Notes on the Historical Approach as a Methodology of Macroeconomics: A Critique to Contemporary Macroeconomics

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Abstract

This paper proposes a path for macroeconomic analysis as an alternative to orthodox analysis because the latter cannot successfully describe the reality of an economic society with the following essential features: 1) the structure of the macroeconomy is basically a system open to the outside; 2) variables within the system are frequently affected by factors outside the system; 3) variables are constantly being influenced by newly emerging factors; 4) the subject of analysis is an aggregate rather than individuals; 5) people usually behave by considering the situation and changing their initial plans; 6) interdependency and feedback form the basic structure; and 7) people do not always behave rationally, and they tend to have some bias in their cognition. If economic society presents all these inevitable features, historical analysis as an evolutionary perspective might be an alternative method for economists.

Keywords: Macroeconomic Analysis, Positive Economic Study, Historical Analysis, Evolutionary Theory, Economic Developments

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1. Introduction

Since Lucas's (1976) renowned critique of econometric policy in 1976, it has been clear that there is no end to methodological problems for fundamental economic analysis, even in recent decades of macroeconomic study. This situation ironically looks similar to the historical experience of Marxist economics, who were hated by most orthodox economists, from the postwar period to the 1990s in Japan. This phenomenon is very curious.

Nobel Prize winner in Economics 2018, Paul Romer, used to describe the current macroeconomic situation in his discussion paper (2016) as follows:

> "The real trouble is that other economists do not care that the macroeconomists do not care about the facts." (Romer (2016), p.22)

As he deplores, if macroeconomic scholars truly do not care about facts and findings, macroeconomics is nothing but a pseudoscience. Unfortunately, we must say that macroeconomics remains a pseudoscience because it is not clear even now what fundamental methodology we should use to analyze the subjects of observation, such as the macroeconomy or economic society.

Every year, however, many papers relating to real business cycle theory, Dynamic Stochastic General Equilibrium (DSGE) and game theory are published[2]. To publish those papers, it seems that technical and mathematical methods are preferred more than descriptive explanations. Using fashionable methods as quickly or elegantly as possible, as famous economists or first-rank journal publications have been doing recently, appears to be more important than shedding light on real economic mechanisms. If this is the case, the situation must be a kind of serious intelligent devolution generated by a devotion to publishing many papers.

This situation highly resembles the history of Marxian economics in Japan, a field of study that has declined drastically since the 1990s. It was highly important for Marxian economists to remain faithful to Karl Marx and his book, Capital, or to be connected with scholars and established schools as authorities. However, they did not address actual economic or social problems, indicating that these scholars' priorities were mistaken. Marxian economists preferred to publish books over many papers. This attitude is in contrast with the inclination of modern macroeconomists. Marxian economists also gave high priority to the interpretation of Marx's texts and the authority of academic society, while they did not seem to care about practical problems and actual economic policies. As a result, Marxian economics has drastically declined, especially since the Cold War.

[2] According to Science Direct, more than 100 relevant papers within the fields of RBC and DSGE have been published per year in the last decade (1,000 in total). There are many more papers published related to game theory.

This situation in Marxian economics is equivalent to the current situation in macroeconomics.

The common point between these two fields is that the discussion of methods, which economists can use to shed light on the mechanisms underlying actual economic situations and social facts, is completely left behind. The methodological approach to the actual economy and society is not a simple subject that we can easily address. This complexity is quite obvious because we could not even forecast the most recent economic crises, such as 2008 and 1997, even though approximately 300 years have passed since economics was born. In addition, scholars often argue for the implementation of totally different and sometimes contradictory economic policies to address the effects of crises and recessions. Why does such a situation often occur? Where does such a situation come from?

This paper re-evaluates the path of classical economics by critically thinking about the fundamental methodological problems of current economic study. Macroeconomics should rethink itself by turning back to basic matters. In particular, this paper tries to adopt the empirical point of view: our research question is whether current macroeconomics and econometric methods show us a bright future for economic analysis. Our conclusion is, unfortunately, "No". Why not? What types of methods are effective? This paper will answer these questions.

2. Lingering problems with Macroeconomics

Recently, some interesting papers about the methodology of economics have been published, all pointing out essential problems within economic analysis.

Paul Romer (2016) deplores the weaknesses of current macroeconomic research and criticizes Lucas's outcomes and his criticism of macroeconomic policy based on a structural econometric model. In particular, Romer warns against negative influences on economics through factionalization or links with Prescott, Lucas and Sargent. According to Romer, technological change in a society cannot be explained by these scholars' approach, which conveniently describes technological change as an exogenous variable. Such research does not represent empirical economics. Romer, however, does not mention which form of economics is then useful.

Samuel Bowles, Alan Kirman, and Rajiv Sethi (2017) note an unsolved problem in economics that Hayek mentions in his series of works—that the essence of an economy is a variety of consecutive innovations and price changes on the market. Bowles, Kirman, and Sethi argue that economics needs an appropriate framework of disequilibrium dynamics to describe these constant changes in actual markets. However, they also do

not propose a concrete framework or method to achieve this.

The argument between Leamer and Angrist and Pische[3] is also interesting. Angrist and Pische are leading researchers of causal inference analysis, and they insist that identifying causality in economic analysis is possible and significant and that causality is different from mere correlation among variables. According to Leamer (2010), however, economics is a type of fiction and not genuine science. He declares that a narrative or plausible explanation according to a likely story is important for economic analysis. He then criticizes Angrist's causal inference for its arbitrariness and the difficulty of choosing appropriate explanatory and instrumental variables. Because Leamer is a professor of econometric methods, his claim is not based on illiteracy in statistical methods. The counterargument from Angrist and Pische (2010) states that it is possible to determine causality even in social sciences and economics, depending on the design of the analysis, although there are, of course, some limitations in economics. This response is a typical reply, reflecting the recent shift of econometric methods into causal inference approaches. However, which type of analytical design is appropriate is left unaddressed even in their reply. Their books related to econometric methods might answer Leamer's criticism, but they do not necessarily provide clarity.

Don Ross (2014) and Ladyman and Ross (2013, 2009) attempt to find a basis for economics as a "special science" from the stance of economic philosophers by comparing it with natural sciences, including quantum physics and neural network systems. They note that macroeconomics may develop as a policy science, using a statistical approach and probability theory. However, they do not develop their own analytical methods, and their thinking on economic development still reflects a naïve stance described by technological progress and population change, similar to Solow's growth model. Likewise, they do not theoretically analyze why and how those technological progress and population change can be generated in the economic development process.

Brian Epstein (2014,2015) presents an opinion from the perspective of a noneconomist. He considers the comprehensive methodological problems of social science as a philosopher. Epstein (2014) claims that microfoundations cannot explain the "supervenience" of the macroeconomy, and his theory is elaborated in Epstein (2015). The definition or meaning of supervenience is not clear, although the opinion that a microfoundation reflecting the accumulation of microeconomic facts cannot underwrite macroeconomics sounds reasonable because the scope of macroeconomics differs from that of microeconomics. However, this opinion is not new. The more serious problem that he does not propose an alternative method to replace traditional economic analysis.

[3] Angrist & Pische (2008, 2014).

Turning to the considerations by nonscholar Matt Ridley (2015,2010) is quite interesting. His opinion as a science writer is very simple: the main principle of economic development since Adam Smith and David Ricardo is purely based on a trade. Ridley (2015) tries to apply his thought to an entire social evolution framework to re-evaluate human development[4]. The implication of his works is that the historical view of social science is more important than various analytical methods, which is highly suggestive for us. According to Taleb (2012), Ridley's thinking is introduced as an anti-teleological argument[5]. In fact, macroeconomics would not follow any teleological approach, such as an optimization theory of microeconomics, if we accept the evolutionary framework for the social sciences.

The arguments above show that these authors are debating the appropriate methods for and empirical approaches to economics, especially macroeconomics, and that there is no decisive method for macroeconomic analysis. The elaborate quantitative and mathematical models in economics could make the essence of the problem unclear. Model analyses in economics assume that the economic structures and the circumstances surrounding them are unchanged, which in practice means that they concern very short-run scenarios. As long as the assumption is for the short run, such methods may be effective and lead to sharp and clear conclusions. However, whether particular variables affect a dependent variable to the degree estimated according to the parameters always depends on the particular situation, and the specified period varies (from the historical long run and to just one day). This is the true difficulty in economics and social sciences: it is impossible for economics to allow us to perform an experiment in which we can completely control all variables or all circumstances except the one point that we want to question. If this characteristic is an inevitable component of macroeconomics, we must consider the method itself more deeply.

3. Two ways in economics

The orthodox macroeconomics taught in the faculty of economics must be a kind of "applied public finance" or "applied public economics" and requires time or space to explain the effects of fiscal and monetary policy[6]. It focuses on analyzing how the main macroeconomic variables, such as national income, prices, interest rates, unemployment rates and exchange rates, are affected by public economic policy. It also analyzes how consumption, investment and international trade are influenced as a result and the

[4] This point of view is essentially same as that in Ichihashi (2016).
[5] Taleb (2012), pp.233-234.
[6] e.g., Mankiw (2009).

feedback to earning income. In addition, macroeconomics seems to specialize in more technical topics, such as the dynamic optimization of economic growth[7].

While these topics are naturally important issues, they cannot well explain the entire movement of the macroeconomic system. While fiscal and monetary policy surely affects prices, interest rates and exchange rates to some extent, consumption, investment and international trade are determined not only by fiscal and monetary policy but also by prices, interest rates and exchange rates. In other words, a certain economic activity could be predicted to influence economic variables in some way, but it is impossible to exactly predict which factors determine economic activity because economic activity is not affected by only economic variables. This point differs from predictions in physics. In general, physicists analyze how a cause results in an influence, but they are not interested in the factors setting up the cause. In economics, however, the factors selected to describe economic activities cannot usually be ignored.

Aggregated macroeconomic activities (especially expenditures) are affected by a number of comprehensive and complicated factors. This understanding has been prevalent since Karl Marx more than 100 years ago. However, it does not seem that a new comprehensive economics has yet been established to replace orthodox macroeconomics. Economists know that many predictions for economic policies have been proven false, but they do not have an alternative frame of reference for understanding economic society as a whole. Addressing this problem is essential.

Here, let us summarize the directions of macroeconomics once again. In broader sense, there are two paths in economics. One path analyzes the effects of a particular macroeconomic policy, such as fiscal and monetary policy, or local economic policy, including subsidy[8]. This analysis is supposed to be able to identify the policy's effects by comparing a policy-treated group with a nontreated group for causal inference. In recent microeconometrics, this type of analysis has become common. The method used in such analysis is based on orthodox statistical tests, which are reasonable. However, even with this method, the observation of counterfactuals remains impossible, and it must rely somewhat on estimation. Therefore, it likely entails some bias or errors. In addition, there is a decisive limitation in that we cannot recognize the differences between those biases and the actual counterfactuals.

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[7] For example, Acemoglu (2009).

[8] There are many similar studies, such as repercussion effects analysis with the CGE model and the classical Leontief model, and others that examine the causal impacts of a particular policy using econometric models. Miller and Blair (2009), Khander, Koolwal and Samad (2010), Morgan and Winship (2007), Imbens and Rubin (2015), Imai (2017).

Another path of economics has more serious problems. Along this path, scholars empirically analyze the laws of the dynamics of a whole economy, which would be the basic research aim of the economics field. The general equilibrium theory is an example of this path[9], as is the development stage hypothesis in Marxian economics. However, if we cannot methodologically describe the whole economy to begin with, it must be impossible to find the laws underlying the economy. The current deadlock of macroeconomics must come from such methodological and structural defects. For instance, the CGE model represented by DSGE has become a large equation system, and it appears to be a black box because the analytical framework is becoming increasingly complicated and redundant. As a result, a universal formula for an economic society may be only an accounting identity (that is, a clearance condition). Only the accounting methodology (which many economists may not like very much) is a reliable tool. In this sense, the System of National Accounts (SNA) might be an effective quantitative method[10]. This method of accounting and aggregation, however, only shows the identity of an accounting balance. It does not offer any principles, laws or clues for changing the balance because the original purpose of accounting was to record the amount of economic transactions on a balance sheet. If we try to analyze the principles and disciplines that might exist behind the accounting balance, a framework to describe the whole object is a must. Therefore, we must return to the starting point. However, if we cannot avoid the structural limitations of economic methodology in describing the entire economic situation (except in the case of accounting balances), the methods used must include a complimentary historical inquiry and statistical analyses without any ad hoc premise about the economic structure.

4. Quantitative method limitation in economics

Here, let us introduce the typical structural problems of empirical economic models. There are two types of problems. One type concerns the estimation problems of a specific structure equation, and the other concerns the causal inference in regression models, which show an average trend.

First, assume the following linear macroeconomic model, including predetermined variables, as an example of the structural equation:

$$X_t = \sum_{i=0}^{p} AX_{t-i} + CF_t + u_t, \text{ where } t = T.$$

[9] GTAP is one of the representative projects of the CGE model.
https://www.gtap.agecon.purdue.edu/default.asp

[10] Ichihashi, Ochi and Yasutake (1999) mentioned the significance of the accounting framework of macroeconomics and the relationship with the general equilibrium theory (Walras law).

where X is a vector of endogenous variables (k x 1) in the targeted system, F is a vector of exogenous variables (n x 1), A is a coefficient matrix of predetermined variables (k x p), C is a coefficient matrix of exogenous variables (k x n) and u is the vector of unobservable variables (k x 1). Additionally, i is time lag and t is time.

Simplifying this model, we can obtain the next equation:

$$X_t = WM + u_t,\ \mathrm{t} = \mathrm{T}.$$

where M is an independent variable vector, including all endogenous and exogenous variables in the system ((p+1+n) x 1), and W is the unknown coefficient matrix (k x (p+1+n)). Transforming this equation,

$$X_t M' = WMM' + u_t M'$$

$$\therefore W = X_t M'(MM')^{-1} + u_t M'(MM')^{-1}.$$

We assume that the second term on the right-hand side can be ignored, which means that if a determinant of the symmetric matrix MM' is not singular, there is an inverse matrix, and the coefficient matrix W can be calculated. Even if the determinant is zero, the coefficient matrix W can be calculated by the submatrix obtained after excluding the linearly dependent vector. This model is available in a comparative static analysis, for example, estimating W_t between two periods, such as t=T and T+j.

One feature of this model is that it includes exogenous variables determined outside the system in addition to endogenous variables and predetermined variables within the system. If those exogenous variables do not affect endogenous and predetermined variables at all, their coefficients must be zero; thus, many exogenous variables that appear to be unrelated to the other variables at first sight can be included in the model.

This type of model can be significant to some extent when the economic system is stable. For example, the coefficient matrix of the input-output model is currently used for the analysis of economic structure and the repercussion effects of economic events since it is known from experience to be relatively stable. It is also available for comparative static analysis and decomposition by factors. However, the real economic structure is always changing. Therefore, economic analyses with many fixed parameters face a serious defect from the outset. This limitation has long been criticized.

The next problem of the empirical economic model relates to econometric models and statistical analyses that are based on a probability distribution. Typical examples are traditional regression models, which come from OLS methods, using cross-section or time series data, for which there are many applications and techniques. This approach is completely different from the former concept of structural models because it treats data as a sample from a population.

Let us consider the characteristics of panel data analysis, a method that is also based on OLS. Time series models, such as VAR, VECM and GARCH, are similar applications of OLS as well as unique tests for the unit root and cointegration.

$$y_{it} = X_{it}\beta + u_i + v_t + \varepsilon_{it},$$

where $i = 1,2,\cdots,n, t = 1,2,\cdots,T$. Here, y_{it} is a dependent variable for item i and time t. X_{it} denotes a vector of independent variables (1 x k), u_i is item i's own time-invariant variable, v_t is a time-variant variable across items, and ε_{it} is a disturbance term. Data size should be i times t. The method for the estimation of parameters is commonly based on the statistical evaluation of samples of (i x t) data. Therefore, this is an analysis of average trends, which is based on the estimation of mean and variance (therefore, on the premise of probability distribution). This method is essentially the same as descriptive analysis, as it looks for trends in aggregated data.

This style is not only used for econometric models but is also common in other empirical sciences, such as physics. The main difference between the social sciences, especially economics, and empirical studies in other fields is that the objects (and their groups) under analysis behave according to their will or intention. Therefore, they may commonly change their actions and plans under given conditions. This difference from empirical studies in the natural sciences is crucial. Although the most similar field in the natural sciences would be biology, complex human behavior is much more challenging to understand than other biological behavior. In particular, the human behavior of trading or exchanging goods via money or other methods is one of the most important features of economics, and this has never been seen in other species; furthermore, the behavior itself is very complex, distinguishing it from other biological behaviors.

The social behavior developed by exchanging goods under external environments in constant change might set a decisive limit on quantitative empirical analysis in economics or social sciences except for an average analysis by sample data (e.g., correlation analysis or limited causal inference) and trend analysis by aggregated data.

5. Characteristics of economies

As mentioned above, the following result rationally appears: as shown in the Copenhagen interpretation in quantum mechanics, the current mathematical models in economics are unlikely to describe a realistic economic society. The reasons are as follows:

1) Variables within a given system are frequently affected by factors outside the

system[11]. Not only consumption and investment but also other variables, such as stock price and exchange rate, are usually influenced by factors outside the economic system. Political regime change, natural disasters, religious movements, etc., can affect production and income equally or sometimes even more than economic variables, such as international trade and price changes. These noneconomic variables can be seen to change randomly, so it is impossible to predict which factors would have an effect and how large the impact on economic variables would be. We cannot completely control all external variables and make repeated experiments like physicists can. In the social sciences and economics, some variables or factors, such as the tax system, monetary flow, prices, interest rates, exchange rates, unemployment rates and wage levels, can be treated as manageable policy variables, but it is undesirable to try to construct models perfectly controlling not only other economic variables on the demand side but also natural factors, demographic structure, culture, civilization characteristics and political institutions.

2) Those variables are also influenced by newly created factors, such as innovation[12]. In addition to noneconomic factors, new inventions and discoveries frequently influence economic variables. We can find many examples, such as guns, gunpowder and printing techniques in the middle ages; the invention of steam engines, the discovery of electricity and the development of transportation during the Industrial Revolution are also typical examples for modern social development. For today's society, the development of the Internet and the invention of cellular phones in the late 20th century are key inventions. As Schumpeter noted, innovations can occur in any production process, from the procurement sourcing of raw materials to the reform of organizations, but innovative changes are not limited to production processes. Any change could affect a number of economic variables. However, the problem is that it is not possible to predict when and how such inventions and discoveries will occur. Our society is strongly influenced by uncertainty, and this character of society is not treated in other empirical sciences.

3) People usually behave by considering a given situation and changing their

[11] The idea that society is fundamentally an open system is often found in the opinions by experts who are not economists, for example, Prigogine and Stengers (1984), Soros (1998). Similar opinions by economists are found in, e.g., Lawson (1997) Chap.18, Dow (2002).

[12] This is pointed out by Schumpeter and Marx. In addition, the point that a simple summation of individual activities across a society cannot be considered a macroeconomy is mentioned in Kirman (2011) and Reinert (2007). For example, synergy effects that come from social cooperation or coordination cannot be explained by the simple aggregation of individual independent activities.

initial plans. Real economic variables, such as prices and exchange rates, vary continuously. In fact, the demand side (expenditure) and supply side (production) in an economy cannot be treated equally. Because neither represents symmetric human behaviors, they should be balanced in terms of accounting rule. We know that producers on the supply side could basically produce products as scheduled, but the behaviors of consumers and investors on the demand side can often change their plans due to caprice or chance. For example, a person does not usually decide during the daytime what he or she will eat for dinner. The demand side in a macroeconomy also changes frequently due to such incidental factors. On the other hand, due to the constraints of the supply side, which is relatively inflexible, undersupply or oversupply in the market occurs. Therefore, it is highly improbable that a transaction can meet an equilibrium (optimal) point in a market as assumed by microeconomic textbooks. In addition, many people behave by watching some variables, including prices, although such information for goods and services could be different in each region or each store, which means that the law of "one price for one good" does not hold. These differences would become greater as the market prices perishable foods, while changes in the exchange rate and interest rate can be more easily captured. It is troubling that these observations differ so much every time we measure them[13].

4) Interdependency, with one factor affecting another, and feedback represent the basic structure of the economy. Interdependency itself can affect people's behavior. Because the fundamental principle of economic development is based on production and trading goods, it is obvious that interdependency plays an essential role in economic development. People often plan their behavior assuming interdependency in transactions or activities, so their behavior feedback to the whole system can affect all members of the system. A typical example of that is finance, which is based on the credit of each party. The assumption is that there is continuity and development of transactions by traders or investors. Borrowers of funds plan collaboration with their business partners considering a market situation and a relation to other companies, and business rivals behave following a similar strategy. Thus, as a result, a game-like situation would soon occur[14]. However, many more players than assumed

[13] Galbraith (1977) and Kahneman (2011) mentioned the influence of such uncertainties on our society.

[14] Leontief (1966) clarified the simple linear model of social interdependency in industrial sectors and

in game theory are playing in society. In addition, it is impossible to predict which situations affect the assumptions before the game starts.

5) The entire economy or society does not have its own purpose, unlike individuals and despotic states. Therefore, the optimization behavior of individuals cannot be observed in the entire economy[15]. Consumers are expected to maximize their utility in economics, but it is generally unknown which type of utility they are interested in. Even if we can assume that the pursued utility is known, orthodox economics holds that it is difficult to compare the utility of each consumer. Likewise, producers are expected to maximize their profits or minimize their costs, but the correctness of this assumption holds in only very limited situations. As business and management scholars have argued, it is well known that firms often behave as though they want to maximize their dominance in a market. A typical example is the existence of giant companies in the Internet business, such as GAFA. It is commonly said that Amazon ran a deficit for approximately a decade after it was established. In addition to these key players in the economy, public sectors, such as government institutions, affect economic transactions to create effective demand, as Keynes suggested. Although it might be possible to justify the hypothesis that public goods are provided by bureaucrats and politicians to maximize social welfare, the results depend on the definition of social welfare, which could be completely different for different types of public goods. Because each player behaves according to a unique purpose, the advance formulation of the certain purpose and optimized behavior of an entire society is impossible. The only desirable goals that an entire society may share are the protection of people's lives and property or the preservation of peace; such goals are often abstract and therefore unmeasurable.

6) In addition to the issues above, people's behavior is not always rational, and they tend to have some bias in their cognition. They often change their behavior due to emotional factors, reputational risk being a typical example. As psychologists have noted, people's perceptions and behaviors are not only less effective but also less rational than economists assume. Their plans are often affected by the characteristics of the society and the region where they live and

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the feedback mechanism by each investment. Hirshleifer and Riley (1992) explained the game situation under asymmetric information and uncertainty.

15 This kind of criticism has been a common criticism of neo-classical economics for decades. For example, Simon (1947, 1957) is well known for his bounded rationality concept, which has been often used in models of economic theory. Another criticism of optimal behavior in economics is Shiozawa (1990) in Japan. His opinion moved toward the broader direction of "complex systems", but his points have little clarity, and he does not appear to propose an alternative methodology.

are easily influenced by climate and natural conditions. Additionally, such plans could be changed even by religious belief, prejudice or superstition on the part of society. Political expressions, human relationships in the workplace and family relations could affect peoples' plans as well. For example, an offense caused during a dispute between husband and wife might have a serious influence on the behavior of each. Moreover, physical conditions in the morning, such as blood glucose level and metabolism, and even feelings, can change our behavior throughout the day. People's behaviors might be rational, of course, but they can also be irrational and incomprehensible. In addition, our cognition itself is characterized by biological or evolutional biases, as Kahneman and Taleb argue. For example, there is a cognition bias that reacts more sensitively to a loss than to the same amount of profit. We also tend to irrationally assume that the situation tomorrow will be similar to the situation today[16]. Considering these human characteristics, it is obviously unreasonable to assume that human economic behavior is effective and rational.

These features are essential for economic society, and current mathematical models cannot exactly describe them. At most, we can use these models only for trend analysis based on aggregated data or prediction based on the average characteristics extracted from circumstances that are changing every moment.

If this conjecture is correct, then viewpoints from qualitative analysis are always necessary to complement the current limit to quantitative economic analysis and to make the social sciences more comprehensive. This necessity means that the perspectives of evolutionary theory or historical analysis are a must for economic analysis when observing the economy and society. Here, historical analysis can be defined as 1) a comprehensive framework used to capture changes in the economy over time (not a parametric method of structural equations), 2) a description of human behaviors as a premise for the changes in the system and 3) the intention to analyze the transition of a whole macroeconomy. An analysis with these points can be supported by statistical analysis according to data availability.

Such methods are necessary for the following reasons: 1) the structure of a macroeconomy or a society is basically a system open to the outside, including a feedback structure, 2) the subject of analysis is an aggregate or a whole society rather than individuals, which means that the analysis should be based on aggregate data or mass observation, and 3) economic society as a subject is continuously changing. As mentioned

[16] Kahneman, 2012 and Taleb, 2008.

above, we should assume that an economy or society usually has unpredictable characteristics as to how and when it is affected by something else. This point makes economics decisively different from other sciences, for being an open system is an essential characteristic of our society. The entire mass, i.e., the macroeconomy, is the main subject of our analysis, and there is no guarantee that the macroeconomy can be constituted after accumulating or summing individual microeconomic analyses. It is impossible to construct a macroeconomy by piling up micro analyses. The macroeconomy represents a situation in which a whole structure is constantly changing. In a science analyzing such a subject, a methodology that considers a closed system and controls many variables is suitable from the outset.

As Hayek (1948, 1960, 1968, 1994) noted, it is a fundamental fact that the real market and economy are constantly changing, and the emergence of new goods and services is common. The emergence of such factors cannot be predicted in advance, and their degree of influence can be evaluated only ex post facto. For instance, who could predict today's prosperity based on smartphones and the Internet in the last decade of the 20th century, except Steve Jobs and Jeffrey Preston Bezos? It could be that even they could not foresee the current fashion. It is a structural feature that economic or social changes and their impacts can be evaluated only after events. This indicates the significance of historical analysis.

Therefore, economists who confine themselves to model building and quantitative methodological techniques cannot advance an effective social science that is able to analyze reality. An economics discipline that disregards (and scoffs at) historical explanations and descriptive analysis would be sooner or later decline (resulting in a fall into authoritarianism). This is what economics experienced in the 20th century.

If we think about this situation, it is obvious that the empirical methods of macroeconomics are limited. We will mention two main methods here. One is the accounting method that checks the balance of the macroeconomy based on aggregate data, as mentioned previously. This method originated from book-keeping, which has a longer history than economics[17]. Up to the present, accounting, represented by the double entry book-keeping form, is a powerful tool across the world. Fortunately, the macroeconomic statistics recorded by the System of National Accounts (SNA), which was founded by Richard Stone, a former disciple of J. M. Keynes[18], and the United Nations

[17] Heeffer (2009).

[18] He won the Nobel prize of economics in 1984 for establishing a new compilation of economic statistics, SNA.

after World War II, has been designed according to the discipline of accounting. The SNA summarizes macroeconomic data of stock and flow in the form of balance sheets (B/S) and profits and losses (P/L)[19]. The aggregate data of the SNA, such as GDP statistics, and their changes can be analyzed by decomposition. However, modeling specific microeconomic behavioral functions and estimating their parameters cannot capture the movement of the real macroeconomy, as noted above.

In this macroeconomic statistical analysis, hypothetical tests based on probability theory are often available in addition to accounting methods. However, because repeated experiments are impossible in the social sciences, identifying causal relationships between dependent variables and independent variables in the analysis is quite difficult. Correlation between variables is often mistakenly considered causality, which entails the risk of supporting poor policy decisions. Therefore, the use of hypothetical test methods should be limited in the case of small samples within a broader macroeconomic situation, although such methods may be used.

Another method for economic analysis is the historical method. In particular, we consider trade history a significant alternative means of economic analysis because the fundamental development principle of human socioeconomics is derived from production and trading history based on the history of exchanging goods and services produced[20]. The process is definitely irreversible. In addition, the activities of exchanging goods and services produced with or without currency are seen in only human society and are absent in other animal communities. Production and exchange have existed since the emergence of human society. These are fundamental activities defining the evolution of human society, and their history is as long as that of human society. Analyzing production and trade history might then provide clues for the study of our economic society. Karl Polanyi (1966), an economist who is seen as the founder of economic anthropology, was interested in the economic history of former societies, such as the Dahomey Kingdom, while Matt Ridley (2010) reassessed classical economists, such as Adam Smith and David Ricardo, given their emphasis on production and trade. Thus, these scholars might believe that historical analysis of an economy based on production and trade should be natural to the social sciences and economics. If so, we entirely agree with them.

Thus, a notable part of economics is based on trade history. Regardless of the purpose of the individual entity, the teleology of a whole society cannot be established.

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19 European Commission, IMF, OECD, UN and World Bank (2009).

20 See Ichihashi, 2016.

Thus, teleological social science cannot be acceptable; Taleb indeed evaluated Ridley's approach as anti-teleology[21]. Anti-teleology is the essence of evolutionary economics. This concept commonly holds in even dictatorships, under socialism or in communist countries. Even a state managed by a very powerful individual cannot control all the behaviors and desires of all its citizens. Thus, it is impossible to assume that a state has its own purpose. If such teleological social science cannot be permitted, economic historical analysis would pose a serious methodological problem. This is the impossibility of prediction, as Karl Popper noted in his book[22]. It was previously thought that Popper wrote to criticize the development stage hypothesis of Marxism at that time, but his point is very significant even in the present, in that it is impossible to use historical analysis to predict the future of society. Evolutionary social analysis must refuse teleological social cognition. Therefore, production and trade history analysis must begin as a descriptive study summarizing facts relevant to the targeted events. Of course, measuring the quantitative or qualitative effects of an historical event ex post facto is also possible. However, it is not possible in principle to predict historical change decisively. This means that many quantitative predictions, such as econometric models, cannot have the same kind of meaning as the reference materials.

This situation is also entirely different from that of biology because the subject of analysis should be a whole including all decision makers and observers, such as ourselves. Each person and each group behaves according to individual wills and plans. If each person can act perfectly rationally, as microeconomics assumes, each might try to maximize his or her utility or profit under uncertain situations. However, human beings are not rational, as mentioned above; in fact, we are creatures with some biases and defects. Even if we set up the premises that we are not perfect but that we try to rationalize our behavior, it is not possible to predict when people might behave irrationally and mistakenly. Studying macroeconomics is different from engineering models for the launch of a rocket, for the calculations involve an external situation that changes continuously under certain conditions.

6. The Historical Approach in Economics

As mentioned above, the essential structure of society, history and path dependence cannot be ignored in economic analysis. If we consider a principle of economic development, including not only the structure and system but also the time (evolutionary

[21] Taleb, 2012.

[22] Popper, 1957.

process) and state or space, the historical approach in economics is a crucial method[23].

Rethinking economics from that point of view, we can see that there is a relatively long tradition of this perspective. The most well-known school may be the German historical school of economics represented by Friedrich List (1841), but another is "the principle of circular and cumulative causation" in economic development pointed out by Gunnar Myrdal (1963) in the 20th century. Since the 21st century, some scholars have actively studied economic history or adopted the historical approach to economic thought, such as Ha-Joon Chang (2003), Erik Reinert (2007), and Reinert et al. (2017). They all consider the historical process (time transition or evolutionary process) as an important factor for economic development and insist that economic policy should vary according to the spatial context and development level (path dependence). For example, these scholars, represented by List, say that a policy protecting infant industry is necessary when a country is in the early developing stage of engagement in international trade, while some competition is important in domestic markets. In addition, they say that even among similar developing countries, the competitive policy can be different[24]. This means that economic policy should be varied and flexible according to the economic development stage, historical process, and geographical or regional and spatial situation because the place and circumstances of each country differ according to its history.

In addition, regarding how high value-added goods can be produced, which is fundamental for economic development, the historical school commonly asserts the necessity of industrial advancement and diversification. This industrialism, as a point of view, also has long tradition: the pioneering studies are Giovanni Botero (1588) and Antonio Serra (1613), who investigate manufacturing, followed by Saint-Simon (1823), emphasizing industry, Marx (1867), advocating production and circulation, and Schumpeter (1912), a proponent of innovation. Since the 20th century, there have been similar viewpoints, such as the "flying geese pattern" by Akamatsu (1935), "Petty-Clark's Law" by C. Clark (1941), and others, such as Kerr, Dunlop, et al. (1960), Rostow (1960), Vernon (1966), Galbraith (1968), D. Bell (1976) and A. Toffler (1981). This industrial change implicates changes in the sectoral constitution of industry, supporting macroeconomic accounting. Industrial diversification means the production of a variety of products simultaneously and entails consumption, investments and trade in various fields. It is mainly based on the manufacturing sectors, but it commonly has a feature of

[23] Ichihashi (2016) comprehensively considered the social structure, economic system and principles of economic development, but the historical approach including evolutionary process and spatial problems was briefly mentioned as only showing the simple chronological record of human society.
[24] Reinert (2007) Appendix IV.

increasing returns to scale or declining marginal costs. Therefore, industrial diversification is totally different from diversification of the primary sector, such as agriculture and mining, with the features of decreasing returns to scale or rising marginal costs[25]. This point should be considered a main concept of macroeconomics. The marginal costs of production in the primary industry mainly depend on natural conditions and are basically increasing. However, it is unknown in which sector of the secondary and tertiary industries decreasing marginal costs will appear. The sector experiencing decreasing marginal cost could be wool products, cotton products and silk products in a certain age, while it could be iron, petroleum chemical products and automobiles in another age. The answer varies historically. Therefore, sometimes an economic policy to protect the infant industry for the national economy is needed. This point of view for macroeconomics has been well regarded for a long time, although it is not a mainstream subject of modern economics. The importance of the historical approach and evolutionary process analysis for the macroeconomy remains clear.

7. Concluding remarks

This paper has tried to answer the question of whether macroeconomics and econometrics as they currently stand can serve as a beacon for future economic analysis. As mentioned above, our answer is "No". The points that lead to our conclusion are as follows:

1) The structure of a macroeconomy or a society is basically a system open to the outside and includes a feedback structure;
2) The variables within a given system are frequently affected by factors outside the system;
3) The variables are influenced by something that has newly emerged, including innovation;
4) The subject of analysis is a whole aggregate or a whole society rather than individuals;
5) People usually behave considering the situation and change their initial plans;
6) In the basic structure of interdependency, one person affects another, and others provide feedback. Additionally, the interdependency itself can affect people's behavior;
7) People do not always behave rationally, and they tend to have some bias in their cognition. They often change their behavior based on emotional factors.

[25] See a classical paper by Graham (1923), which pointed out a basic problem of comparative advantage theory.

An economic society that has these characteristics cannot describe its doings using fixed structural models. Inferences by statistical data and econometric models also show only the average trends and their deviations. If an economic society has all of the characteristics mentioned above as inevitable features, we must use a completely different approach. Historical analysis is thus a far more reasonable alternative and complementary method.

Such an historical approach might not be a decisive alternative method for macroeconomics, for the method has its own weak points. For example, the answers to questions about which variables we should focus on and which we should omit or how we can simplify our models appropriately always depend on the situation. In addition, only and excessively describing small facts entails the risk of losing perspective of the entire economic system. New variables that were not assumed to exist at the initial stage are emerging rapidly and have a significant effect on the entire system. It is not possible in principle to predict the emergence of such new variables. Historical analysis is a traditional method, but it also has well-known difficulties and problems.

Nevertheless, the historical approach could be a useful method for contemporary macroeconomics despite its weaknesses because comprehensive historical analysis could help describe ex post facto important factors that appear for a certain period and end up affecting other factors. Processes such as the generation of things, development and extinction – as the philosopher Hegel formulated – are possible. This method makes it possible to understand how factors or variables that are significant in future generation and will leave their mark. It is possible to analyze how economic society has evolved by going back to past records. In addition, as noted by the Nobel laureate in chemistry, Ilya Prigogin[26], historical development in this world is irreversible, like chemical reactions. Economic development is also an irreversible process, which means that numerous time-reversible models in economics have faced serious limitations from the beginning. An evolutionary approach to macroeconomics might then be better. These thoughts and approaches are completely different from conventional orthodox macroeconomics, and they have been considered a heterodox stream of economics or heretical by economic historians. However, the more carefully one looks into our economic society, the more difficulties the fixed variable models are shown to have. On the other hand, the historical approach seeks to grasp economic societies as evolutionary systems and has much greater potential.

[26] Prigogine and Stengers, 1984.

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