x_p is the trend-ratio of the quantity of commodity demanded, in case of commodity p ;

$\alpha_{pq \cdot 12 \dots (q-1)(q+1) \dots n}$ is the partial flexibility of the price-trend-ratio y_p with respect to the commodity-trend-ratio x_p ;

$\beta_{pq \cdot 12 \dots (q-1)(q+1) \dots n}$ is the partial elasticity of the commodity-trend-ratio x_p with respect to the price-trend-ratio y_p .

(ii) According to the equation (1), the following relations are clear:⁽²⁵⁾

a) The logarithmic oscillation of the price of goods is the linear function of the partial flexibility of the given price oscillation for the oscillation of the goods.

(22) "In occasione della morte di Pareto: Riflessioni," *Giornale degli economisti*, 1924, p. 3.

(23) *Ibid.*, Note on p. 33.

(24) "Partial Elasticity of Demand," *Quarterly Journal of Economics*, 1926.

(25) This is different from Professor Pantaleoni's formula. This was contrived by the writer so as to prove the matter empirically.

b) In the first approach the change in price oscillation reveals in accordance with the partial flexibility of the given price for the goods which initiates the change. $\log y_p$ changes according to $\alpha_{pq \cdot 12 \dots (q-1)}$ if x initiates the change.

(iii) A similar process can be conceived of the relations of the factors which compose partial elasticity.

(iv) The above-mentioned result seems to lead to some conclusions on the general price oscillation. If the price oscillation index consists of the individual oscillations as derived by the equation (1), the index will be expressed as follows:

$$\begin{aligned} n \log i &= \log y_1 + \dots + \log y_p + \dots + \log y_n \\ &= \text{constant} + \log x_1 \Sigma \alpha_1 + \dots + \log x_p \Sigma \alpha_p + \dots + \log x_n \Sigma \alpha_n \end{aligned}$$

This shows that the index by logarithm indicates the linear function of the sum of individual partial flexibilities in price.

(v) What is stated above seems to serve as a key to theorizing deductively on the statistically estimable periodic oscillation or its cycles. The importance of an article in price oscillation is proportionate to its statistical weight and its price flexibility. It seems that, if many economically important goods that have the high price flexibility or the low income elasticity of demand should go through a definite cyclic process on account of the influence from a natural factor, the result will be the occurrence of a general price oscillation. For example, among the farm products, foodstuff, which has the relatively low income elasticity of demand and the relatively high price flexibility, should go through a regular 8 year period of trade cycle, the oscillation of general price would also occur in every 8 years.

The above is a brief summary of Moore's theory of price fluctuation.

While examining Moore's theory, I feel rather dubious if it is right to call it endogenous. For all this theory aims at is to point out the importance of a certain article in bringing about a general price fluctuation. It is a problem to take it as an endogenous theory, when all the fluctuation factors can be considered exogenously affecting it. Despite the fact, it does not follow that the epoch-making significance of this theory contrived with the idea of the elasticity of demand will come to nil, when we know that it was set forth with a meagrely provided method of scientific analysis.

IV. EVALUATION OF PANTALEONI'S DYNAMIC ECONOMICS

By recent economists, represented by R. Frisch and P. A. Samuelson,

various concepts as statics, dynamics, stationary state and evolution have been clearly defined. Having examined the thoughts on dynamics by Pantaleoni, Clark, Patten and Moore so far, it seems quite proper now to criticize them from the standpoint of dynamics as conceived by Frisch and some other economists, so that what errors they made, how they came to commit such blunders and to what extent they were near to the condition of perfection which we delineate, can be made clear.

Glancing over their thoughts, the first thing which strikes us is that they confused the method of analysis with the object of analysis in dynamics. Schumpeter points out: "Most writers confused them, witness the growing popularity of the phrase 'static state,' which is the hallmark of this confusion."⁽²⁶⁾ These scholars were no exception. Clark claims definitely that statics is only a model of stationary society, and dynamics, a model of evolutionary change. Pantaleoni states: "Static economics is thus the study of equilibrium positions. Dynamic economics, on the other hand, is the study of movements taking place in positions of disequilibrium and leading to a return to equilibrium positions. (La statica economica sara quindi lo studio di posizioni di equilibrio. La dinamica economica sara invece lo studio di movimenti manifestati in posizioni di disequilibrio che riconducono a posizioni di equilibrio.)" He also holds that dynamics can be properly studied through the object of analysis.

Among the economists who were in confusion of this sort, we find another type: those who identified dynamics with economic change, as was seen with Patten's concept on dynamics. To him, society is none but a historical existence; it is always dynamic, hence it is possible to have the science of dynamics. Pantaleoni, however, never conceived things that way.

The third confusion, or the imperfection in dynamic thought comes from the attitude which understands dynamics as the theory of the slight deviation from economic equilibrium, although it admits definitely that dynamics is a method for analysis. After all it failed to emerge from comparative statics. Typical of this was Barone.

Surveying in this way, we may say that the dynamics of Pantaleoni was not quite successful either in comprehending essential dynamic economics like those of contemporaries. But Schumpeter states: "All was not mere confusion. We also find suggestions that point toward the dynamics of our time. They were not more than suggestions, sometimes not more than obiter dicta. I can only refer to the (rela-

(26) A. J. Schumpeter: *History of Economic Analysis*, 1954, p. 966.

tively) clearest and most important of them, which are all due to Pantaleoni."⁽²⁷⁾ Wherein then should we find the values of Pantaleoni's dynamics?

(1) Pantaleoni states: How an observed composition of various elements in an economic system is related to the preceding original one should be studied as a positive problem with time element involved (not merely as a logical sequence of matter). This will be taken as his recognition of the basic point of dynamics;

(2) Pantaleoni's concept of dynamics is by no means satisfactory as was mentioned before, but he was resolute in the thought that economic statics is none but a particular case (*Caso Particolare*) of dynamic economics. Such a penetrating view held at the time when the core of economics was considered to be in its static phase, that is, in its self-completed perfection in a static condition, should certainly merit our appreciation;

(3) Pantaleoni recognized two types in dynamics: one which settles down to an equilibrium, and the other which continues to move on permanently.⁽²⁸⁾ This is the point which we value very highly, and because of this we consider his concept of dynamics very much like the one we hold now. The dynamics of his contemporaries was something more like Patten's. So we admire Pantaleoni's penetrating insight.

In spite of the worthy contribution to dynamics, Pantaleoni did not formulate his initial directive thought into a system of theories. It was Henry Moore who, being struck by Pantaleoni's view, came forward,—not necessarily successfully,—to attempt at the theorizing of dynamics in the direction that Pantaleoni had indicated. As was mentioned before, Moore's method amounted practically to a comparative statics. It should, nonetheless, be redited as a step forward over Pantaleoni's thought.

Moore's theory of price fluctuation is not such a superior theory of economic fluctuation, as Schumpeter describes. The best we can say of it is that it, taking into consideration the importance of the weight of goods in general price, correlated the prices of individual goods with the general price fluctuation. Concerning the cyclical factor for fluctuation, it is all left to the natural working of such an article as farm product which commands a large weight. In this sense, the fluctuation theories put forward about this time were merely exogenous. we find, however, some of them contain excellent ideas such as in

(27) *Ibid.*, p. 967.

(28) *Ibid.*, p. 967.

that of Arthur Spiethoff in that some endogenous concept was implied, although it was not properly formulated.

Considering, however, how ill-provided the scholars in those days were in devices for the analytical study of their subject, Moore's theory of price fluctuation should be paid a high tribute, as it is the reflection of his ingenuity. For all that, we had to wait for the advent of Keynes, that is, until the 1930's, when the dynamic theory of economic fluctuation came to be formalized into a system.

Moore's attempt to theorize economic fluctuation was by no means a success, but it should be admitted that his object was undoubtedly to change economics into a dynamic science, since his thought was formed clearly under the influence of Pantaleoni's dynamics.

Seeing that the expression, dynamic economics, was not even defined at the time when Moore launched out on his venture, we consider it quite natural that his theory was very inadequate. Here we should know how important it is to have a logically strict terminology for the development of any science. If the nature of statics had been more clearly defined in those days, the problem of dynamics must have attracted the attention of scholars more effectually.

V. A STARTING-POINT FOR THE DYNAMIC STUDY OF ECONOMICS A TENTATIVE CONCLUSION

In Pantaleoni's time, economics was considered static in nature, as was clearly so with L. Walras; it was a self-completed science, so-to-speak. And the scholars in those days, including Pantaleoni himself, were educated under the influence of this notion. Despite this, the possibility of going beyond the static aspect of economics was suggested. This was certainly a significant event in the history of economics, especially when we are aware that the present current of economics is moving toward its dynamic interpretation.

The writer does not dare say that Pantaleoni was the starting-point for the dynamic interpretation of economics. The reason is that, in spite of his ample suggestion regarding the direction which economics should take, he himself made no actual advance in that direction. But because of his suggestion and influence, Henry Moore made a step forward in that direction. In this sense, Pantaleoni may be rightly called the starting point in the genealogy of dynamic economics.

THE MAIN REFERENCES MATERIALS:

- (1) J. A. Schumpeter: *History of Economic Analysis*, 1954.
- (2) P. A. Samuelson: "Dynamic Process Analysis," *A Survey of Contemporary Economics*, ed. by Harris 1949.
- (3) Maffeo Pantaleoni, "Di alucuni fenomeni di dinamica economica," *Erotemi di economia*, 1925, Vol. II.
- (4) Henry L. Moore: "Pantaleoni's Problem in the Oscillation of Prices," *Quarterly Journal of Economics*, Vol. 40, 1926.
- (5) Jenny Griziatti Kretschman: "Storia delle dottrine economiche," 1954.
- (6) Gustavo Del Vecchie: "Vecchiee nuove teorie economiche," 1956.