

# Ricardo's Theory of Value

Masayasu Yoshizawa

## Introduction

1. The Value of a Commodity
  - 1.1. Scarcity and the Quantity of Labour
  - 1.2. Difference in the Quality of Labour
  - 1.3. Capital and Profit
2. Difference in the Production Periods
  - 2.1. Rice Cakes, Rice, and Rice Wine
  - 2.2. Effect of a Change in Profit Rate
    - 2.2.1. Effect on the Relative Values of Commodities
    - 2.2.2. Three Measures of Value
  - 2.3. Ricardo's Procedure in his Unfinished Article *Absolute Value and Exchangeable Value*
3. Difference in the Ratios between Circulating and Fixed Capital
  - 3.1. Corn, Cloth, and Cotton Goods
  - 3.2. Effect of a Change in Profit Rate
    - 3.2.1. Effect on the Relative Values of Commodities
    - 3.2.2. Effect on the Total Value of Commodities
  - 3.3. Ricardo's Procedure in *On the Principles of Political Economy and Taxation*
4. Shift of the Center

## Introduction

It is the central proposition in the labour theory of value that the value of a commodity depends upon the quantity of labour required to produce it. This proposition faces at least three types of difficulties which derive from ①the scarcity of certain kinds of commodities (1.1.), ②differences in the quality of labour (1.2.), and ③the existence of capital and the returns paid to it (1.3.).

Ricardo avoids tackling head on the difficulties arising from the first two areas, and instead focuses upon the difficulties arising from the third area —the existence of capital and the return which is necessarily paid to it.

My intention is to clarify Ricardo's method and, in order to do this, I shall deploy two kinds of argument. First, I will investigate the difficulties arising from the difference in the production periods (2.1.~2.2.), and how Ricardo deals with them (2.3.).

Secondly, I will consider the difficulties caused by the difference in the ratios between circulating capital and fixed capital (3.1.~3.2.), and again examine Ricardo's method in dealing with them (3.3.).

Finally I hope to show that Ricardo's method in which he deals with the difficulties in the labour theory of value, contains a self-destructing element (4).

## 1. The Value of a Commodity

### 1.1. Scarcity and the Quantity of Labour

According to Ricardo, the value of a commodity depends on the relative quantity of labour which is necessary for its production. He states at the beginning of his *On the Principles of Political Economy and Taxation*:

“The value of a commodity, or the quantity of any other commodity for which it will exchange, depends on the relative quantity of labour which is necessary for its production, and not on the greater or less compensation which is paid for that labour.”<sup>(1)</sup>

But this principle is not applicable to some commodities, the value of which is determined by their *scarcity* alone. For example, ‘some rare statues and pictures, scarce books and coins, wines of a peculiar quality, which can be made only from grapes grown on a particular soil, of which there is a very limited quantity’<sup>(2)</sup>—the value of these commodities is wholly independent of the quantity of labour originally required to produce them.

Ricardo, however, insists that these commodities form a very small part of the mass of commodities daily exchanged in the market, and that by far the greater part of the commodities which are the objects of desire, are produced by labour. According to Ricardo, therefore, when searching for the laws which regulate the relative prices of commodities, we need to focus our investigation only on such commodities as can be increased in quantity by the exertion of human industry.

## 1.2. Difference in the Quality of Labour

To maintain the principle that *the value of a commodity depends on the quantity of labour which is necessary for its production*, two obstacles must be overcome; that is to say, ① difference in the quality of labour,

(1) Ricardo, D.: *The Works and Correspondence of David Ricardo*, edited by P. Sraffa with the collaboration of M. H. Dobb, Cambridge, at the University Press for the Royal Economic Society, 1951-55, Vol. I, *On the Principles of Political Economy and Taxation* 1951, p. 11.

(2) Ricardo, D.: *On the Principles of Political Economy and Taxation*, p. 12:

and ②the existence of capital and the returns paid to it (i.e. profit). Let's begin with the first.

Even if the relative values of commodities are determined exclusively by the relative quantities of labour required to produce them, how can we compare the quality of labour between two men whose abilities will inevitably differ? Ricardo circumvents this difficult problem by relying on market forces. He states:

“The estimation in which different qualities of labour are held, comes soon to be adjusted in the market with sufficient precision for all practical purposes, ... If a day's labour of a working jeweller be more valuable than a day's labour of a common labourer, it has long ago been adjusted, and placed in its proper position in the scale of value.”<sup>(3)</sup>

### 1.3. Capital and Profit

Let's turn to the second obstacle : the existence of capital and the returns paid to it (i. e. profit). Ricardo states in Chapter I , SectionIII of *On the Principles of Political Economy and Taxation*:

“Even in that early state to which Adam Smith refers, some capital, though possibly made and accumulated by the hunter himself, would be necessary to enable him to kill his game. Without some weapon, neither the beaver nor the deer could be destroyed, and therefore the value of these animals would be regulated, not solely by the time and labour necessary to their destruction, but also by the time and labour necessary for providing the hunter's capital, the weapon, by the aid

(3) Ricardo, D., *ibid.*, pp. 20-21.

of which their destruction was effected.<sup>(4)</sup>”

The value of hunted animals (e.g., beaver or deer) is determined by ①the time and labour necessary to their destruction, and ②the time and labour necessary for providing the hunter's capital, the weapon.

It is not difficult to understand what 'the time and labour necessary to their destruction' means, but it is more difficult to understand what 'the time and labour necessary for providing the hunter's capital' really means.

Let's consider a simple case: there are two men; person A is engaged exclusively in the production of bows and arrows, and rents them to person B; taking the bows and arrows, person B goes to hunt animals. Probably the bows can be used many times, and even the arrows might be used two or three times. That being the case, how can we calculate the quantity of labour which is transferred from the bows and arrows into each hunted animal? In other words, how much must person B pay person A for using the bows and arrows?

As soon as capital and capital returns (i.e. profit) appear on the scene, the central proposition in the labour theory of value that *the value of a commodity depends on the quantity of labour which is necessary for its production*, faces grave difficulties. In the following part of this paper, I will try to clarify what these difficulties are, and how Ricardo dealt with them. I will present two types of three-sector models:①the first model in which only circulating capital is used (2.1.~2.2.) ;②the second model in which fixed capital is introduced (3.1.~3.2.).

---

(4) Ricardo, D., *ibid.*, pp. 22-23.

## 2. Difference in the Production Periods

### 2.1. Rice Cakes, Rice, and Rice Wine

Let us suppose that there are three sectors which produce ①Rice Cakes, ②Rice, and ③Rice Wine. To simplify the argument, and to clarify the focal point, I am assuming that only circulating capital is used in the production process. [This assumption signifies that the role of instruments, machinery, factory and so on (i.e. fixed capital) is neglected. Later this assumption must be removed.]

In the Rice-Cake sector, 730 workers are employed, and each worker is paid ¥10,000 a day. The cost of materials (rice) which is used per day, is ¥2, 700,000. Assume that the production of rice cakes is completed in a day, and we can neglect the reward for circulating capital. Then, the value of rice cakes *at the end of the first day*, becomes ¥10,000,000 (see, Table 1).

But, if a longer production period is required, it is not possible to

Table 1

	profit rate : $\pi$	at the end of the First Day	at the end of the First Year	at the end of the Second Year
Rice Cakes	wages:7,300,000 (730×10,000×1) materials :2,700,000	→10,000,000		
Rice	wages :7,300,000 (2×10,000×365) materials(seeds) :2,700,000		11,000,000 → $\pi=10\%$ 10,500,000 $\pi=5\%$	
Rice Wine	wages :7,300,000 (1×10,000×730) materials :2,700,000			12,100,000 → $\pi=10\%$ 11,025,000 $\pi=5\%$

neglect the return to capital. In the Rice sector, 2 workers, who are each paid ¥10,000 a day, are employed for 365 days, and their wages are paid on the first day. The cost of materials (seeds) is ¥2,700,000, and it is paid on the first day, also. The production period for rice is 365 days. If the profit rate is 10% per year, the value of rice *at the end of the first year*, becomes ¥11,000,000.

In the Rice-Wine sector, 1 worker whose wage is ¥10,000 a day, is employed for 730 days, and his wage is paid on the first day. The cost of materials is ¥2,700,000 and it is paid on the first day, also. The production period of rice wine is 730 days. If the profit rate remains unchanged for two years at 10%, the value of rice wine *at the end of the second year*, becomes ¥12,100,000.

Although at the starting point the values of the inputs are identical in the three sectors, the value of rice is greater than that of rice cakes, and is smaller than that of rice wine. This difference in values derives from the difference in production periods. Thus the proposition that *the value of a commodity depends on the relative quantity of labour which is necessary for its production*, must be modified.

## **2.2. Effect of a Change in Profit Rate**

### **2.2.1. Effect on the Relative Values of Commodities**

In 2.1. we assumed the profit rate to be 10% per year. If the profit rate falls from 10% to 5%, what will happen? The value of rice cakes *at the end of the first day* does not change. But the value of rice *at the end of the first year* decreases by ¥500,000 from ¥11,000,000 to ¥10,500,000, and the value of rice wine *at the end of the second year* decreases by ¥1,075,000 from ¥12,100,000 to ¥11,025,000 (see, Table 1).

How do these decreases in value affect the relationship between the three commodities? With the profit rate falling, the longer the production period of a commodity, the greater will be the decrease in its relative value.

### 2.2.2. Three Measures of Value

When the profit rate is 10% per year, the value of 1 unit of rice cake equals the value of 0.909 units of rice. But if the profit rate falls to 5%, the value of rice falls, also. Now, in order to get 1 unit of rice cake, we must offer 0.952 units of rice (see, Table 2).

If we select *rice cakes* as the measure of value of all commodities, with the profit rate falling from 10% to 5%, the value of *rice* decreases

Table 2

	profit rate:10%	profit rate:5%
Rice-Cake-Measure	1 unit rice cake =0.909 units rice  1 unit rice cake =0.826 units rice wine	1 unit rice cake =0.952 units rice [the value of rice: -4.5%] 1 unit rice cake =0.907 units rice wine [the value of rice wine: -8.9%]
Rice-Measure	1 unit rice =1.1 units rice cakes  1 unit rice =0.909 units rice wine	1 unit rice =1.05 units rice cakes [the value of rice cakes: +4.8%] 1 unit rice =0.952 units rice wine [the value of rice wine: -4.5%]
Rice-Wine-Measure	1 unit rice wine =1.21 units rice cakes  1 unit rice wine =1.1 units rice	1 unit rice wine =1.1 units rice cakes [the value of rice cakes: +9.8%] 1 unit rice wine =1.05 units rice [the value of rice: +4.8%]



4.5%, and the value of *rice wine* decreases 8.9%.

However, if we select *rice* as the measure of value, with the profit rate falling from 10% to 5%, while the value of *rice cakes* increases 4.8%, the value of *rice wine* decreases 4.5%.

If we select *rice wine* as the measure of value, both the value of *rice cakes* and the value of *rice* increase, but the former increases more (9.8%) than the latter does (4.8%).

Given that there are now three possible measures of value, which should we select as the most suitable? Ricardo seems to recommend selecting *rice* as the best measure of value of the three.

### 2.3. Ricardo's Procedure in his Unfinished Article *Absolute Value and Exchangeable Value*

Ricardo insists that we should select as a measure of value *a commodity produced by labour employed for a year*. He enumerates the advantages of doing this.<sup>(5)</sup>

1. It is a perfect measure for all commodities produced under the same time period as the measure itself.
2. The greatest number of all commodities which are the objects of exchange, are produced by labour employed for a year.
3. A commodity produced by labour employed *for a year* (rice in our model) is a convenient mean between the extremes of commodities produced by labour employed *for much more than a year* (rice wine in our model), and commodities produced by labour employed *for much less than a year* (rice cake in our model).

---

(5) Ricardo, D.: Absolute Value and Exchangeable Value 1823, in: *The Works and Correspondence of David Ricardo*, Vol. IV 1951, p. 389, p. 405.

Ricardo says that, in most cases, using the mean as the measure will give a closer approximation to the truth than if either of the extremes are used. However, he also acknowledges that his measure is not a perfect one, and that his selection is in some degree arbitrary. Before I assess Ricardo's argument, I would like to turn to the second model which incorporates fixed capital.

### 3. Difference in the Ratios between Circulating and Fixed Capital

#### 3.1. Corn, Cloth, and Cotton Goods

First, we begin with an examination of the three-sectors model which Ricardo himself presents in his *On the Principles of Political Economy and Taxation*.<sup>(6)</sup>

Suppose that there are three capitalists. Capitalist A employs 100 workers and lets them cultivate corn in the first year. If each worker is paid £50 per year, and if the profit rate is 10% per year, the value of corn *at the end of the first year*, will be £5,500. Suppose that Capitalist A spends his profit (£500) in the second year, instead of investing it into his enterprise. Thus, he repeats the same process in the second year as in the first year. It follows that the total value of corn *for 2 years*, will be £11,000 (see, Table 3).

Capitalist B, in the first year, employs 100 workers and lets them make a machine. In the following year he employs 100 workers again and lets them make cloth, with the assistance of the machine. Providing each worker's wage is £50 per year and the profit rate is 10%, the total value of the cloth and machine *at the end of the second year*, will be £11,550, which is £550 greater than the value of corn.

(6) Ricardo, D.: *On the Principles of Political Economy and Taxation*, pp. 33-34.

Capitalist C, too, employs 100 workers and lets them make a machine in the first year. He then lets his workers make cotton goods with the assistance of the machine in the second year. The total value of the cotton goods and machine will be £11,550, also, i.e. equal to the total value of capitalist B's cloth and machine.

Where does the difference between the total value produced by capitalist A and the total values produced by capitalist B and capitalist C derive from? The cause which produces the difference in the total values, lies in our assumption that *capitalist A spends his profit* (£500) and doesn't reinvest it into his enterprise.

Table 3

	at the beginning of First Year (wages: £ 50)	at the end of First Year (profit rate:10%)	at the beginning of Second Year (wages: £ 50)	at the end of Second Year (profit rate:10%)
Corn	100 workers (£ 5,000)	→ corn (£ 5,500) <i>£ 500 is expended</i>	100 workers (£ 5,000)	→ corn (£ 5,500) <i>total value of corn for 2 years: £ 5,500 + £ 5,500 = £ 11,000</i>
Cloth	100 workers (£ 5,000)	→ machine (£ 5,500)	100 workers (£ 5,000) machine (£ 5,500)	→ cloth & machine (£ 11,550)
Cotton Goods	100 workers (£ 5,000)	→ machine (£ 5,500)	100 workers (£ 5,000) machine (£ 5,500)	→ cotton goods & machine (£ 11,550)

### 3.2. Effect of a Change in Profit Rate

#### 3.2.1. Effect on the Relative Values of Commodities

What is fixed capital? Although it is very difficult to define, we can

point out some of its distinctive characteristics.

1. A machine or factory as a typical example of fixed capital cannot be easily diverted from one specific purpose to another.
2. Usually a machine or factory continues to exist and work over several production periods.
3. A machine or factory must be completed before production begins.

The first characteristic of fixed capital does not have a direct relationship with our problem. The second characteristic is not within the scope of this paper. Therefore, I deal only with the third characteristic. In order to clarify the difference between circulating capital and fixed capital, I assume;

1. the reward for circulating capital is paid at the end of the production period (therefore, we need not count the profit to circulating capital),
2. the cost of fixed capital is paid before production begins (therefore, the invested money bears profit).

In order to simplify the argument, further I assume;

3. the durable period of fixed capital equals one production period.

Let us suppose that there are three sectors which produce ①bread, ②gold bars, and ③computers, and that the ratios between circulating capital (c) and fixed capital (f) in the three sectors vary as follows:

bread sector :  $90c+10f$   
 gold bar sector :  $50c+50f$   
 computer sector :  $10c+90f$

Let us also suppose that the production period in each of the three sectors is one year. If the profit rate is 10% per year, at the end of the production period, the values of bread, gold bars, and computers

Table 4

	profit rate:10%	profit rate:5%	profit rate : 10%	profit rate : 5%
Bread ( $90c+10f$ )	101	100.5	1 unit bread = 0.962 units gold bars 1 unit bread = 0.927 units computers	1 unit bread = 0.980 units gold bars [the value of gold bars: -1.9 %] 1 unit bread = 0.962 units computers [the value of computers: -3.7 %]
Gold Bars ( $50c+50f$ )	105	102.5	1 unit gold bar = 1.040 units bread 1 unit gold bar = 0.963 units computers	1 unit gold bar = 1.020 units bread [the value of bread: +1.9 %] 1 unit gold bar = 0.981 units computers [the value of computers: -1.8 %]
Computers ( $10c+90f$ )	109	104.5	1 unit computer = 1.079 units bread 1 unit computer = 1.038 units gold bars	1 unit computer = 1.040 units bread [the value of bread: +3.8 %] 1 unit computer = 1.020 units gold bars [the value of gold bars: +1.8 %]

will be 101, 105, and 109 respectively (see, Table 4). With the profit rate falling from 10% to 5%, the values of the three commodities will fall to 100.5, 102.5, and 104.5 respectively.

When the profit rate is 10% per year, the value of 1 unit of bread equals the value of 0.962 units of gold bars, but if the profit rate falls to 5%, we must offer 0.980 units of gold bars for 1 unit of bread. If we select *bread* as the measure of value of all commodities, the value of *gold bars* decreases 1.9%, as the profit rate falls to 5%. Likewise, the value of *computers* decreases 3.7%.

But if we select *gold bars* as the measure of value, the value of *bread* increases 1.9%, whereas the value of *computers* decreases 1.8%.

When *computers* are selected as the measure of value, both the values of *bread* and *gold bars* increase, but the former increases by more (3.8%) than the latter (1.8%).

### 3.2.2. Effect on the Total Value of Commodities

When the profit rate is 10% per year, the total value of the three commodities at the end of the production period will become 315. With the profit rate falling to 5%, the total value of the three commodities also falls to 307.5 (see, Table 4). When we select *bread* as the measure of value for all commodities, the ratio of the total value to the measure *decreases* (see, Table 5). When we select *computers* as the measure of value, the ratio of the total value to the measure *increases*.

But if we select *gold bars* as the measure of value, the ratio of the total value to the measure remains *unchanged*, in spite of a fall in the profit rate.

Table 5

	profit rate:10%	profit rate:5%
Bread-Measure	$\frac{315}{101}=3.12$	$\frac{307.5}{100.5}=3.06$ [The total value decreases]
Gold-Bar-Measure	$\frac{315}{105}=3$	$\frac{307.5}{102.5}=3$ [The total value is unchanged]
Computer-Measure	$\frac{315}{109}=2.89$	$\frac{307.5}{104.5}=2.94$ [The total value increases]

### 3.3. Ricardo's Procedure in *On the Principles of Political Economy and Taxation*

Ricardo seems to recommend selecting a commodity like the gold bars in our model in 3.2. as the measure of value. His argument consists of two parts. First, he says that the change in profit rate has only a slight effect upon the relative prices of commodities.

“Neither gold then, nor any other commodities, can ever be a perfect measure of value for all things;but I have already remarked, that the effect on the relative prices of things, from a variation in profits, is comparatively slight; that by far the most important effects are produced by the varying quantities of labour required for production; and therefore, if we suppose this important cause of variation removed from the production of gold, we shall probably possess as near an approximation to a standard measure of value as can be theoretically conceived.”<sup>(7)</sup>

(7) Ricardo, D., *ibid.*, p. 45.

Secondly, he seems to hope that the ratio of fixed capital to circulating capital in the gold sector represents the average ratio of all sectors.

“May not gold be considered as a commodity produced with such proportions of the two kinds of capital, as approach nearest to the average quantity employed in the production of most commodities? May not these proportions be so nearly equally distant from the two extremes, the one where little fixed capital is used, the other where little labour is employed, as to form a just mean between them.”<sup>(8)</sup>

That being the case, the gold would give a measure which deviates much less from the ‘truth’ than either of the extremes (bread or computers).

#### 4. Shift of the Center

To summarize the argument in 1.1.~3.3.

1. The fact that a return (profit) must be paid to capital, forces us to modify the central proposition in the labour theory of value ; that the value of a commodity depends on the relative quantity of labour which is necessary for its production (2.1.;3.1.).
2. With the profit rate falling, the longer the production period of a commodity, the greater the decrease in relative value of that commodity (2.2.).
3. With the profit rate falling, the higher the ratio of fixed capital to circulating capital, the greater the decrease in relative value

(8) Ricardo, D., *ibid.*, pp. 45-46.



of that commodity (3.2.).

Based upon these conclusions drawn from his model, Ricardo went on to recommend ①selecting as the measure of value, a commodity which is produced by labour employed for a year [for example, corn] (2.3.) and ②using gold as the measure of value (3.3.).

I think these two proposals by Ricardo contain a self-destructing element. It is highly probable that market forces cause the following process:

fall in the profit rate → fall in the relative price of rice wine [whose production period is longer than the average production period] (see, 2.1. ~ 2.2.) → increase in the demand for rice wine → increase in the production of rice wine → prolongation of the average production period

If profit rate continues to fall, the average length of the production period for the economy as a whole will become longer, which will inevitably cause the production period of rice to be shorter than the average production period.

fall in the profit rate → fall in the relative price of computers [the ratio of fixed capital to circulating capital in the computer-sector is higher than the average ratio] (see, 3.2.1.) → increase in the demand for computers → increase in the production of computers → rise in the average ratio of fixed capital to circulating capital.

That being the case, the ratio of fixed capital to circulating capital in the gold-bar-sector will be lower than the average ratio for the economy as a whole.

\* I wish to express my appreciation to my colleague Mr. J. A. S. Wild for correcting my manuscript and giving me several useful advices.