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ARTICLE

Keynesian Economics—An Evolutionist Manifesto

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Abstract

The purpose of this paper is to sketch an evolutionist Keynesian economics and to discuss its micro-foundation and non-neoclassical character. The word 'evolutionist' means economics based on the multi-agent-oriented system, composed of agents following the satisficing principle. The word 'Keynesian' means economic theory closely based on Keynes' original works. First, we see the existing poor situation of Keynesian economics and argue what historical studies on Keynes' works should be. Second, we show our interpretation on what Keynes actually did and discuss its micro-foundation by satisfying group behaviour.

Keywords: Keynes, multi-agent-oriented system, micro-foundation, satisficing principle, historical time.

Where has Keynes gone?

Even in macroeconomics which is regarded to be created by Keynes' General Theory,[1)] his theoretical influence almost disappears today. This declining tendency becomes apparent, especially after the introduction of the hypothesis of Rational Expectation into macroeconomics by Lucas (1972), where a macroeconomic model is built in a neoclassical way.[2)] Moreover the Lucas critique (Lucas, 1976) shows that any change in policy systematically alters the structure of economy with optimal agents, and thus makes economists tend to regard macroeconomics starting from macro variables, namely IS-LM type Keynesian models, out of date.

Although the studies on micro-foundation are lead by the interest to rebuild macroeconomics on the basis of agents' rational behaviour, in its beginning, Clower (1965) and the following non-Warlasian equilibrium studies explicitly intend to show micro-foundation for Keynesian principle of effective demand, and some studies like that of Leijonfuhvud (1968) directly treat Keynes' works, not only General Theory (GT)

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[1)] Actually, macroeconomics is created by the interpretation of Keynes' GT as the IS-LM model in Hicks (1937).

[2)] On the 'neoclassicalization' of macroeconomics, see Yoshikawa (2000, chap. 1).

but also Treatise on Money (TM). However, after the Lucas critique, the micro-foundation does not necessarily mean that of Keynesian macroeconomics. Recently, especially in the RBC, macroeconomics seems to perfectly forget Keynes' theme.

On the other hand, historical studies on Keynes' works have been developed independently on the development of macroeconomic theories. With the publications of most of source books, papers and letters, including all those from the Collected Writings to the Keynes' Economic Papers, it has become far easier to access them than before. Thus studies on the history of the making process of GT come into a new phase, where precise treatments of those sources independent of any theoretical viewpoint are required. Hirai (2003) shows one peak point of this phase with its exhaustiveness. As its title goes, Hirai casts light on Keynes' works 'from multiple points of view', and describes such complicated phases that Keynes shows.

However, in the theoretical situation we saw above, what we want to know is whether Keynes actually made any theoretical system still meaningful today. Especially what we want to know is whether his message theoretically implies more than an expression of relation between aggregated variables or not.

What Keynes said vs. what Keynes did

To get a clear theoretical picture on this point, we must distinguish between what Keynes said and what Keynes actually did. We shall see the importance of distinguishing between them with the following quotations.

> In my Treatise on Money I defined what purported to be a unique rate of interest, which I called the natural rate of interest—namely, the rate of interest which, in the terminology of my Treatise, preserved equality between the rate of saving (as there defined) and the rate of investment. I believed this to be a development and clarification of Wicksell's 'natural rate of interest', which was, according to him, the rate which would preserve the stability of some, not quite clearly specified, price-level.
>
> I had, however, overlooked the fact that in any given society there is, on this definition, a different natural rate of interest for each hypothetical level of employment. And, similarly, for every rate of interest there is a level of employment for which that rate is the 'natural' rate, in the sense that the system will be in equilibrium with that rate of interest and that level of employment. Thus it was a mistake to speak of the natural rate of interest or to suggest that the above definition

> would yield a unique value for the rate of interest irrespective of the level of employment. I had not then understood that, in certain conditions, the system could be in equilibrium with less than full employment (GT, chap. 17, pp. 242–243).

Here, Keynes says he presumes full employment equilibrium in TM. And one may reconfirm it with next quotation from TM.

> This means, indeed, that in equilibrium—i.e. when the factors of production are fully employed, when the public is neither bullish nor bearish of securities and is maintaining in the form of savings deposits neither more nor less than the 'normal' proportion of its total wealth, and when the volume of saving is equal both to the cost and to the value of new investments—there is a unique relationship between the quantity of money and the price levels of consumption goods and of output as a whole, of such a character that if the quantity of money were double the price levels would be also (TM vol. 1, p. 132).

This quotation also shows that the definition of 'equilibrium' in TM includes full employment, and it seems to be an absolute proof that Keynes actually treated economics with presumptions of full employment. Thus almost all economists, including economic historians studying GT, regard TM as the 'classics'.

If this is the only definition of equilibrium in TM and if Keynes only describes economy as based on this 'equilibrium', indeed, their treatment is appropriate. However, the narrative next to the quoted part is, "this simple and direct quantitative relationship is a phenomenon only of equilibrium as defined above", and Keynes shows more general argument on monetary economy with a differently defined equilibrium. TM is described in a chapter named "The Conditions of Equilibrium". Keynes does not refer full employment as a necessary condition of equilibrium in this chapter, and his argument through TM does not need to presume full employment. Going back to the quotation from GT again, we can find that Keynes says "I had, however, overlooked the fact that in any given society there is, on this definition, a different natural rate of interest for each hypothetical level of employment". Contrary to his subjective judgment in GT, he actually uses the definition not implying full employment and even makes simulations with different levels of output and employment by himself in chapter 20 of TM.

Therefore, to get a clear theoretical view on what Keynes actually did, we must distinguish between what Keynes said and what Keynes actually did. We have no space

to check the entire differences here, but there are also important differences as following.

a) Although Keynes refers to the natural rate of interest which is from Wicksell in GT quoted above, and also states that is "following Wicksell", he defines "the rate of interest which causes the second term of our second fundamental equation to be zero the natural rate" (TM, p. 139), his actual definition of the rate never follows Wicksell's way.

b) Although Keynes admits 'the first postulate of the classics' as an important point of agreement in chapter 2 of GT, the making process of GT shows his argument on output level has been developed without notion concerning with profit maximization by entrepreneurs.

As seen above, Keynes actually did not develop his economic theory on the basis of standard notions in economics, such as the profit maximization behaviour or the demand=supply equilibrium. What kind of economic theory did he actually develop then? As briefly shown in Yoshida (2001), the main points of our reading result in what he did are;

1. Most variables in TM mainly appear as price variables because Keynes intends to show plainly their relation to the quantity equation in Tract on Money. However, these 'prices' are not 'prices' normally used in economics, but only average prices which is defined as sales divided by quantity of production, which do not imply the one-price-one-goods or market clearing prices. As the production quantity is fixed and given by production in the past, sales are the only importance in the formula.

2. The first fundamental equation (sales of consumption goods=production cost+profit=income−savings) in TM shows the orientation of production and employment adjustment by entrepreneurs of consumption goods production sector according to the sign of the profit.

3. The sales of the consumption goods, i.e. the consumption expenditure, depend on the income which is determined by the employment level of consumption and capital goods production sectors in the last period.

4. If one combines these processes in 2 and 3, one can construct the multiplier process on the basis of group behaviour. However, such a description is fully dropped in GT.

5. Keynes also describes group adjustment behaviour of entrepreneurs of capital goods production sector, assets holder, and banking system (as a policy control variable) in TM. Since his argument is essentially built on the combinations and simulations of these group behaviour, we can formulate our basic system as the following difference

equations;

$$X_j(t+1)=A_j\cdot F_j(\sum w_{ji}X_i(t)-S_j+Z_j(t), B_j) \quad (j=1,\ldots,n)$$

where X_j is the adjustment output of j-th group, A_j is the parameter of maximum adjustment quantity, $F_j(\ )$ is a threshold function whose minimum/maximum value is ± 1 and whose output is 0 when the absolute value of the input does not exceed B_j, B_j is the buffer size of the j-th group, w_{ji} is the weight to estimate the adjustment output of the i-th group, S_j is the satisficing standard of the j-th group, and Z_j is the stimulation to the j-th group from outside the system.

As is summarized above, concerning about the micro-foundation problem, we can see group behaviour behind the relation among macroeconomic variables described by Keynes. If one couples such group behaviour and traces the interaction of their outcome, Keynesian macroeconomic relation is easily found as the result, including the principle of effective demand as its special case.[3)]

Micro-foundation reconsidered by evolutionist Keynesian

Thus we can directly see a micro, or less-macro, foundation in macroeconomics in a different manner from the neoclassical here. Such group behaviour foundation is our first answer to the question of whether Keynes thought more than a mere relation among macroeconomic variables or not. However, to fully settle the micro-foundation problem, we must argue the reason why we build macroeconomics not on the basis of optimising individual behaviour but on the basis of satisficing group behaviour. Therefore we must make the inside of the group behaviour clear.

A clue to answer this question exists in the definition of equilibrium. The equilibrium in TM is defined as a condition where both of the profit on consumption goods and the profit on investment goods are zero. Each profit is defined as value of output minus cost of production, where value of output just means sales and cost of production contain normal profit for entrepreneurs. The ‘normal’ profit means the profit level which will not cause entrepreneur groups to change their output level in average. However, in the equilibrium, i.e. zero profits, Keynes also states,

> The reader will appreciate that the condition of zero profits means that aggregate profits are zero. For a stability of the price level as a whole is perfectly compatible

[3)] For example, see chapter 6 of Yoshida (2003).

> with the profits of particular entrepreneurs or particular classes of entrepreneurs being positive or negative, just as it is compatible with the prices of particular commodities rising or falling (TM, p. 137).

This quotation suggests that group behaviour is a result of aggregated individual behaviour. Even in the case of zero aggregated profit, there can be individual entrepreneurs with positive or negative profit. Since production adjustment is executed by each entrepreneur with different adjustment reaction, zero aggregated profit does not necessarily mean strictly zero aggregated production adjustment. Therefore, one should define the equilibrium as either zero aggregated profit or zero aggregated production adjustment. But a more important point is that group behaviour is constructed by individual behaviour. On individual behaviour, Keynes states,

> . . . even when one is dealing with separate industries, or separate groups of industries, my supply curve is one which relates output and profit, not one which relates output and price (CWK 8, p. 380).

Since the 'supply curve which relates output and profit' means satisficing behaviour and the 'supply function which relates output and price' means profit maximization behaviour, this quotation states that individual industrial behaviour is the same type as group behaviour, i.e. satisficing behaviour. Then the answers to two questions challenge us. The first one is what procedure connects individual behaviour to group behaviour, and the second one is why we should formulate individual behaviour as satisfying behaviour.

To the first question we have three answers. Firstly, put individuals with similar type behaviour into one category, and then;

1. If it is appropriate to consider timing of individual behaviour to be synchronized, one can just bundle it and makes a group behaviour process.
2. If it is appropriate to introduce interaction among individuals and to formulate group behaviour as a state where the interaction is fully spread, one can use random access neural network model to formulate it.
3. If it is appropriate to suppose an intermediate state between the above two cases, where the interaction is not fully spread, you can introduce an interaction coefficient to reflect the strength of interaction, which amplifies a group adjustment output.

To the second question, we must argue the characteristics of our Keynesian

economics. We choose the satisficing behaviour as the standard description for the behaviour of an economic agent in a huge and complex real-working system. Unless time is irreversible and entrepreneur's production function is not given in a simple and returns-decreasing form, profit maximizing cannot be a proper description for the behaviour of actual entrepreneurs. With limited ability to gather and deal with information around him or her, an individual can only execute his or her customized routines which originally acquired from the existing world. One may think that, regarding satisficing standard as given sounds too ad-hoc, each agent must have the satisfying standard as his or her reference point to make decisions, since our model is presumed to work out of its equilibrium and signals to each agent are not integrated into a global price vector. Of course we can introduce learning into our behavioural model, however, learning takes a certain time longer than behaviour timing. As time is irreversible in the real world, a circumstance around an agent is not always the same, so learning is not usually timely enough. Hence we consider that satisficing behaviour principle is appropriate for the first approximation of agent behaviour.

Neoclassical economists may argue;

> Although an agent may be irrational, a behavioural model based on the irrationality can only be a description of a phenomenon at most, because irrational behavioural models can exist infinitely. By contrast, the rational behavioural model, i.e. a behavioural model based on profit or utility maximization under budget or technology constraint, is narrowly limited, and we can measure irrationality only by the rational standard.

However, our satisficing behaviour model is not given by an arbitrary selection, because it is chosen as an ideal model of behaviour of observed agents in the actual world.

Furthermore, our aim to make a model for social science is not to evaluate the distance from the impossible rational state but to understand the mechanism of behaviour of the actual economic system.

Conclusion

From what has been sketched above, we conclude that, in opposition to the neoclassical macroeconomics today, we can construct an evolutionist Keynesian economics as a multi-agent-based simulation model based on a micro-foundation as satisficing group and individual behaviour. As each group or individual has its reference point in satisfying standard, it can make decisions autonomously in irreversible time, regardless of whether the system is in equilibrium or not. The time irreversibility is also referred to

by Robinson (1971) as the 'historical time' concerning with the uncertainty, but in our version of Keynesian economics, it plays an important role in the system working circumstance. Adding to this, our evolutionist Keynesian model is an embodiment sample for the loosely coupled system denoted in Weick (1976), which contrasts with the tightly connected and fine tuned system of the neoclassical economics. We hope trials by evolutionists will open a new frontier in social sciences.

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