



Munich Personal RePEc Archive

Reproduction Structure and Technological Progress in Economy: The Role of Talents as Capital

Tochimoto, Michio

Economic Society of Rikkyo University, Tokyo, Japan

3 December 2017

Online at <https://mpra.ub.uni-muenchen.de/83086/>
MPRA Paper No. 83086, posted 04 Dec 2017 07:10 UTC

Reproduction Structure and Technological Progress in Economy: The Role of Talents as Capital

Michio, Tochimoto

(This is the newly arranged edition of the paper which was published in the Rikkyo Economic Review, Vol. 69 No. 5, pp 221-247, written in Japanese in 2016.)

Abstract

Human activities in concrete production are diversified from product manufacturing, service production to management technology. Technological progress is organized into such various human activities. This paper is written on our "Talents capital hypothesis", after surveying the genealogy of economic thought since Smith, and, carefully examining the theoretical basis of the hypothesis. The concept "Talents capital" comprehensively captures the human activities. The hypothesis is that realistic technological progress should be based on qualitative development of "Talents capital", that is, accumulation and succession of production-related knowledge and technology, embodied in workers group (=personal owner of individual enterprises as well as employee (including corporate officer) in general enterprises) .

Table of contents

Introduction

1. Recognition of human activities in economic reproduction structure
 - 1) Economic reproduction as a combination of human activities
 - 2) Genealogy of economic thought related to recognition of human activities
 - 3) Paradigm change from exchange to production
2. Ambiguity of capital concept and "Human Capital" concept
3. Embodiment of technological progress into Talents capital
4. Conclusion

References

Introduction

Returning to the starting point of how to think about the basic elements of the economic reproduction structure, Classical School was strongly conscious of the three classes namely land-owner, capitalist and worker, before and after its formation. Each supply land(production-means not produced), the capital(currency used as resources for production activities, fixed/liquid assets as produced production-means) and labor

service, respectively. There was a general view that they constitute the basis of the reproduction structure.

Since Classical School, generally typical example of human activities in the production of goods and services was "labor", in particular, wage labor which is supplied by workers who do not own production-means. It is conceptualized as labor by workers, and it is aligned with land (physical / monetary) and capital¹, both of which compose production-factors. While it is positioned as a factor of production, in such a concept of "labor" we are in doubt that such grasping of human activities and handling are adequate. Human activities in concrete production are diversified from product manufacturing, service production to management technology. Technological progress is organized into such various human activities. This view is presented as a "Talents capital" hypothesis and develops the argument. Regarding the coined word of this author, "Talents capital", the expression "Human capital" has already been established in the area of economic analysis, especially in the field of labor issue. However, the author's Talents capital concept is not merely a paraphrase. It is a new attempt to press a fundamental review on the positioning of human activities so far in the composition of production factors themselves.

For example, concerning technological progress, in the conventional doctrine, it has been said that it either should be built into fixed capital, which is generally physical equipment, or should be seen from the viewpoint of "total factor productivity". However using the concept "Talents" (=workers) is more appropriate so as to recognize realistic technological progress. This concept comprehensively captures the human activities of owner of individual enterprises as well as employee (including corporate officer) in enterprises. Recognition of realistic technological progress should be based on qualitative development of "Talents capital", that is, accumulation and succession of production-related knowledge and technology with improvement of its ability to update.

The author argues that the concept "Talents capital" is also excellent as a theoretical term.

To begin with, the traditional "technical progress" terminology on the basis of the ambiguous "labor productivity", that does not look directly at the capacity building for the employee's own production activity, is open to question. The ambiguity of the "labor productivity" concept means followings. The "labor productivity" concept has wide range from the concept of *physical* productivity that measures how much quantity of labor, that a certain number of people or hours put in the production process, could produce

¹ The concept of "capital" is ambiguous and we will reconsider its significance according to the following context.

the product in terms of quantity, to the concept of *value* productivity that measures either one or both of product and labor -input on a monetary basis. As a result of this ambiguity, a disarrayed discussion may be carried out without clearly defining them.

In particular, changes in the relative relationship between the wage level and the product price level, such as the deterioration in treatment due to devaluation of real wages, could be interpreted as a change in “productivity”. Such terminology that could be economically discerned as an increase in the qualitative level of labor should be problematic, politically as well as analytically. In extreme assumption, the productivity improvement means real wages devaluation → labor income plummeted → household consumption plummeted → catastrophic production → economic collapse.

This paper is written on our Talents capital hypothesis, after surveying the genealogy of economic thought since Smith, and, carefully examining the theoretical basis of the hypothesis. We will scrutiny the structure and function of economic reproduction including the view of technological progress.

First of all, concerning the basic idea of the whole article, there is a problem of how to think about the ownership of the so-called "production-means not produced", in relation to productive activities. Typical case is the exercise of land ownership and eventually, the treatment of the rent. The current treatment in Japanese national accounts calculation is in compliance with the international standard of 93 SNA and with a common theory in economics since Ricardo. In response to the idea of deeming the rent in the most inferior land as zero, i.e. the “differential rental theory” (described later), the rent (rent fee) which belongs to the property income, shall be paid from a part of the production-factor-remuneration (Sales surplus) generated by the owner of the enterprise in the production process with labor and capital. The term of the author's "production-means not produced" will be clarified in Ricardo section of this paper.

Fixed capital such as factory, machinery and equipment is "Produced production-means", but its ownership and forms of use are various depending on the industry type and the business type in each industry. In addition, there are some variations in fertility. There is also room for the consideration of its use as a sort of differential rent for fixed capital from the similarity with the land.² In addition, there are many points to consider carefully about the handling such as relation with technological progress.

In any case, the fixed capital can be a factor that causes complicated confusion due to the technical problem of its processing.

² This is called "quasi-rent" and described in the section of Marshall, later.

On top of that, our reproductive structure protects private ownership to the extent permitted by the legal system to the last, that in a broad sense market transactions (meaning including negotiated transactions) are general and important means of exchanging and combining individual goods and services and their usage rights.

Money plays an essential role in making market transaction effective not only for instantaneous but also for continuous. We assume the system as an institutional case, that is, the reproduction structure we consider is under the so-called monetary market economy.

1. Recognition of human activities in economic reproduction structure

1) Economic reproduction as a combination of human activities

The economic reproduction structure we should recognize is a movement body of a society (human aggregation) in which causality is hierarchically and irreversibly changed according to the characteristics of its structure while being influenced by exogenous factors.

Unlike buildings or machinery composed of inorganic materials, there are mechanisms of environment adaptation called “homeostasis”³ in organisms. This homeostasis is a conservative function in organisms. At the same time in the case of organisms, there is another mechanism characterized as an innovative function. It is a mechanism of irreversible growth change from birth to death. In terms of engineering, homeostasis is negative feedback. Growth control of change can be seen as positive feedback (feedforward), on the contrary.⁴

Therefore, when looking at the economic reproduction structure, which is an aggregate movement body of mankind, as a kind of organisms, we may find elements corresponding to the internal environment such as body temperature, blood volume and blood components of living organisms, and they may have the mechanism of regulation corresponding to the endocrine system or the nervous system to keep it within a certain

³ American physiologist W. Cannon advocated a biologically important concept in Cannon [1932], named as “biostatic homeostasis”. Living organisms are exposed to external environment such as temperature and humidity. Physical characteristics such as body temperature, blood pressure, blood components and other internal conditions should be kept within a certain range suitable for survival, under the regulation by the endocrine system and the nervous system, which makes it possible.

⁴ Feedforward control is one of automatic control methods that detects the command value and disturbance entering the control system and cancels this before it would be affected. Usually in addition to the feedback control, it is used when higher performance is to be achieved.

range, suitable for sustaining the structure. And even if this structure has to follow an irreversible constant change direction itself, we may find a mechanism that makes the change as smooth and comfortable as possible. The recognition of the economic reproduction structure and its activities pursued by this paper includes such awareness. We use the word, “structure”, as one indicating the relationship between the whole parts and portions as well as the functions shared among them, concerning the existence of this moving body. Therefore, we try to recognize how human activities in the economic reproduction structure serve to keep the entire structure, and at the same time, how to change the structure itself on the other.

2) Genealogy of economic thought related to recognition of human activities

① Recognition of reproduction structure and human activities in Smith

Smith recognizes the product flow of each year, which is currently conceptualized as "national income", as wealth, which comes from the circulation of production of consumer goods and capital goods (whose production factors are land, labor and capital) → consumption and fixed capital formation → reproduction of consumer and capital goods → consumption and fixed capital formation → As a physiocrat, Quesnay, who is famous of *Tableau Économique*, showed the thought of economic cycle and became the forerunner of the rest of economic thinkers.

Then, regarding an internal environment of reproductive structure, Smith focuses on the importance of social division of labor in the production technology system, that is, the importance of bypass production. According to him, maintenance and promotion of merit of bypass production depend on the adjustment mechanism of free competition market. The market mechanism adjusts not only exchanges of the goods to be produced but also the income distribution to the production contributing services offered by the production factors, namely, land, labor and capital. However, because the expression "invisible hand" was too impressive, he invited the dissemination of a popular interpretation as if Smith were exclusively chanting “Laissez faire doctrine”.

Nevertheless, in fact, he drew his ideal social image, as stated in "Theory of Moral Sentiments", as follows.

"All the members of human society stand in need of each other's assistance, and are likewise exposed to mutual injuries. Where the necessary assistance is reciprocally afforded from love, from gratitude, from friendship and esteem, the society flourishes and is happy. "⁵

⁵ Smith [1759] Par. II, Sec. II, Chap. III

We should keep in mind that utilization of individual selfishness is not the center of assertion of Smith. Rather, we should pay great deal of attention to the detailed discussion focusing on the way how the government should play the role to support the market economy, before making suggestions, throughout his "Wealth of Nations".

Mercantilism, which was the dominant economic policy theory at the time, considered that the financial strength is increased through improving international balance of payments by encouraging exports and/or restricting imports, under the recognition of wealth = money. However, Smith said that labor in the economic cycle, which is aimed at improving the productivity of rice (= necessities and convenience goods) production, which ultimately leads to improvement of national finance. Smith's economic thought is clearly stated in the beginning of the "Wealth of Nations", titled "Introduction and plan of the work" as follows.

"The annual labour of every nation is the fund which originally supplies it with all the necessaries and conveniences of life which is annually consumes, and which consist always either in the immediate produce of that labor, or in what is purchased with that produce from other nations. ... The causes of this improvement, in the productive powers of labour, and the order, according to which its produce is naturally distributed among the different ranks and conditions of men in the society, make the subject of the First Book of this Inquiry. "⁶

The Smith's idea of emphasizing the productivity of labor was the origin of a complicated discussion concerning "labor theory of value" over the price of goods and the exchange value for its basis. In the subsequent history of economics, this Smith's labor theory of value has been inviting detailed discussions such as whether it means "labor embodies value theory" or "labor commanded value theory" and so on.

Rather, the crucial point is that, at the time capitalism was established in the industrial revolution, Smith showed theoretical and political importance of development through the accumulation and organization of human activities in the economic reproduction structure.

Considering the difference between Smith's "labor" concept and the author's "work service" concept, Smith, who inherited physiocrat's philosophy, which emphasized business management of agricultural capitalists, used the wording of "own labour" and "other people's labour" in the book "Wealth of Nations", and thus used "labour" not as limited to wage labour but as a concept widely capturing the whole human activities

⁶ Smith [1776] Introduction and plan of the work

directly contributing to the production process.⁷ If so, Smith's "labour" concept and the author's "working service" concept are basically no different. Incidentally, Smith's view on labor is not his originality, but it is based on the profound academic accumulation of thought and research by philosophers from Locke to Hume, as well as by economists including Petit etc.

For example, Locke says that labor as based on "natural rights to life, body, freedom, property," which is unique to each person, becomes the basis of the concept of "self-ownership" as a person's control over person's personality. In addition, Hume's view of labor inheriting this philosophy of Locke is "labor = happiness". He wrote,

"Working industry, knowledge and humanity are connected by inseparable chain".⁸

According to his opinion, national wealth is formed through mutual cooperation of agriculture, manufacturing industry and commerce. People engaged in these three departments produce surplus by their own labor, so that they can be said to be "of diligent occupation". It states that surplus products (increase and consumption of goods) are "storage of labor" or "a kind of labor reservoir".

However, the person who is responsible for this "labor" is a farmer, a manufacturer, a merchant, and is understood collectively as an independent producer. Hume does not clearly distinguish them from wage workers. The word "Labourer" also applies to farmers, manufacturers and merchants, and is synonymous with "Producers."

Thus, at least, the Talents capital hypothesis advocated by the author stems from the range of the concept of "labor" given by Smith. It is permissible to position this hypothesis as being clearly expanded to that of a private entrepreneur as well as executive officers of a corporate enterprise of today.

② Recognition of rent and human activity in Ricardo

Economic characterization of rents has reflected the history of changes in the economic system, from the time the economics were formed to this day, and also the rising and falling of the social rank among classes at that time.

The form of the original rent under the production style based on feudal land ownership is the so-called labor-rent, which means to engage in ingestion of agriculture and crops on lords and landowner farms for a certain period. It is said that this

⁷ Smith [1776] Book I, The beginning of Chap.III, " When the market is very small, no person can have any encouragement to dedicate himself entirely to one employment, for want of the power to exchange all that surplus part of the produce of his own labour, which is over and above his own consumption, for such parts of the produce of other men's labour as he has occasion for. "

⁸ See Hume [1752].

labor-rent has evolved into material-rent.

However, it has been argued by prominent philosophers that the land, which is the production-means not originally produced, should be a free good for human society or a shared property so that the proprietor of some specific land should have no grounds to unconditionally acquire the fruits of the land use role.⁹ As opposed to this, Ricardo preached the essence of the rent as follows, which has come to be a common view as the so-called differential rent theory.

"The rent of land is the part that is paid to the owner for use of the soil's fundamental and immortal power in the earthly production. During the first settlement of a country, if there is abundance of fertile land and now it is not necessary to cultivate only a very small proportion for maintaining the population, or, if the capital which the population can dominate can actually cultivate only a very small proportion, the rent does not exist, because no one will pay for the use of the land if there is a plentiful amount of land that is unoccupied and thus also free to anyone who wishes to cultivate it. . . . The rent is always paid for the use of land when, regarding cultivated land, the quantity is not infinite and the quality is not uniform, as the population increases, the quality is poor or the location is inconvenient."¹⁰

In addition, Ricardo intends to thoroughly investigate the labor theory of value on the relative relationship that market prices of goods should converge over the long term, and in addition to the above-mentioned differential rent theory, the "comparative production cost" theory on trade benefits insisted. In theory, it is possible to apply notion of market price reaction to the existence of comparative advantage in individual production technology claimed by comparative production cost theory not only for foreign trade but also for whole transaction exchanged for domestic division of labor. In the end, he can interpret that the market price response to the existence of comparative advantage is an automatic adjustment mechanism of the economic reproduction structure itself.¹¹ In this regard, there is a reason to pay attention to the "comparative

⁹ For example, in addition to the theory of ownership of Lock mentioned above, there is Kant's citizen state theory etc.

¹⁰ See Ricardo [1817] Chap. II.

¹¹ However, as for the claim of free trade based on the comparative production cost theory, Davidson showed severe criticism. "(Consequently,) free trade competition usually implies that in developed nations, there will be a loss of jobs to workers in nations that have large populations of cheap available labor, working in sweatshops, with little legislation requiring safe and healthy working conditions. The result of such free trade competitive forces must inevitably lower the standard of living of the workers

production cost" theory.

According to Ricardo [1817] and etc., the essence of his thought can be arranged as follows.

- Ricardo showed that the source of exchange value of goods is rarity and the amount of labor required to acquire it, but since most of the goods targeted for desire are acquired by labor, its exchange value is dependent on the latter. In addition, contribution to the value of goods of the materials, equipment and machinery used alongside labor are also dependent on the amount of labor dispensed in the production of those.

- While this thoroughly labor embodies value theory, Ricardo set the following rule for the distribution.

(A) Wage: Wages are determined to be equal to the value of necessary living goods to enable the survival and reproduction of workers.

(B) Profit: Profit is determined as the remainder of the value of the product minus the wages of labor and the value of other production means.

(C) Differential Rent: If any grain has the same value in the market, the grain produced in the coexisting honorable place has an exchange value (market price) exceeding the value corresponding to the amount of labor being invested in the production and will generate excess profit, but if it becomes known, capitals will rush into the land that produces this excess profit. As a result of the competition between capitals, the rent to the extinction of excess profit will be paid to the landowner, depending on the magnitude of the demand for the grain.

As described above, we reviewed the concept of Ricardo on production-means and producer in the reproduction structure, but after all it is hard to recognize that the argument about legitimacy from the social point of view of the rent itself is sufficiently done. The author's way of thinking about this point, "production-means not produced" is as follows. Production is a human collective activity that works on the natural environment while being restricted by the natural environment represented by land. In general, the owner of this land (natural environment) affects the conditions of production activities. Therefore, assuming a certain conservation management act by the owner, it can be reasonable to let the producer, as a user of the natural environment,

in the developed nations as their wages are reduced toward the wages paid in low-wage countries. ... (Nevertheless,) under the banner of free trade, we permit Americans to buy products from such uncivilized and unhealthy factory environments just because the factories are located in China. " (Davidson [2009])

bear the cost of conservation management. Supplementary, not only private expenses such as rent, social costs connected with environmental problems should also be considered.

Furthermore, it should be noted that Ricardo's main article "Principles of Economics and Taxation" Chapter V has the following description of the concept of capital. "Capital is nothing but a part of the wealth of a country that is used for production, and it consists of foods, clothing, tools, materials, machinery, etc. necessary to carry out labor."¹²

The concept of "capital" used by economists is described in further detail here and there after Marshall's section, as it relates to issues directly linked to the subject of this paper. In this section, let us note that the term "capital" for Classical School including Ricardo is not limited to the range of current-assets and fixed-assets in current corporate accounting, but it is a wide range of asset concepts including workers' food and clothing as "necessary for performing work". In the meantime, Smith's capital concept is wider and includes contents equivalent to the modern "Human Capital" described later.

③ Marx's reproduction structure recognition and surplus value

Marx expressed the economic cycle system as a capital circulation movement using "Reproduction formula" in Chap. XX to XX I of "Capital theory" Vol. II. He also said in Vol. I, by the idea of applying Ricardo's labor embodies value theory to the labor force itself as a product, "The labor force's reproductive cost was produced by that labor force. The value of the product exceeds the labor force's reproductive cost."¹³ This clearly states that the source of the profit is the surplus value."

Actually, however, Smith has already used the expression "The annual labor · · is the fund.", as described above, in "Wealth of Nations" and showed that labor is worth more than the reproductive cost of the labor force.¹⁴ What should we consider in his perception and how should we consider the contribution of labor to production as one of the so-called production factors?

As one approach to this problem, the author expanded the concept of labor from the viewpoint of general human activities, replaced it with "working service", and added capital to "Talents capital" as a separate frame "Fixed capital" such as factory /

¹² Ricardo [1817]

¹³ It is detailed in "Capital Theory" Volume 1, 2 to 5. Although surplus value is originally simply a term expressing the difference between trading and sales, the increment of G in the movement of production capital of 'G-W - G' is the redefinition of the surplus value by Marx.

¹⁴ The whole story of national wealth focuses on expanded reproduction by improving labor productivity.

machinery equipment etc. to be regarded as cumulative of "past working service", and "fixed capital" such as "fixed capital" which is held by the creditor or investor's "

Monetary assets "in the basic model of Keynes. Leijonhufvud will take a position to consolidate this non-monetary asset concisely as follows I explained it.

"The basic model of Keynes treats capital goods and bonds as a single aggregate amount, so if the model is separate from money, the model includes this as a sole asset summary, so we will call it" Non-money assets. " Both bonds and capital goods are claims against the expected income stream."¹⁵

In addition, the author treats the land as one of the factors of production that should get the rent from the operating surplus, commensurate with the contribution in the production process from the above-mentioned viewpoint. In addition, as strict discussion, it is necessary to carefully consider the relationship between the evaluation of contribution of the so-called production factors and payment of rent etc. based on the ownership relation of each factor, taking into account the legal aspects and the historical and social aspects concerning the formation of the owned relationship. Furthermore, the relationship with the reconsideration of capital concepts, which will be described later, is also a problem. However, in view of the awareness of problem on this paper, it is judged that it will be lacking the whole balance, so in this paper, the author will not go into deeper discussion the rent of land.

In any case, so-called capital circulates in various forms during the process of reprocessing multiple goods, and it is necessary to take a close look at the relationship between this circulation and human activities.

④ Recognition of human activities in general equilibrium model of Walras

As is well known, the general equilibrium model of the markets, that Walras has created, is based on function of each market for product, production factors and currency as the basic structure of the economy. It showed that the equilibrium of the economy as a whole is realized and the effective allocation of scarce resources is brought about, through the price adjustment function by market competition, assuming certain assumptions. The general equilibrium model of Walras focuses on important aspects in the reproduction structure such as interdependence of economic activities, providing a basic framework of economic analysis (paradigm). On the other hand, interdependent simultaneous determination of economic variables and realization of equilibrium is so emphasized that the model is basically characterized as static framework rather than the economic cycle as reproduction. In short, his recognition of human activity is

¹⁵ Leijonhufvud [1969]

insufficient, and consequently, the production process of goods is also treated as a kind of transformation from production equipment and/or market goods for intermediate goods by exchanging and combining through function of market.

For this reason, in Keynes's viewpoints towards the solution of the serious unemployment problem, it looks like a thought or a model that leads to conservative policy judgment at the current situation, subject to severe criticism.

However, even in the economics after the so-called Keynesian Revolution, while more dynamic model is planned to build in order to use the full idea that emphasizes the market adjustment function in general equilibrium theory of Walras, while Keynesian macro model have been continuously questioned regarding its microscopic basis, leading to the formation of a major school which is collectively called "neoclassical economics".

⑤ Marshall's human capital ("Personal Capital")¹⁶

Marshall showed the concept of "Personal Capital" which is the pioneer of the concept of "human capital" to be described later. This is not necessarily known, but the perception of his economic reproduction structure is important.

First, A. Marshall = M. P. Marshall mentioned in "The Economics of Industry", Chapter 3 "Capital",

"Almost all Personal Wealth is or may be Personal Capital."

It should be noticed that Smith's next paragraph of "Wealth of Nations" is quoted.

"The acquisition of all useful abilities, by the maintenance of the acquirer during his education, study or apprenticeship, always costs a real expense, which is a capital fixed and realized, as it were, in his person. Those talents, as they make a part of his fortune, so do they likewise of that of the society to which he belongs. The improved dexterity of a workman may be considered in the same light as a machine or instrument of trade which facilitates and abridges labour, and which, though it costs a certain expense, repays that expense with a profit."¹⁷

This paragraph of Smith is in a passage explaining fixed capital, and Smith positively positions this "capital" as the fourth kind of fixed capital.¹⁸ However, in order to clearly show the specificity as capital related to human activities, we would like to position our "Talents capital" as a concept different from the fixed capital which is a material accumulation, so as to avoid unnecessary confusion of discussion. Marshall's human

¹⁶ "Personal Capital" is expressed as "Marshall's human capital".

¹⁷ Marshall and Marshall [1881]

¹⁸ Smith [1776]

capital ("Personal Capital") has been expanding since then in the main article "Principles of Economics". It is deemed to have been progressing to give more aggressive positioning in line with his theory of organic growth.¹⁹ Indeed Marshall says in the preface of the "Principle of Economics" version 8, as follows.

"Economic evolution is gradual. Its progress is sometimes arrested or reversed by political catastrophes: but its forward movements are never sudden; • • "

"The Mecca of economist lies in economic biology rather than in economic dynamics."

"The main concern of economics is thus with human beings who are impelled, for good and evil, to change and progress. Fragmentary static hypotheses are used as temporary auxiliaries to dynamical –or rather biological–conceptions: but the central idea of economics, even when its Foundations alone are under discussion, must be that of living force and movement."²⁰

Furthermore, Marshall pointed out that the time required to prepare for additional supply of specialized talent is remarkably long as one of the characteristics of labor in the 6th chapter 5 of the same book, and pointed out , as follows.

"The next peculiarity in the action of demand and supply with regard to labour, which we have to consider, is closely connected with some of those we have already discussed. It consists in the length of time that is required to prepare and train labour for its work, and in the slowness of the returns which result from this training."

"This discounting of the future, this deliberate adjustment of supply of expensively trained labour to the demand for it, is most clearly seen in the choice made by parents of occupations for their children, and in their efforts to raise their children into a higher grade than their own."

"But we must not omit to notice those adjustments of the supply of labour to the demand for it, which are effected by movements of adults from one trade to another. "

"But the incomes which are being earned by all agents of production, human as well as material, and those which appear likely to be earned by them in the future, exercise a ceaseless influence on those persons by whose action the future supplies of these agents are determined. "²¹

Also, Marshall's view on "Quasi-rent" is also important as a basic premise of the reproduction structure of this paper. It refers to the fact that regarding durable factories, buildings or machinery and equipment, the rents extra or the increase in disposal prices should be received in accordance with their superiority, if they have a technical

¹⁹ Amidst several revisions of the same author, Marshall has emphasized that "analogy by biology" is more useful than "analogy by physics" as a method of investigating key issues in economics.

²⁰ Marshall [1920] Preface to the Eighth Edition, pp. xxiv, xxvi

²¹ Marshall [1920] Book 6, Chap. 5, pp. 474 - 479

advantage in production activity similar to the fertility of the land in the short range of time.²² From our way of thinking, as Talents capital improves, the assessment of these fixed capital should be recognized as complementary as improving accordingly.

⑥ Emphasis on employment problems and Focus on decision-makers of Capital Investment in Keynes

Keynes' recognition of economic reproduction structure and its movement mechanism is shown below by narrowing down to the range necessary for the thesis of this paper by the author's interpretation and arrangement. First of all, it is noteworthy that Keynes' understanding of economic reproductive structure and its movement mechanism uses so-called "effective demand" concept, although effective demand concept itself is not his originality. For example, Smith explains the effectual demand in "The Wealth of Nations" as follows.

"The general price at which an item is actually sold is called a market price. The market price of an individual item is calculated by comparing the quantity actually supplied to the market to the demand of those who are willing to pay the natural price of the item (the rent, wages, profits required to supply the market) to the market. The person with this intention can be called an effectual customer and its demand is effectual. It can be called demand. This is an effectual demand to bring about the movement to supply products to the market. The effectual demand is not the same as the whole demand. It can be said however poor people have demand for a 6 horse carriage. One may wish to have a carriage, but this is not an effectual demand, because goods cannot be supplied to the market to meet this demand."²³

Regardless, as Keynes's emphasis on this concept of effective demand, as to controversy over the theoretical validity of the so-called "law of Say"(= "supply supplies its own demand") in "Neo classicalist economics" , it is important that he felt the need to express his opinion clearly. Keynes felt the necessity to insist that, in recession , the real economy shrinks in the form of a balance between excess demand of money due to "preliminary motivation" etc. , aware of the future uncertainty increase, and excess supply of goods, and that as a result of this, incomplete employment will be realized. It means that "the law of Say" will not be established.²⁴

What is more important is that Keynes was facing the problem of uncertainty about

²² Marshall [1920], pp. 62-63 etc.

²³ Smith [1776] His "effectual demand " is little bit different from Keynes "effective demand".

²⁴ Keynes' basic understanding of capitalism as a monetary production economy, in principle, "the law of Say" is denied. This point is discussed in detail by post-Keynesian economists. See, for example, Davidson [2009].

the future expectations of corporate capital investment behavior as a front. And different from the typical "Keynesian Revolution" interpretation after his "general theory" announcement,²⁵ we must confirm that he discussed the intrinsic imbalance of the principle economy.

This Keynes's consideration on the capital investment behavior of company includes the insight of human psychology related to corporate activities at its core. For example, the judgment of capital investment decision makers on the so-called "marginal efficiency of capital" is a human decision on the basis of future uncertainty rather than cold calculation. It is a human activity itself. The knowledge of the employee who supports that decision is one of the internal environment of enterprise production. In the first place, the term "workers" in this paper includes individual corporate owners as well as corporate officers in legal corporation. In the modern capitalist economy, decision making of corporate capital investment by this "worker" is closely related to the qualitative improvement of Talents capital and the problem of technological progress.²⁶

⑦ "New combination" by Schumpeter's business enterprises

Schumpeter firstly recognizes that the economic cycle can be compared with the blood circulation of animal organisms and then experiences a type of variation that discontinuously changes the framework of the economic cycle and the orbit itself from within the system. He strongly emphasized that the "new combination" (= innovation) by business enterprises will bring economic development of this meaning.²⁷

Human as an "enterprise" that he states is a worker developing human activities related to management and production technology and should be said to be the one that fits the author's concept of "Talents capital." The key point in the concept of an enterprise is not to own factories and machinery facilities as a capitalist, but to lead "new combination" as a manager of a company or as a planner / developer of broad production technology. In the private enterprise, the company owner is the "entrepreneur" itself, and included in the worker defined by the author of this paper.

Moreover, at a corporation such as a large enterprise where the so-called "separation of ownership and management" is advancing, what actually lead such a new combination is not shareholders but rather managers. It is a general employee who is an officer of a director etc., engaged in corporate activities directly linked to the site of production and

²⁵ IS-LM analysis of "Neoclassical Integration" typified by Samuelson is a typical example, and interprets Keynesian model as the special case in Walrasian general equilibrium models.

²⁶ Pasinetti claims that paradigm transformation from "exchange economy" to "production economy" is its core. Pasinetti [2007] pp.329-334

²⁷ Schumpeter [1926]

marketing activities. The cooperative relationship between them is also important.

Rather than grasping the traditional dichotomy that human beings who are actually engaged in business activities are "capitalist = manager vs wage workers = passive employees", the structure of the project and/or team of production activities. I think that it is more constructive and superior as awareness of the workers of dynamic production activities to grasp from the concept of "workers", engaged in technological innovation. In any way, the shareholders may be, occasionally, a company officer or even a general employee. It is no problem.

By interpreting the Schumpeter's reality as a "worker" in the company, the concept "Talents capital" of the author also encompasses the concept "Entrepreneur" of Schumpeter. Regarding Schumpeter's vision that "Innovation is the long-term development of the economy", Keynes said in "Volume 2",

"In the case of fixed capital, it is easy to understand why the investment rate will fluctuate, and enterprises are expected to undertake the production of fixed capital, according to their expectations about profits earned. Apart from many small reasons as to why they vary in the changing world, I will be able to admit Professor Schumpeter's explanation of the major changes unconditionally. ".²⁸

However, when demand for existing technologies and/ or products is saturated, there is no guarantee that Schumpeter's assertion of a new combination will automatically appear.

Although it seems that it has not necessarily been noticed enough, Schumpeter shows a unique consideration on the concept of "capital" in the main book "Theory of Economic Development" Chapter 3, Section 2. It is important to understand the view of economic structure of Schumpeter. The outline is introduced here.

[Capital concept of Schumpeter]

· A capitalist economy is an economic form in which goods necessary for new production are withdrawn from specific uses in circulation by purchasing in the market. The capital is nothing but a lever to make it possible to put goods under, and means to dispose of goods for a new purpose, or a means to order a new direction for production. We depart from the function of capital so as to arrive at the essence of capital phenomena.

· The essence of capital and capitalism

The capital is confronted with the world of goods. The function of goods is useful for productive purpose depending on their technical nature. It is to produce technically and physically different goods. The capital is the procurement of goods. It is a third factor

²⁸ Keynes [1936]

that is necessary for production in the distribution economy, standing between business enterprises and the world of goods

In this way, Schumpeter defines capital from the functional aspect of means of goods procurement for production, and production-means of production are recognized as transient existence which is consumed in the middle of the production process.

As interpreted by the author, capitalists for Schumpeter are related to the production process as a provider of goods procurement means to the last. It is not a leading role in the production process. The leading role in the production process is "enterprise". There are cases in which it is also a capitalist as a matter of fact, but it is a different existence as a concept, which is consistent with that Schumpeter positions. Only land and labor should be recognized as the essential production factors by him.

3) Paradigm change from exchange to production

We have traced the genealogy of economic thought from Smith to Schumpeter within the range related to the awareness of problem of this paper and considered how to grasp human activities in economic reproduction structure.

Studies to elucidate the sustainable conditions of the economic system as a permanent reproductive process, especially the historically formed research flow on roles of the human activities in the reproduction structure utilizing the market mechanism, on the premise of realistic legal and social private-property rights protection, created Marshal's "Personal Capital" theory. Keynes further insighted the characteristics of the dynamic structure of the production economy and the function of money, so as to emphasize the fundamental imbalance of the capitalist economy based on the principle of effective demand in the economic circulation of production → income → consumption and/or investment → reproduction as well as future uncertainty.

Such Keynes's contribution clearly indicated the need for policy intervention.

Based on the contribution of Keynes, Pasinetti preached that the reality, which should be the subject of economics, has historically shifted to the "production economy (industry)" phase focused on solving various problems in the dynamic development of the economy based on technological progress (innovation), from the aspect of "exchange economy (trade)" where the emphasis is on static optimum (efficient) distribution of existing scarce resources. As a result of this, paradigm transformation of economic analysis that directly looked at this reality is inevitable. The post-Keynesian economic theory, which is consolidated in his argument²⁹, is increasing the influence, under the

²⁹ Pasinetti [2007] pp. 331 - 334

rising awareness of income/asset disparity-expansion in the world economy after the Lehman shock.

For example, "cost paradox" pointed out by the post-Keynesian school shows that reduction of labor costs, regarded as a representative of "restructuring" by companies, invites reductions in workers income→shrinkage of household consumption demand in Macro level. It is a mistake of synthesis that keeps track of the well-known "savings paradox". However it has been not so familiar with the neoclassical idea that emphasizes the selfish behavior of each economic agent as to take it under the consideration of economic policy. Understanding of the serious danger of this "cost paradox" that could spread over the long term is progressing finally after the discussion of "Human Capital" became a focus of attention. The details of Human Capital are to be mentioned later.

2. Ambiguity of capital concept and "Human Capital" concept

We have until now described "capital" as general expression, but now we must reorganize this concept of capital. First of all, when classical schools divided people into three groups of landowners, capitalists and (wage) workers in view of economic considerations while being strongly conscious of the conflicting relationship, it can be said that the property owned by capitalists, in particular, was imaged as the traditional general "capital" concept. Capital concepts are limited not only to real assets used in the production process that start with stocks of raw fuels, works in progress and products, so-called fixed assets such as factories, buildings, production tools and machinery, etc.. Depending on the thesis or in the context of that, capital concepts may include financial assets owned by investors in hand owned in return at the level of real assets, namely, receivables (deposits and bonds) and property rights (stocks as equity rights etc.). Furthermore, money held by capitalists or investors as opposed to financing products and liquidity assets is also important and may be included in the concept of "capital" in some discussion.

However, as far as a concept on economics is concerned, rather than the concept of capital from such a private point of view, the concept of capital for society as a whole is more important. In the case of a capital concept from a social point of view, for example, Smith showed the classification of workers' acquired skills as the fourth kind of fixed capital. Marshall also advocated his "Human capital" (Personal Capital) concept.

They extended capital concept to a general stock-like existence that contributes to the production process widely beyond the scope of assets owned by capitalist / investor. Because the author's "Talents capital" concept is completely incompatible with the

so-called “capitalist-owned property”, there may be a strong impression of strange wording, but when thinking of the concept of capital for society as a whole in such way, it is not necessary of a strange language usage.

The creation of already established "Human Capital" concept, predecessor of “Talents capital" concept advocated by the author, should be recognized also as natural not from a point of view of a private company but from a social point of view.

The origin of the idea of human capital is the description of "The wealth of nations" (previously described on this paper). Economists in the latter half of the 20th century such as Mincer and Becker redefined Smith's idea with the concept of " Human Capital "and made it a useful tool for analysis. The relationship between wage and income level and education / training becomes clear to everyone's eyes, and the usefulness of "human capital" concept is said to be unwavering.

Mincer [1958], for example, presented a simple theoretical model in which each worker selects the education-training period by comparing the discounted present value of the expected cumulative earned income at the start of the workable period with respect to how to take balance, under the assumption that the workable period of workers to be constant. In this assumption, the pre-employment education-training period has the effect of reducing the earnings by shortening the actual working period on the one hand, but has the effect of increasing the earning capacity of the worker on the contrary.

[Outline of model]

First, it is assumed that all individuals have the same ability and have equal employment opportunities. However, the job type will differ depending on the required amount of training. Training is time-consuming, therefore the earning years are deferred by the number of years added, that is, number of years of earning will shrink generally. For convenience, one-year training is assumed to reduce the early years by one year. Therefore, if it is assumed that each individual can compensate for such cost of different training periods, the present value of the lifetime income must be equal at the time of job selection, and furthermore during the working period, assuming that income flow is certain.

The training cost in this case depends on the length of the training period for two reasons: the first and main reason is the lack of earnings during the training period and the second is the training fee of the training itself. It is to increase the cost of books etc. For simplicity, however, we will consider cases where this second training expense is zero. (In the Mincer paper, these strong simplification assumptions are gradually relaxed, but this paper is limited to the introduction of the first simplest model.)

- Given conditions: n (education and training years), l (workable years), a_n (earnings per year), r (annual discount rate), V_n (discounted present value of expected cumulative earned income at the start of the workable period), e (base of natural logarithm)
- Discrete model (assuming compound interest calculation on a yearly basis)

$$V_n = a_n \sum_{t=n+1}^l \left\{ \left(\frac{1}{1+r} \right) \right\}^t$$

- Continuous model (assuming instantaneous continuous compound interest calculation)

$$V_n = a_n \int_n^l (e^{-rt}) dt^{30}$$

Since the definite integral part of this continuous model is $\frac{1}{r}(e^{-rn} - e^{-rl})$, eventually,

$$V_n = \frac{a_n}{r}(e^{-rn} - e^{-rl})$$

Hereinafter, a case where the number of years of education and training is different using this continuous model is considered.

Assuming that a_{n-d} is the earnings per year when the number of years of education and training is $n-d$ rather than n , the discounted present value of the expected cumulative earned income in that case is $V_{n-d} = \frac{a_{n-d}}{r}(e^{-r(n-d)} - e^{-rl})$, where $0 < d < n$.

Therefore, if the ratio of earnings per year is denoted by $k_{n, n-d}$, in the equilibrium of selection of education and training years, $V_n = V_{n-d}$,

$$k_{n, n-d} = a_n / a_{n-d} = (e^{-r(n-d)} - e^{-rl}) / (e^{-rn} - e^{-rl})$$

By multiplying the denominator and the numerator by e^{rl} respectively and arranging them,

$$k_{n, n-d} = a_n / a_{n-d} = (e^{r(l+d-n)} - 1) / (e^{r(l-n)} - 1)$$

Therefore, from the above equation, for the ratio of earnings per year $k_{n, n-d}$,

- greater than 1 because it is a numerator > denominator.
- It is an increasing function of the discount rate r .
- The decreasing function of the workable years l .

³⁰ Because of the definition of the transcendental function $e^r = \lim_{m \rightarrow \infty} \left(1 + \frac{r}{m} \right)^m$. Because $1/e^r = e^{-r}$, "The discounted present value of the expected cumulative earned income at the start of the workable period" in the case of continuous compounding calculation is V_n is the cumulative discounted present value of the earned income in each year of the actual working years (ln) Although it is forehead,

$$V_n = \int_n^l a_n \{ (e^{-r}) \}^t dt = a_n \int_n^l (e^{-rt}) dt.$$

In other words, as expected, in the equilibrium of choice of education and training years,

(a) More trained people get higher annual income.

(b) The large difference in each year's earnings due to the difference in d years of training years corresponds to a higher discount rate.

(c) Since the margin of the number of years required for recovery of the training cost is also relatively small as the workable years are shorter, the difference in the year earnings value must be large.

Furthermore, Mincer [1974] estimated empirical analysis by estimating a semi-logarithmic wage function whose explanatory variables are the number of years of education and training and the number of years of work. Stimulated by these sets of his theoretical and/or empirical research, a genre called "Educational economics" became established.

In addition, Becker (1993) took over the contents of the first edition of 1964 and the second edition of 1975, which was added to it, as heritage, incorporating the development of subsequent research.

In the second chapter written down newly in this third edition, after Becker's "Human Capital" concept was explained explicitly, he wrote jokingly, "It will seem strange now, I did a risk hedge of a title by attaching a long subtitle ("A Theoretical and Empirical Analysis, with Special Reference to Education") with a little hesitation about making the title of the first edition "Human Capital". ". His summary of "Human Capital" concept is as follows.

"For most readers, capital means bank accounts, 100 shares of IBM, factory assembly lines, steel plants in the Chicago area, etc. If they represent long-term income and other useful outputs In the sense that they are all forms of capital, but I intend to describe different types of capital, Schooling, Computer Training Course, Medical Expenses (Omission), etc., also improve health, earn or to enhance the enjoyment of cultural life in many parts of an individual's life. To say that expenditure on education, training, medical care etc. is an investment in capital is completely consistent with the traditional capital concept."³¹

From the beginning, the author Becker has been working to grasp human activities related to school education, vocational training, medical care, labor migration, education and also the detection of information on price and income as human capital investment. He has tried furthermore to show theoretically and empirically that this

³¹ Becker [1993] pp.15 -16

human capital investment makes an important contribution to overall economic growth. The paper "Human Capital, Fertility, and Economic Growth" (Authors Becker, Murphy and Tamura) in the third part of the same book showed what should be addressed in order to find the factors of growth and development of the economy. A theoretical model shows human capital investment, the number of families, birth rate, interaction between human capital and physical capital, etc. as answers.³²

Becker's "Human Capital" refines the concept of labor force by recognizing accumulation of educational investment as a kind of capital. It is said to have contributed to academic research for factor analysis of economic growth and concept review of "technological progress" and other studies of economics.

However, from the viewpoint of organization of production factors in the economic reproduction structure, the "Human Capital" approach basically leaves the conceptual framework of labor force and its productivity, and only as an additional factor, educational investment. In the empirical analysis, even if a portion that can be attributed to the effect of accumulated educational investment is recognized, its contribution is of an additional and parallel nature to the last. As a matter of fact, for example, considering how innovation of a specific enterprise is being promoted, it is difficult to find a way of thinking about the problem of economic development including the technological progress under the concept of traditional "labor" limited to subordinate wage workers who do not engage in management. There is an inevitable limit.³³

On the other hand, in relation to the role of human activities in the reproduction structure utilizing the market mechanism, it is important to look directly at the reality of the position of the wage workers who do not own production means and the living conditions. Even so, if you observe the actual condition of the enterprise, the majority of the enterprise forms are so-called small and medium enterprises, and in the case of individual enterprises, workers consist of the owner and employees who are closely related to the owner. Even in the case of enterprises with corporate form, it is of family management on "skinship" relations in many cases, so to say, it is a kind of destiny community composition, the human relationship as internal environment. Thinking only the conflicting framework of the interests called "capitalist vs. wage labor" is not valid from the viewpoint of organism observation in this paper. In addition, regarding the actual situation of human activities in large enterprises of corporation type in which

³² Becker [1993] pp.323 - 349

³³ Analysis based on the concept of "Human Capital" further differs from our idea in that the productivity of fixed capital as a physical facility is left as a relative independent factor and in addition, the relationship with it is also not arranged after all.

so-called separation of ownership and management became common, it should be recognized that the practical value of analysis in the development of new technologies, promotion of research, etc. depends upon how to integrate the set of workers from the representative director to the newly hired employee into one activity unit.

In view of this, we reviewed the basic framework of conventional production factors, then, introduced concepts of "workers" including not only wage laborers who do not own production means but also corporate real management, and the concept of "Talents capital". We propose to consider comprehensively the role of human activities and the various problems in this economic reproduction structure. As a result of this, instead of traditional labor concepts, "working service" is the factor of production, and the stock of the workers which is the supply source of this production factor is called "Talents capital", where this stock features to enclose not only quantitative but also qualitative change.

3. Embodiment of technological progress into Talents capital

Our talents capital refers to a set of workers, taking qualitative evaluations into account, and is the subject of human activities in the economic reproduction structure as a social system. In addition, the Embodiment in our hypothesis, unlike conventional general economic theory, is not a durable real property such as factory, building and machinery, which is fixed capital, much less mysterious image of "total element productivity". Rather it is our Talents capital. This idea of Embodiment into technological capital of technological progress is largely responsible for Pasinetti's research. In accordance with Pasinetti [1993], human learning is what achieves technological progress as economic consequence.

This can also be confirmed from the fact that human activities of "entrepreneur" play a decisive role in Schumpeter's "new combination" (= innovation). In this case, it is logical to recognize that physical elements such as fixed capital are only complementary items. In addition, the dramatic development of information and communication technology in the world of the 21st century and its impact given to the industrial society are no longer limited in the economic analysis. It is demonstrating that accumulation of talents evaluated as intellectual existence is more worthy of attention rather than physical elements such as fixed capital. The accumulation of fixed capital realized today is subject to risk of obsolescence every moment. In that sense, it is very difficult and uncertain to predict the future profit of capital investment on the premise of existing technology.

Due to the existence of the above uncertainty which is a feature of technological

progress, it is difficult to evaluate the present and future economic value of the accumulated fixed capital. This is a serious problem in modern manufacturing industry as well as information processing industry and other industries. In addition, because fixed capital stock has an aspect as an accumulation of past "work service" in the first place, its contribution to the production process (concretely, evaluation of capital depreciation) cannot be independent from the evaluation of "work service".³⁴ Ultimately, usefulness of fixed capital data as an economic analysis tool must be regarded as extremely limited.

Furthermore, regarding intellectual property rights, even if a system that takes certain legal protection measures is incorporated into the economic reproduction structure, when considering positive externalities, the social costs of blocking can be of a magnitude that cannot be ignored. Therefore they should not be blocked in the future forever. In short, protection measures are generally timed. So-called founder profit due to the success of innovation is temporary in nature.

After all, the way of personal and social distribution of innovation cost is a knotty problem. In economic policy theory, subsidies for promoting innovation and tax incentives are cried out, and in fact many of them are institutionalized. However, such incentive measures, which inherently involve a specific intervention to corporate activities that should be normally in free competition, must certainly be limited. For completion, it is hoped that an extensive supportive network such as the academic society, related industries including mass media and financial institutions should be organized.

Knowledge in this case is not given by a conventional general education, but must be advanced expert knowledge. In short, innovation is carried and accumulated by talents who are organizing such knowledge.

With the recent progress of technology centered on IT, technical trends tend to become labor-saving investment type, and as extreme forecasts, all production activities are mechanized so that literally "without employment" economy will realize. The emergence of a situation, in which a large number of no income earners pop out into society without being able to live their lives, has also been discussed. The primary industrial revolution (invention of steam engine) and the secondary industrial revolution (The invention of electric machinery and the equipment) have been resolved by the emergence of new industries. However it is pointed out that the current tertiary industrial revolution

³⁴ Inventory stocks such as raw materials and work in process, which are consumed in the middle of the production process, also have an aspect as an accumulation of past "work service", so in terms of strict measurement of productivity in each period, It is also necessary to consider the evaluation of the contribution part to production.

(invention of digital technology) is linked with so rapid and thorough mechanization in all over production activities accompanied by the dramatic development of information and communication technology that employment adjustment is bringing about a situation that cannot catch up with the acceleration of technology evolution.³⁵

On the other hand, Brynjolfsson and McAfee [2011] not only shows these pessimistic figures, but also on the other hand shows the expectation for new possibilities of opening high-tech and human cooperative relationships. In order to consider the structure and function of economic reproduction constructively while including the view of technological progress, we must have a vision of institutional framework that can deal with such real problems.

It should be derived from consideration that leads to the proposal of a production contribution evaluation system that pays the post-Keynesian analytical framework warning "cost paradox" and can return the fruits of technological progress to talents capital. Specifically, it may focus on the vintage of human capital.³⁶

As a measurement procedure for distinguishing between the change in treatment side regarding workers and the change in productivity in technical / physical meaning, firstly, data should be organized according to the industrial classification taking account of precision in measurement-technology. Then, in order to grasp the change of treatment side, we should analyze the change of the relationship between the price of goods consumed mainly by workers like "wage goods" in classical economics, and the income of workers. We have to consider the relationship between this change in treatment side and the change in productivity of "work service" in the technical / physical meaning. In that consideration, we should learn from the above mentioned research on Human Capital. There are many issues.

4. Conclusion

In this paper, we first tried to represent the hypothesis that "Technological progress embodies to talents capital." and to base that idea by following the genealogy of economic thought.

If the hypothesis can get certain positive evaluation, the next step is how to recognize and measure long-term technical progress concretely by forming talents capital taking qualitative factors into consideration. When considering this qualitative factor, it should be noted that it is necessary to consider clearly the distinction between the change of treatment side regarding workers and the change of productivity in technical / physical

³⁵ Brynjolfsson and McAfee [2011]

³⁶ It is conceivable to apply a vintage approach on fixed capital (or capital investment).

meaning. In particular, if improvement of "labor productivity" of labor-intensive interpersonal services (typical of which is medical care / nursing care service) is aimed at reducing income of workers for providing the service, and if it means "securing of profits", the efforts of qualitative improvement of workers who provide human services may be neglected at all. Such is starkly outstanding in so-called "black companies". However, even in a general corporation, if the ratio of the profit (sales surplus) after deducting labor costs to the total corporate assets of the company is simply to be regarded as an improvement in "labor productivity", the problem is same.

Economic activity is essentially a human act for human being. Thinking for better design and management of reproductive structure should be a future task.

References

- Becker, G.S. [1975] *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education, 2nd Edition*, Cambridge, MA: NBER.
(Japanese translation, Sano, Y. [1976] Toyo Keizai Inc.)
- Becker, G.S. [1993] *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education, 3rd Edition*, Chicago: University of Chicago Press.
- Brynjolfsson, E. and McAfee, A. [2011] *Race Against the Machine: How the Digital Revolution Is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy*, Cambridge, MA: MIT Press.
- Cannon, W.B. [1932] *Wisdom of the Body*, London: Kegan etc. & Company Ltd.
- Davidson, P. [2009] *The Keynes Solution: The Path to Global Economic Prosperity*, New York: Palgrave Macmillan.
- Denison, E. [1979] *Accounting for Slower Economic Growth*, Washington, D.C.: Brookings Institution.
- Hume, D. [1752] *Political Discourses*, Edinburgh: A. Kincaid and A. Donaldson.
- Keynes, J.M. [1936] *The General Theory of Employment, Interest and Money*, London: Macmillan.
- Leijonhufvud, A. [1969] *On Keynesian Economics and the Economics of Keynes*, New York: Oxford University Press.
- Locke, J. [1690] *Two Treatises of Government*, London: Awnsham Churchill.
- Marshall, A. [1920] *Principles of Economics, 8th Edition*, London: Macmillan.
- Marshall, A. and Marshall, M.P. [1881] *The Economics of Industry, 2nd Edition*, London: Macmillan.

- Marx, K. [1867] *Das Kapital, Karl Marx-Friedrich Engels- Werke, Bd.23*, Diez Verlag .
- Mill, J.S. [1849] *Principles of political economy: with some of their applications to social philosophy, 2nd ed.* London: Parker.
- Mincer, J. [1958] “*Investment in Human Capital and Personal Income Distribution*”, *Journal of Political Economy*, Vol. 66, No.4, pp. 281-302.
- Mincer, J. [1974] *Schooling, Experience, and Earnings*, Cambridge, MA: National Bureau of Economic Research.
- Pasinetti, L.L. [1993] *Structural Economic Dynamics: A Theory of the Economic Consequences of Human Learning*, Cambridge: Cambridge University Press.
- Pasinetti, L.L. [2007] *Keynes and the Cambridge Keynesians: A Revolution in Economics' to be Accomplished*, Cambridge: Cambridge University Press.
- Ricardo, D. [1817] *On the Principles of Political Economy and Taxation*, London: John Murray.
- Robinson, J. [1971] *Economic Heresies: Some Old-Fashioned Questions in Economic Theory*, New York: Basic Books.
- Schultz, T.W. [1960] “*Capital Formation by Education*”, *Journal of Political Economy*, Vol. 68, No.6, pp. 571-583.
- Schumpeter, J. [1926] *Theorie der wirtschaftlichen Entwicklung, 2. Auflage*. München und Leipzig: Duncker & Humblot.
- Smith, A. [1759] *The Theory of Moral Sentiments*, Strand & Edinburgh: A. Millar; A. Kincaid & J. Bell.
- Smith, A. [1776] *An Inquiry into the Nature and Causes of the Wealth of Nations*, London: W. Strahan & T. Cadell.