

Title	Priority order and consumer behavior
Sub Title	
Author	浜田, 文雅(Hamada, Fumimasa)
Publisher	Keio Economic Observatory Sangyo Kenkyujo
Publication year	2014
Jtitle	KEO discussion paper No.132 (2014. 5)
JaLC DOI	10.14991/004.00000132-0001
Abstract	This paper attempts to propose an alternative microeconomic theory of consumer behavior in terms of distributional approach. A model determining the optimal priority order of and demand for consumer goods not only of the homogeneous type but also of the heterogeneous type under the budget constraint of a consumer and the market conditions is presented. Utility of a commodity is decomposed into the value in use and the value in quality. The latter is assumed to depend on personal income level. Market demand for each commodity is also determined.
Notes	
Genre	Technical Report
URL	https://koara.lib.keio.ac.jp/xoonips/modules/xoonips/detail.php?koara_id=AA10715861-00000132-0001

慶應義塾大学学術情報リポジトリ(KOARA)に掲載されているコンテンツの著作権は、それぞれの著作者、学会または出版社/発行者に帰属し、その権利は著作権法によって保護されています。引用にあたっては、著作権法を遵守してご利用ください。

The copyrights of content available on the KeiO Associated Repository of Academic resources (KOARA) belong to the respective authors, academic societies, or publishers/issuers, and these rights are protected by the Japanese Copyright Act. When quoting the content, please follow the Japanese copyright act.



Priority Order and Consumer Behavior*

Fumimasa Hamada

May 2014

Abstract

This paper attempts to propose an alternative microeconomic theory of consumer behavior in terms of distributional approach. A model determining the optimal priority order of and demand for consumer goods not only of the homogeneous type but also of the heterogeneous type under the budget constraint of a consumer and the market conditions is presented. Utility of a commodity is decomposed into the value in use and the value in quality. The latter is assumed to depend on personal income level. Market demand for each commodity is also determined.

Key Words: Heterogeneous commodity, utility maximization, optimal preference order, income distribution, consumer demand.

JEL: D01, D03, D11, D31.

* The author thanks Shinsuke Nakamura, Michitaka Hikari, Toru Maruyama and Masao Fukuoka of Keio University for their helpful comments and discussions. He is also thankful to Masao Ogaki of Keio University and Mamoru Kaneko of University of Tsukuba and other participants for comments at the Keio Seminar and at the Joint Meeting of Mathematical Economics Monday Seminar in Keio University. The author is Professor Emeritus, Department of Economics, Keio University, 2-15-45 Mita, Minatoku, Tokyo 108-8345, Japan. E-Mail: yamamine-75@pa2.so-net.ne.jp

1. Consumer's Utility: Quality and Ordering of Choice

The traditional theory assumes, in general, that any consumer goods has a smooth declining curve of its marginal utility, but this assumption is not able to be applicable to many consumer goods, because in reality, there are three types of commodities; that is, type A is of the commodity like as treated in the standard text book, the marginal utility curve of which is smoothly declining. Type B is of the case where the marginal utility curve has a fairly steep down-slope, and type C is the case where the marginal utility curve is vertical that means that marginal utility of the second unit is equal to zero. Many kinds of clothes, shoes, cups, plates, and other daily consumption goods and so on could be considered to be of type C. Consumer's decision to purchase this type of commodity is just to buy or not to buy it in most cases. In case where the consumption bundle includes commodity of type C in the ratio not to be negligible, it may hardly be possible to assume that there are smooth indifference curves on the super space of the multi-dimension by number of commodities available like in the neoclassical microeconomic theory of consumer behavior. In order to extend microeconomic theory of consumer behavior towards the more realistic, consumer's preference among consumption goods has to include the extreme case like as of type C described above.

Though we accept, in part, the law of decreasing marginal utility, we also take into account of the case where marginal utility curve has a vertical slope, so we assume that consumer decides the priority order of consumption goods to buy so as to maximize total utility of the consumption basket with the budget constraint subject to each personal income and the market conditions as given.

Let us assume that utility value of any consumer goods can be divided into two components; appreciation of necessity or usefulness, and quality. The former is the value in use or a basic utility of consumer goods for human life. When a consumer makes decision to purchase any commodity, this consumer is assumed to decide a priori the priority order of purchasing. This a priori order may depend not only on its value in use in daily life, on one hand, but also on its attractiveness, in other words, on the appreciation of its quality on the other hand.

Now, let us define utility of one unit of a commodity divided by its price as the unit utility. This is the utility of one unit of a commodity per unit currency, say, Yen. The price of commodity is important, so more exactly, the a priori preference or priority order of that commodity could be assumed to be determined by the volume of unit utility of that commodity. Here it should be noted that the quality of each commodity is given an important role. The difference of quality of each commodity is the core point in the modern economy when the income differentials are prevailing. In the present society,

consumer seems to be interested in diversity of consumption, so that it may prefer the commodity of different quality, instead of increasing quantity of the same commodity.

Let us think about the reason why consumer makes decision of purchasing a commodity among others. It may be realistic to assume that consumer selects the commodity of the highest unit utility among the commodities first. For example, there are many sorts of meat of different quality within the meat item. We have to make clear of the reason why a sort of meat of some quality is selected among others by a consumer. In order to think about this, it may be necessary to define the utility value in more detail.

2. Priority Order of Purchasing: Utility value theory of purchasing power

Utility value of consumer goods is defined as the subjective value of it. However, this is not what is declared by consumer's words but is what is expressed through its behavior of choosing and consequently purchasing it. The value of a commodity can be considered to be established by a consumer to choose and purchase it in its market. We also accept that the traditional or neoclassical theory of consumer behavior assumes that utility value of a consumer goods is given by one's subjectivity.

So, there is assumed to be the same number of preference function as that of consumer. There may be a tacit understanding that it includes value in use and attractiveness; that is, the former is the usefulness or the necessity for daily life and the latter is appreciation of a sort of additional value to utility value such as quality, design, color, feeling, fashion and so forth.

Let us call this as the value in attractiveness from now on. Value in use of a commodity may also be subjective, and for the simplicity's sake, let us assume that the utility of consumer is equal to the sum of the utility over all goods which consumer purchases. In other words, utility of one unit of a commodity is independent of that of other commodities¹.

Value in use of consumer goods is a part of utility of one unit of a commodity, and it can also be assumed to decline, as the unit to purchase increases. In this implication, value in use is assumed to be subject to the law of decreasing marginal utility. As already noted, there may be three types of commodity, classified in terms of the shape of marginal utility curve: type A, type B and type C. Utility of the last one unit of a commodity turns out to be smaller than that of the previous order in the case of commodity of type A and type B.

¹ It may be possible to extend this extremely restricted case to more general case, but this may be the next stage of this study.

Value in attractiveness of a commodity is also subjective, but this can be thought as considerably influenced by income of each consumer. For example, a consumer of lower income, when to make decision of choosing and buying rice, will not attach any greater importance to the value in attractiveness of any high quality of rice because of its severe budget constraint. In other words, value in attractiveness as an important component of utility of consumer goods depends on the excess capacity of the purchasing power of each consumer. Because of the budget constraint, consumer of lower income has to discount the value in quality of each consumer goods, though it is recognized as a part of utility value. It should also be noted that producer of commodity may insist the attractiveness of each commodity by advertizing, so consumer is assumed to appreciate or depreciate that based on its purchasing power; that is, its income level.

Since the value in use of a commodity is not common to all consumers, its utility value as the sum of value in use and value in attractiveness is finally determined by the value in use and the income level of each consumer. Consequently, utility value of one unit of a commodity as the subjective value of consumer goods is determined by the two objective factors: the quantity of consumption and the income level of consumer with the structural parameters including the personal attributes of live-style specific to each consumer as given. More exactly, the value in use is a decreasing function of the quantity of consumption, and the value in attractiveness is an increasing function of personal income level.² Thus, for instance, even within one consumption item, consumer could be assumed to select a commodity based on the order, from the higher to the lower, of the unit utility of commodity described above, and here, income level of each consumer takes the most important role in deciding the order of selection.

It may be possible that even within one item, consumer selects a commodity of the highest unit utility defined above and also may select the second and the third, and so on with its income level as given. But the second and/or the lower selection within an item may not necessarily be the case of consumer of the higher income. There may be the other commodity of the higher unit utility in other items to this consumer. So, a consumer will select one commodity within each consumption item, and will decide the optimal priority order of all the commodities available in the market from the commodity of the higher unit utility; that is from the highest unit utility through the lowest under the budget constraint. This implies that consumer is assumed to maximize total sum of utility per one unit of currency and consequently by multiplying the sum of

² A special case will be used, to explain the role of individual income when the optimal priority order is determined as shown in Table 1. However, in the theoretical model to be presented in the later section, value in use is assumed to be completely subjective of each consumer.

budget to it, the total utility of this consumer. Since the unit utility of commodity of type A or type B is a decreasing function of the quantity of its consumption, there could be included some units of the same commodity to be selected as that of different priority order from others.

From the view point of the utility value theory defined as above, the same commodity is not the same to each consumer who has a different income. This can be shown by an example of a special case where there are two commodities of different quality but of the same value in use within a consumption item.

Let us define $V_i^k(q_i)$, ($i = a$ and b) as the value in use of one unit of commodity i of consumer k , and $W_i^k(y_k)$ as the utility of attractiveness of one unit of commodity that consumer k with income y_k purchases after (q_i-1) units is to purchase, $q_i=1,2, \dots, Q_i$; and U_i^k as the utility of one unit of commodity i , so that,

$$U_i^k(q_i, y_k) = V_i^k(q_i) + W_i^k(y_k - \bar{y}), \quad \bar{y} = \{\sum_{k=1}^K y_k\}/K$$

$$V_i^k \geq 0, W_i^k > 0, \quad i = a, b, \quad k=1, 2, \dots, K, \quad q_i = 1, 2, \dots, Q_i$$

Suppose that there are two consumers ($K=2$) whose income is different; that is the income of consumer 2, y_2 is higher than that of consumer 1, y_1 . In Table 1, V_i^k , utility value in use of one unit of commodity a and b is supposed to be the same to consumer 1 and 2; that is 100. Utility value in attractiveness of commodity a , W_a is 80, but that of commodity b , W_b is 300, and these values can be assumed to be a sort of the firm's side evaluation. So utility of one unit of commodity a , U_a and that of b , U_b is 180 and 400 respectively. Suppose that consumer 1 evaluates the attractiveness of commodity a , W_a^1 as 20, and that of commodity b , W_b^1 as 30 subjectively, depending on the income level of consumer 1 that is assumed to be lower than that of consumer 2. Then consumer 2 is assumed to evaluate subjectively the attractiveness of commodity a , W_a^2 as 80, and that of commodity b , W_b^2 as 300 based on its higher income.

Table 1 The Choice of Commodity within an Item – An Illustrative Case

Commodity		a	b
Value in use	V	100	100
Value in attractiveness	W	80	300
Utility	U	180	400
Value in attractiveness of consumer 1	W^1	20	30
Value in attractiveness of consumer 2	W^2	80	300
Utility of consumer 1	U^1	120	130
Utility of consumer 2	U^2	180	400
Price of commodity	P	10	20
Unit utility of consumer 1	Ω_i^1	12	6.5
Unit utility of consumer 2	Ω_i^2	18	20
Choice of consumer 1		Yes	No
Choice of consumer 2		No	Yes

Note: All variables are in terms of one unit of commodity.

Thus, utility of one unit of commodities a and b of consumer 1 are 120 and 130, as denoted by U_a^1 and U_b^1 respectively, but, of consumer 2, they are 180 as U_a^2 and 400 as U_b^2 , depending on the higher income. Suppose that the price of commodity a is 10 and that of b is 20. Then, the unit utility of commodity a and b of consumer 1, Ω_a^1 and Ω_b^1 is 12 and 6.5, but that of consumer 2, Ω_a^2 and Ω_b^2 is 18 and 20 respectively, and consequently, consumer 1 decides to purchase commodity a, but consumer 2 decides to purchase commodity b that is assumed to have the higher quality or attractiveness. It may be realistic to assume that consumer who decides to purchase commodity like b does not purchase commodity like a. The same is true for the case where there are more than two commodities within a consumption item.

3. Purchasing Power of Consumer and Demand for Consumer Goods

Purchasing power of each consumer mainly depends on the income and the rate of saving. There can be considered many factors to influence on the saving rate of income. Economic theory has so far developed the mechanism that many factors change the rate of saving of consumer income. Though each theoretical mechanism has been made clear in some degree, it is still not clear how the rate of saving is determined by those factors as a whole. Keynes has finally proposed to accept a standard value by the empirical law of propensity to save. This may be a sort of the standard value of “g” (= 9.806m/s²).

Following Keynes, consumer knows that there are many factors influencing the time preference of consumption with the income level as given, but its whole mechanism appears too complex to take into account, so that as a realistic solution, some rate of saving is accepted based on the past experience. As a consequence, the purchasing power or the budget constraint of each consumer can be considered to depend on its income level and the rate of saving or propensity to save.

Given income level and propensity to save of each consumer, the budget constraint or purchasing power of each consumer is predetermined, and given the prices of consumer goods and the budget constraint of each consumer, demand for consumption goods by each consumer can be determined by the priority order of consumer goods; That is, the optimal priority order and the budget constraint gives rise to the maximum utility to this consumer. The unit utility of consumption goods depending on the income level of each consumer decides the optimal priority order, from the highest through the lowest, to purchase. The budget constraint determines demand for consumer goods, and the income distribution determines the market demand for consumer goods and also the aggregate demand for consumer goods.

4. A Model of Priority Ordering and Demand for Consumer Goods

In order to make clear of the basic idea of this theory of priority order, let us propose some basic assumptions as bellow:

Assumption 1

Utility of one unit of a commodity is decomposed into the two components; that is, the value in use and the value in quality. The former is the usual utility value, and the latter is an increasing function of income of each consumer. Consumer appreciates the value of a commodity not only for its usefulness, but also for its attractiveness such as material quality, design, color and so on.

Assumption 2

Consumer maximizes total utility by making priority order of utility of one unit of commodity per unit of currency, from the highest through the lowest.

Assumption 3

There are three types of the curve of marginal utility or value in use; that is, type A, type B and type C. In type A, utility of additional one unit of commodity is smoothly decreasing as its consumption increases. In type B, utility of additional one unit of commodity is drastically decreasing. In type C, utility of additional one unit of commodity is equal to zero.

In Assumption 1, consumer durable goods could be dealt with so as to be consistent with the usual non-durable goods; that is, the quantity of factor services in unit period of durable goods is proportional to its stock. This assumption is just the same as that in the theory of capital. Consumption of durable goods is its quantity of the factor services in unit period. If the number of years of durability of that goods is T, and its real value is C_d , the consumption of that durable goods in unit period, say one year, is equal to C_d/T . So, the real value C_d is the real investment in it by this consumer.

Assumption 2 implies that utility of one unit of commodity divided by its price can be recognized as utility of one unit of commodity per unit currency, say Yen, and let us call this the unit utility. The unit utility of the same commodity may appear several times in different priority order, and if the unit utility of two commodities is the same as each other, the commodity number is made precedent in the priority order. The sum of the unit utility of each commodity selected by the priority order gives rise to the maximum value of the total unit utility under the budget constraint, so by multiplying this sum with the sum of budget, the total utility is maximized.

Let us define the unit utility of commodity i of person k as Ω_i^k , $i=1,\dots,M$; $k=1,\dots,K$. Then,

$$\Omega_i^k = \{V_i^{k_i} + W_i^{k_i}(y_k)\}/p_i = U_i^k/p_i, \quad V_i^{k_i}(q_i) \geq 0, \quad W_i^{k_i}(y_k) > 0, \quad (1)$$

$$i=1,\dots,M \quad \text{and} \quad k=1,\dots,K,$$

where $V_i^{k_i}$ is the value in use and $W_i^{k_i}$ is the value in attractiveness of commodity i to person k who earns income y_k , and p_i is the price of commodity i .

Let us call $W_i^{k_i}$ as the attract function; that is, the attract function can be specified as below:

$$W_i^{k_i}(y_k) = \alpha_i^k + \beta_i^k(y_k - \bar{y}), \quad \bar{y} = \{\sum_{k=1}^K y_k\}/K, \quad \alpha_i^k, \beta_i^k > 0, \quad (2)$$

$$i=1,2,\dots,M, \quad \text{and} \quad k=1,\dots,K,$$

where α_i^k and β_i^k is constant respectively.

Then, the priority order of Ω_i^k is;

$$\Omega^k = \{\Omega_{i(1)}^k, \Omega_{i(2)}^k, \dots, \Omega_{i(j)}^k, \dots, \Omega_{i(M')}^k\}, \quad \Omega_{i(j)}^k \geq \Omega_{i(j+1)}^k, \quad M' \geq M \quad (3)$$

$$\text{for the income of person } k, \quad k=1,2,\dots,K,$$

where Ω^k is the set, the components of which are in the order of priority decided by person k who gains income y_k . The subscript $i(j)$ implies that the commodity number of the commodity to be selected in the j th order is i . As already notified, if there are two commodities the size of the unit utility is the same as each other, the commodity number is made precedent in the priority order.

If $\Omega_{i(j)=h}^k = \Omega_{i(j)=h}^k$, then let us assign the priority order like as below:

$$\Omega_{i(j)=h}^k \geq \Omega_{i(j+1)=h}^k, \quad \text{subject to } h \leq h'.$$

The relation between the budget constraint and income of person k will soon be explained later.

Expression (3) also gives rise to the purchasing list of consumer goods under the budget constraint of person k . Let us assume that the budget constraint of person k who earns income y_k is expressed as $c_k y_k$ where c_k is the average propensity to consume of person k . Then, the optimal priority order of consumer's goods of person k can be determined by the inequality as below:

$$\sum_{j=1}^{O^k} p_{i(j)=h} \leq c_k y_k, \quad k=1, \dots, K, \quad (4)$$

where $p_{i(j)=h}$ is the price of commodity h of the j th priority order during the unit period (Ex. week, month, quarter, half year or year), so O^k is the number of the last priority order, and y_k is the income of person k , the distribution of which could be subject to the function of the Logarithmic-Normal type. It should be noted that the index j is not the number specific to commodity, but the number of the priority order of commodity.

The priority order set of unit utility for all incomes K is defined as below:

$$f: \{y, p\} \rightarrow \{\Omega^1, \dots, \Omega^k, \dots, \Omega^K\} = \Omega \in \Gamma, \quad (5)$$

$$y = \{y_1, y_2, \dots, y_k, \dots, y_K\}, \quad p = \{p_1, p_2, \dots, p_i, \dots, p_M\}$$

where Γ is a set of non-increasing finite series of non-negative real number. For each order set in Ω , the commodity identifier I_k is like as below:

$$I_k = \{i_k(j) = h\} = \{1 \ 1 \ \dots \ 1 \ 7 \ 7 \ 7 \ \dots \ 7 \ 5 \ 6 \ 6 \ 6 \ 8 \ 11 \ \dots\}, \quad (6)$$

$$j=1, \dots, O^k (\cong M)^3, \quad h=1, 2, \dots, M, \quad k=1, 2, \dots, K,$$

where i_k is the commodity number that is included in the optimal priority order of selection by consumer k with income y_k , and $i_k(j) = h$ implies that in the optimal priority order decided by consumer k , the commodity number of the j th order is h . O^k is the lowest priority order of consumer k . Since some commodity may be preferred more than once in different order, O^k may turn out to be greater than M , the last commodity number.

Now let us define Θ_k as the quantity identifier to make the optimal priority order j correspond with the commodity number i and its quantity q_i as below:

$$\Theta_k = \left\{ \sum_{j=1}^{O^k} q_{i(j)=h}^k \right\} = \{15 \ 0 \ 0 \ 0 \ 1 \ 3 \ 12 \ 1 \ 0 \ 0 \ 1 \ \dots\}, \quad k=1, \dots, K, \quad (7)$$

where $q_{i(j)=h}^k = 1$, and $q_{i(j) \neq h}^k = 0$. Each number within the parenthesis is the quantity of commodity i ($= 1, 2, \dots, M$).

With the values of p_i, y_k and c_k as given, and using (7), the inequality (4) for

³ The number in the parenthesis is the original commodity number. There may be more than one unit for some commodity to be selected as shown in (6), where there are 15 units of the commodity No.1 to be selected.

consumer k determines the sum of consumption expenditures and its components to be purchased under the optimal (utility maximizing) priority order of consumer goods.

$$\sum_{i=1}^M \theta_{ik} p_i \leq c_k y_k, \quad k=1,2,\dots,K \quad (8)$$

where θ_{ik} is the i th element of Θ_k , $\sum_{j=1}^{O_k^k} q_{i(j)=h}^k$. The reason why this order of priority is optimal is that this consumer can realize the maximum utility by deciding to select this set of consumer goods under the budget constraint and the market conditions.

As the income level of consumer changes, the unit utility of commodity changes through the change in the value in attractiveness, and so, the optimal priority order changes. Given the income of consumer and the market conditions, the corresponding optimal priority order is determined, and consequently, the sum of consumer's demand of each person with the optimal priority order is determined. That realizes the maximum utility attainable by the person in question. Needless to say, the marginal utility of money of this person is equal to the utility of the commodity of the lowest priority order.

Now, with the distribution of consumer's income and the market conditions like prices of consumer goods as given, the market demand for consumer goods is determined for each consumer. If the summation is taken with respect to the index k , the equation for market demand for each commodity can be obtained as below:

$$D_i = \sum_{k=1}^K \theta_{ik}, \quad i=1,2,\dots,M, \quad (9)$$

where M is the last commodity number in the market.

Needless to say,

$$\Theta_i = \left\{ \sum_{k=1}^K \sum_{j=1}^{O_k^k} q_{i(j)=h}^k \right\} = \{\Theta_i\} = \{D_i\} \quad (10)$$

$$i=1,2,\dots,M, \quad h=1,2,\dots,M.$$

Reviewing (5),

$$g: \Phi \rightarrow \Theta_i \subset R^I, \quad (11)$$

where

$$\Phi = Y_1 \times \dots \times Y_K \times P, \quad y_1 \in Y_1, \dots, y_K \in Y_K, \quad \{p_i\} \in P,$$

Where R^I is the direct product set of I th order.

5. A Social Change in the Value in Use

There have taken place some important social topics, such as metabolic syndrome, the natural foods fashion, the ecological intention and so forth. These intentions will give rise to a reduction of the value in use of a specific commodity that leads to a decrease of the unit utility of the commodity in question, so that its priority order drops down in some degree or more. Because of that, this commodity might be removed out from the consumer's selection.

On the other hand, if this social change is what increases demand for any item, like as in the change for the ecological goods; that is, demand for this commodity will increase, and consumer will cut the purchase for some other commodities of the lowest priority order.

6. Substitution, Complement and Income Effect

In this model, substitution between two commodities is explained as their change of the priority order, so if there takes place a drastic change in their relative prices, one of the two will be dropped from the final consumption list, and the other will be introduced into the list. A commodity selected in some order, may accompany with another commodity as the complementary one in the next order. For example, tea or coffee would accompany with sugar, and sugar may be accompanied with some other cooking foods like as meat and/or vegetables. So, the same commodity will appear in the lower order, several times as complementary goods.

Income effect on the commodity of type C is simple; that is, if income of consumer increases, this increment will be paid for other commodity of the priority order following the lowest priority order. A decline of price of any commodity will also increase demand for any commodity of the priority order following the commodity lastly selected.

7. A Graphical Presentation

In order to make clear of the idea of this study, let us try to make a brief graphical presentation of the mechanism of this microeconomic theory of consumer behavior presented in this paper. Figure 1-a shows that utility of one unit of commodity i of type A to be purchased by consumer k with income y_k in a unit period decreases as the unit to purchase increases. On the vertical axis is measured utility of one unit of commodity i to be purchased by consumer k in a unit period. On the horizontal axis is measured the units of that commodity in the same period. Figure 1-b shows that the degree of decrease of utility of one unit of commodity i is rapid for the case of commodity of type B compared with that of type A. Figure 1-c shows the case for type C.

Figure 2 shows a down-wards step curve formed by the priority order of commodities with utility of one unit of each commodity to be purchased by consumer k with income y_k , divided by its price in the order from the highest through the lowest. For example, the commodity number, $(i(1)=h)$, may be 100, 2, 7, or 150. Some commodities may appear more than once, in different order. We can depict K Figures, where K is the number of consumers.

Figure 3 shows the form of attract function. The person whose income level y_k is

less than the average \bar{y} is assumed to discount the value in attractiveness of that commodity. Consumer whose income is higher than the average is assumed to appreciate the value in attractiveness. The attractiveness to be discounted or appreciated is supposed to be built up and announced in advertising by the firm that has made that commodity.

Figure 4 explains the process of determination of the optimal priority order of consumer goods to purchase. On the fourth quadrant of the figure, the personal income distribution is depicted. The real line curve shows the distribution before change, while the dotted line curve shows after the change. If income distribution is taken in terms of disposable income that is considered as subject to changes in tax system, the form of income distribution may also change. The situation of the same income in the distribution before the change and after the change is made clear.

The first quadrant of the upper part of the figure shows the same figure configuration as that on the Figure 2. The curve L corresponds with the diagram in the case where personal income is y_l and the curve k corresponds with that of personal income y_k . On the 2nd quadrant of the Figure 4, the horizontal axis measures the sum of payments to be made to get the commodities from the order of the number 1 through the number j^{th} . If the person of income y_l selects commodities up to the number j_l , then it has to pay the sum of E_l , and if the person of income y_k selects commodities up to the number j_k , then it has to pay the sum of E_k . It should be noted that we implicitly assumed here without the loss of generality that the average propensity to consume is unity; that is, $c_l=c_k=1$ for the simplicity's sake.

8. Marginal Utility of Money

The optimal priority order of consumer goods of a person k is, as already observed, determined by its income, and this implies that the marginal utility of money is equal to the unit utility of the goods lastly selected by this person based on its budget constraint with the prices of all the consumer goods as given. Since the priority order of the unit utility of a grand mansion located near the center of capital or the famous resort area may be much lower among the others, the marginal utility of super high income person may be equal to it. It is needless to say that the attractiveness of the grand mansion depends also on the income level of each person, and so the priority order of this goods of the lower income person is quite different from that of the higher income person.

9. Concluding Remarks

We have so far considered the microeconomic behavior of consumer demand,

specified quite differently compared with the neoclassical theory. It was assumed that consumer maximizes the sum of utility of one unit of commodities available divided by its price under the budget constraint. Needless to say, by multiplying this sum with the budget, consumer maximizes its total utility. Though here is assumed the independence of utility of commodity to purchase available to consumer, the priority order of each commodity is determined by the order of utility of one unit of commodity per unit currency from the highest through the lowest, and this makes an implicit relation concerning utility of commodity in the order of priority. Of course, the substitution between commodities is not directly taken into account, but it is introduced very restricted, but in a realistic way. In this theory, commodity substitution is not understood as partial but complete.

The reason why we proposed a new idea on the explanation of consumer behavior in terms of distributional approach, described above, is that we hardly accept the law of decreasing marginal utility that is considered as applicable to all the consumer goods evenly. It may be rather rare case where this law can be applicable. Each commodity is regarded as the one within almost the same consumption item as each other, but the price of each commodity is different from each other. Price is understood as the main factor that shows quality differences embodied in each commodity. And so, in most cases, the consumer's decision may be to buy or not to buy a commodity. The neoclassical theory does not explain these cases; that is, of type C. Instead, it assumes that commodities within each consumption item can be aggregated into the so-called "composite commodity", and this assumption may be very useful from the view point of the theoretical internal consistency, in order to formulate the whole system of the general economic interdependence that includes both the consumer's behaviors and the producer's behaviors. However, this consumer schedule does not take into account of the case where consumer selects one commodity from a set of commodities, each of which has different quality and so different price but regarded as of the same kind, or included in one consumption item.

An alternative theory of microeconomic behavior of consumer could also propose a solution for the optimal demand for consumer goods that gives the optimal priority ordering under the budget constraint of each consumer and market conditions, in terms of distributional approach. "Arrow-Debreu economy" assumes that all the commodities are "divisible on the indifference curves. We should say this assumption an axiom, and we cannot accept this axiom because of its unreality.

The new approach presented here seems to have one possibility to synthesize the theory of market demand for commodity with that of financial securities concerning the

liquidity preference by [5]⁴, and the Marshallian market supply behavior of commodity by [3]⁵. An attempt to make a rough sketch of the new system of economic analysis is presented in [1]⁶. They are all attempted by the “Distributional Approach”. The implicit understanding of real economy by the Cambridge oral tradition and J.M. Keynes is considered as to draw a whole system including consumer behavior, firm’s investment behavior, financial investor’s behavior, and so on.

References

- [1]Hamada, F.,”An Economic Theory of Income Distribution,” *Mimeo*, 2011
- [2]Keynes, J.M., *The General Theory of Employment, Interest and Money*, 1936.
- [3]Marshall, A., *Principles of Economics*, 9th edition with annotations by C.W. Guilbaud, Vol.1, 1961 459-460
- [4]Obi, K.,*Observation and Theory of Labor Supply by Houshold*, Keio University Press. 1910.
- [5]Tobin, J.,”Liquidity Preference as Behavior towards Risk,” *Review of Economic Studies*, 25:65-86, 1958.
- [6]———, (1955),”Multiple Probit Regression of Dichotomous Economic Variables,” *Cowles Foundation Discussion Paper No.1*, 1955.

⁴ The first part of Tobin’s paper proposes the relationship between the distribution (difference) of opinion about the normal price of a security and its actual price to deduce the demand function for money.

⁵ A. Marshall presented the market supply schedule for a commodity as a series of price of a commodity that corresponds with the supply of the commodity produced by each firm,that forms the distribution of supply of goods by firm.

⁶ F. Hamada presented a theory of labor supply, where there is the distribution of the subjective view (value) on the disutility of the same kind of labor among the applicants, while the utility of the wage to obtain is the same to all the applicants. The more elaborate study is presented in Obi[4].If the disutility of labor of all the applicants is smaller than the utility of the wage, then the number of labor supply is equal to that of labor of the labor force. The “Neoclassical Postulate” corresponds with the case where this distribution converges to its average value.

Figure 1-a Changes of Utility of One Unit of Commodity

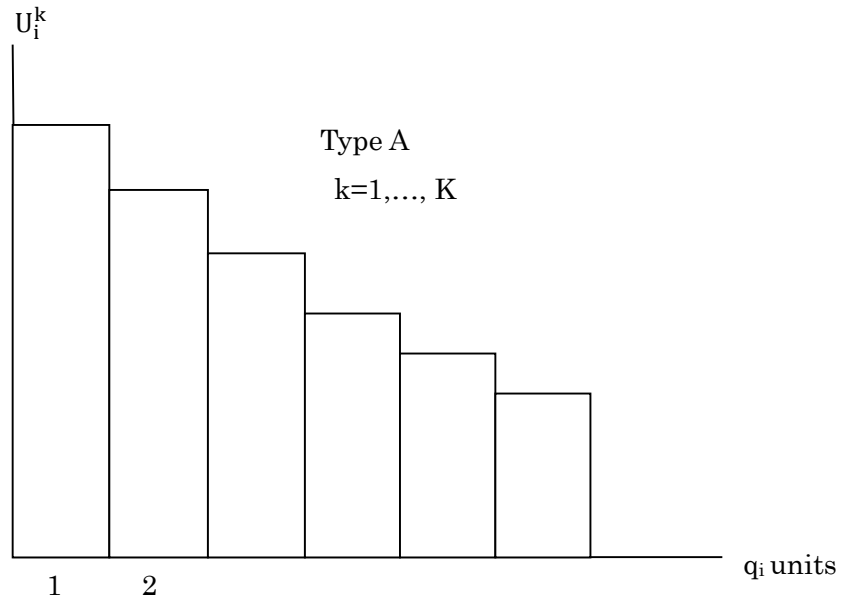


Figure 1-b Changes of Utility of One Unit of Commodity

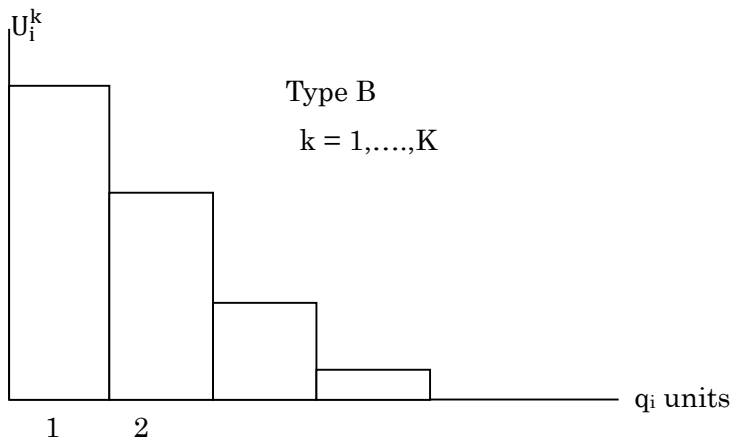


Figure 1-c Utility of One Unit of Commodity

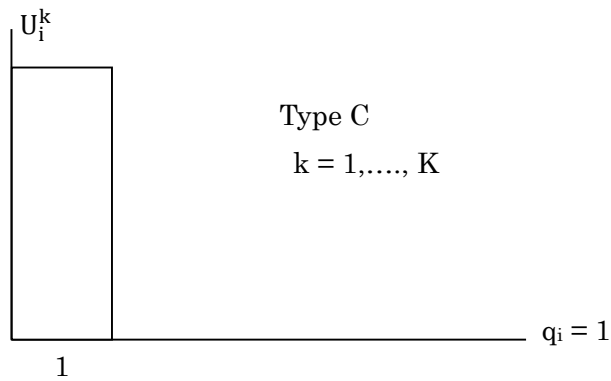


Figure 2 The Priority Ordering of the Unit Utility of Commodity

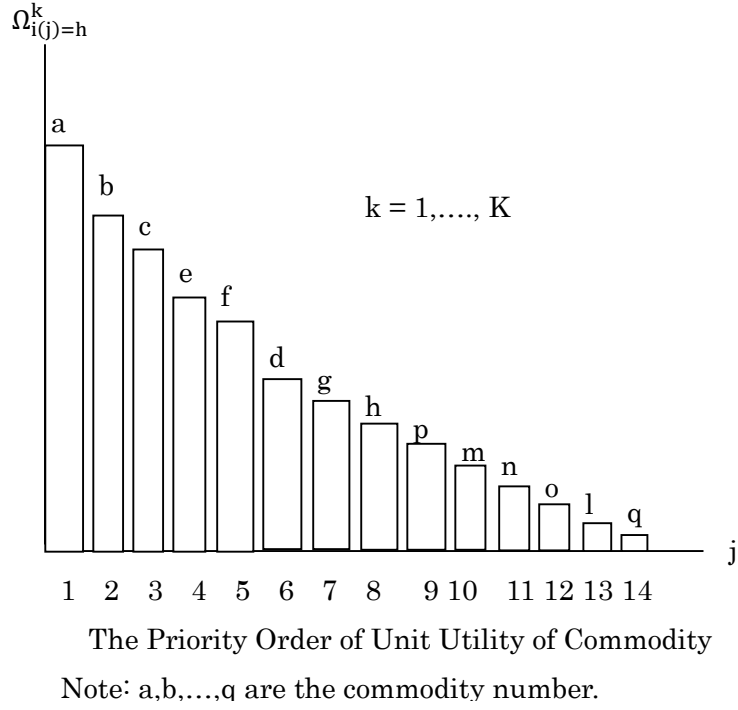


Figure 3 The Form of the Attractant Function

$$W_i^k(y_k) = \alpha_i^k + \beta_i^k(y_k - \bar{y}) \geq 0, \quad \beta_i^k > 0$$

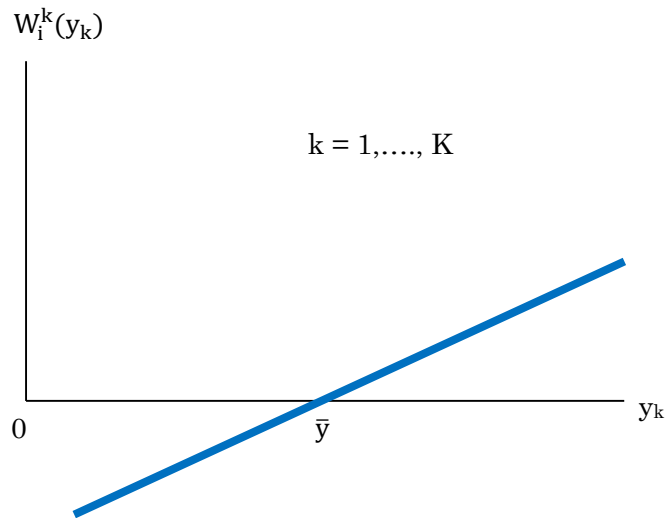


Figure 4 The Optimal Priority Order and Demand for Consumer Goods

