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Globalization or Isolation?—Ricardo's Model

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Through the attempt to clarify justifiable economic circumstances where a policy of globalization and/or a policy of national isolation is proven valid, the author revealed in this thesis that there are two such economic phases: An economy where the theory of comparative advantage, proposed by David Ricardo, is applicable, and an economy where the theory is not applicable. The author applied his original approach to prove the validity of Ricardo's comparative advantage theory, and found that the theory can be justified only when a macro economy is in the primal problem phase, where a policy of globalization is effective. It is a necessary and sufficient condition for the theory to be valid. In other words, Ricardo's theory of comparative advantage is not applicable when a macro economy is in the dual problem phase, where a policy of national isolation, instead of that of globalization, is valid. The primal problem phase and the dual problem phase of a macro economy, called in this thesis by the author, are a version of an expression quite common in OR (operations research).

Keywords: Ricardo's model, globalization, isolation

Introduction

Whether to select a policy of globalization or that of national isolation has always been a crucial subject for those in power in the past, and it will continue to be so forever. Japan's Tokugawa Shogunate, for instance, chose a policy of national isolation. The establishment of the Tokugawa administration marked a significant historical turning point for Japan, in the sense that its founder Tokugawa Iyeyasu brought an end to a centuries-old era of civil war. An isolation policy was adopted during the Edo era, while he and his successors committed to stabilizing the Japanese society. However, their predecessors like Oda Nobunaga and Toyotomi Hideyoshi, who seized power through civil strife, adopted a policy which could be called "globalization" in modern parlance. Japan's major trade partners at that time included such countries (and regions) as Spain and Portugal, which were at the height of their prosperity, China, Korea, Ezo (today's Hokkaido), as well as Ryukyu (today's Okinawa).

This naturally leads to the following questions: What advantages did Oda Nobunaga and Toyotomi Hideyoshi have by engaging in trade with those countries and regions at that time? Why did the Tokugawa Shogunate adopt a policy of national isolation (in fact, Japan continued its trade activities with the Netherlands, and China during the period)? The author attempts to clarify these points in this thesis.

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Verifying the Theory of Comparative Advantage Advocated by David Ricardo

As to the question of what are the advantages of free trade, or policy of globalization, the "theory of comparative advantage" proposed by David Ricardo (1772 through to 1823) provides the answer. Born in London, Britain, Ricardo became interested in economics after reading Adam Smith's *The Wealth of Nations*. He later wrote *On the Principles of Political Economy and Taxation*, which helped develop the theory of classical economics.

Ricardo's theory of "comparative advantage" helped shed light on the fundamental principles of international economics, and justified free trade as a form of international division of labor. In other words, Ricardo's theory proves the validity of "globalization" in modern parlance.

The author uses an example of a university professor and his secretary at a study room, as an illustration. Suppose that the professor has an advantage in his ability in research (*R*) over the secretary (as a matter of course). The secretary, on the other hand, has an advantage in her competence in word-processing (*W*) over the professor. In this circumstance, if the professor concentrates on research (*R*), and the secretary concentrates on word-processing (*W*), the most efficient division of labor at the study room can be achieved. This circumstance is called "absolute advantage".

On the other hand, suppose that the professor has an absolute advantage both in research (*R*) and word-processing (*W*) abilities over the secretary. However, if the degree of the professor's advantage in research (*R*) capability is relatively higher than the degree of advantage in word-processing (*W*) capability, we could say that the professor has a comparative advantage in research (*R*) ability over the secretary, and that the professor has a comparative disadvantage in word-processing (*W*) ability over the secretary.

In other words, the secretary has a comparative advantage in word-processing (*W*) competence over the professor. When applying Ricardo's theory, this can be restated as follows:

> When the professor has an absolute advantage both in research (*R*) and word-processing (*W*) ability, and his research (*R*) capability has a comparative advantage over the secretary, and the secretary's word-processing (W) capability has a comparative advantage over the professor, the most efficient division of labor at this study room can be achieved if the professor concentrates on research (R) and the secretary concentrates on word-processing (W).

Ricardo's comparative advantage theory has had difficulty in being accepted, in contrast to the absolute advantage theory, which was easily recognized in the world. However, Ricardo devised a mathematical proof of his comparative advantage theory. In essence, it signifies that "the efficiency at this study room when the professor and the secretary divide their roles would never be worse than when they don't do so". This statement will be shown valid by proving the following inequality:

The efficiency of a case where roles are not shared $\leqq$ The efficiency of a case where roles are shared

Ricardo's Model

Suppose that professor (*P*) and secretary (*S*) engage only in research (*R*) and word-processing (*W*) work and nothing else at the study room, the efficiencies marked by *P* and *S*, when they engage either in (*R*) or W, respectively, are shown in Table 1.

Table 1 shows that *P* is able to accomplish a unit of *R* in a week, but that *S* needs three weeks to complete it. And while it takes *P* three weeks to finish a unit of *W*, *S* needs four weeks to complete the same amount of

work. In other words, *P* has an absolute advantage in both *R* and *W* over *S*. However, in respect to *R*, *P* has a comparative advantage over *S*, while *S* has a comparative advantage over *P* in respect to *W*.

Table 1

Disparity in Work Efficiency

Disparity in work efficiency	Research (*R*)	Word-processing (*W*)
Professor (*P*)	1 week	3 weeks
Secretary (*S*)	3 weeks	4 weeks

Suppose that the study room workforce consists only of professor *P* and secretary *S*, with no other assistant professors or associate professors. The amounts produced by *P* when he concentrates on *R* for 12 weeks, then on *W* also for 12 weeks, are shown in Table 2. The same table also demonstrates the amounts produced by *S* when concentrating on *R* for 12 weeks, then on *W* also for 12 weeks.

Table 2

Absolute Advantage Specialization

	Research (*R*)	Word-processin (*W*)
Professor (*P*)	12 units	4 units
Secretar (S)	4 units	3 units
Total	16 units	7 units

As shown in Table 2, *P* has an absolute advantage both in *R* and in *W* competence over *S*. *P*'s advantage in *R* capability is valued at three times higher than *S*, and *P*'s advantage in *W* ability is 1.33 times higher than *S*. That is to say, *P* has a comparative advantage in *R* over *S*, whereas S has a comparative advantage in *W* over *P*.

Then, when *P* and *S* both specialize in work where each of them has a comparative advantage, just as Ricardo suggested, and when *P* concentrates on *R* for (12 × 2 weeks) and *S* concentrates on *W* also for (12 × 2 weeks), the amounts of production of *R* and *W*, respectively, are shown in Table 3.

Table 3

When Specializing in One's Comparative Advantage

	Researc (*R*)	Word-processin (*W*)
Professo (*P*)	24 units (21 units)	0 unit (1 unit)
Secretar (S)	0 unit	6 units
Sum	24 units (21 units)	6 units (7 units)

As was stated by Ricardo, if both *P* and *S* specialize in work where each of them has a comparative advantage, the production of *R* increases from 16 units to 24 units, whereas the production of *W* declines from 7 units to 6 units, as shown in Table 1 and Table 2. However, if *P* produces a unit of *W*, it brings the total production of *R* to 21 units and that of *W* to 7 units. As a result, the total production at the study room, comprising both *R* and *W*, increases. It is the main concept of Ricardo's comparative advantage theory.

Substantiating the Theory of Comparative Advantage

In this chapter, the author applies his original approach to substantiating the validity of Ricardo's

comparative advantage theory.

Production Possibility of Professor (*P*) and Secretary (*S*) in *R* and *W*

If professor (*P*) specializes in *R*, a maximum of 24 units of *R* would be produced, whereas *P* would be able to produce a unit of *W* if he gives up on producing three units of *R*. Here the ratio 3:1 is derived from the trade-off between the amount of production of *R* and *W*. Table 4 demonstrates the estimated production possibility of professor (*P*) when applying this ratio.

Table 5 demonstrates the production possibility of secretary (*S*) under the same condition.

Table 4

Production Possibility of Professor (P)

Production possibility point	Research (*R*)	Word-processing (*W*)
I	0	8
II	3	7
III	6	6
IV	9	5
V	12	4
VI	15	3
VII	18	2
VIII	21	1
IX	24	0

Table 5

Production Possibility of Secretary (S)

Production possibility point	Research (*R*)	Word-processing (*W*)
I	0	6
II	$\frac{4}{3}$	5
III	$\frac{8}{3}$	4
IV	4	3
V	$\frac{16}{3}$	2
VI	$\frac{20}{3}$	1
VII	8	0

Production Possibility Frontier of Professor (*P*) and Secretary (*S*)

Figure 1 demonstrates the production possibility frontier of professor (*P*), which expresses the ratio between the amount of production of *R* and *W*, produced by *P*. Figure 2 represents the production possibility frontier of secretary (*S*), which indicates the ratio between the amount of production of *R* and *W*, produced by *S*.

When comparing Figure 1 and Figure 2, the angle of the production possibility frontier of *P* is lower than that of *S*. This also verifies the fact that *P* has a comparative advantage in *R* over *S*.

Increased Work Efficiency Through Share of Roles Between Professor (*P*) and Secretary (*S*)

Next, the author touches upon whether the study room's work efficiency improves if professor (*P*) and secretary (*S*) share the roles.

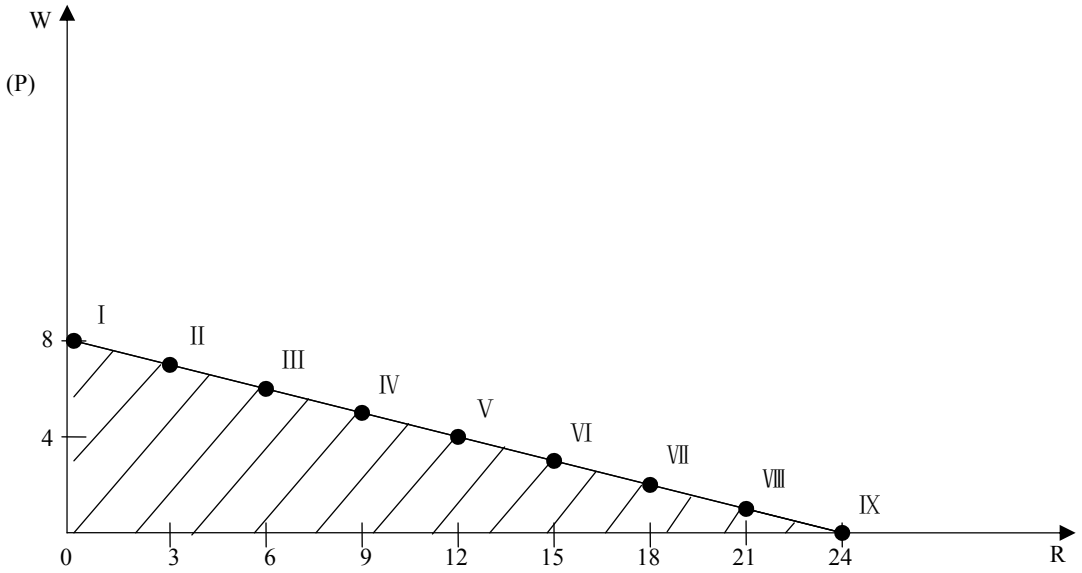


Figure 1. Production possibility frontier of professor (*P*).

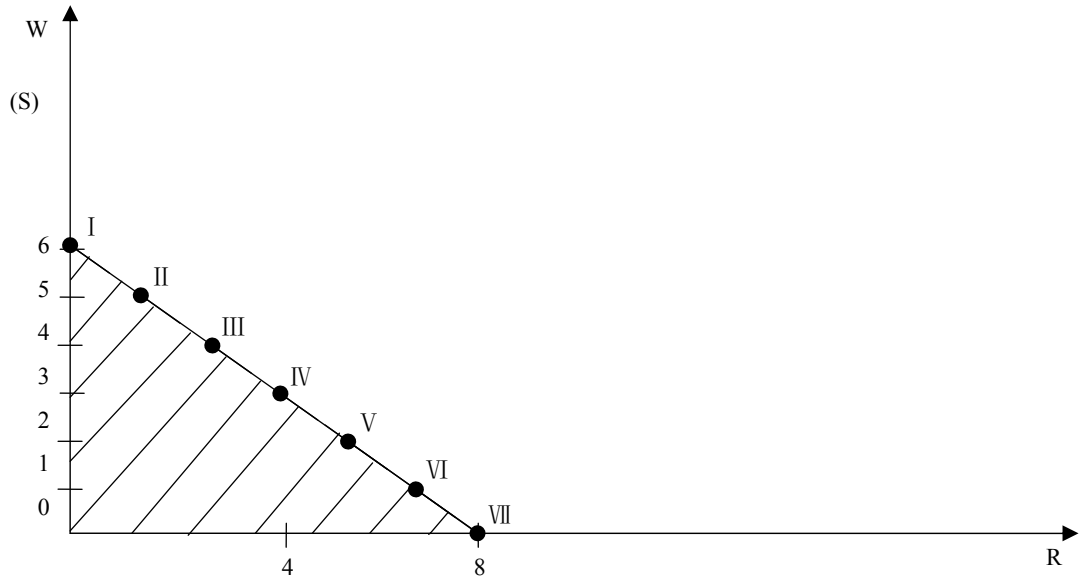


Figure 2. Production possibility frontier of secretary (*S*).

Figure 3 (Kinoshita, 2009) demonstrates the result of sharing of roles between *P* and *S*, with the production possibility frontier of *P* stretching above the production possibility frontier of *S*. Before they start dividing their works, *S* produced three units of word-processing (*W*) work, and four units of research (*R*) work. But after they start sharing the roles, the study room as a whole becomes able to produce a total of nine units of *R*, in addition to three units of *W*, meaning that its production efficiency increased. A shaded area in Figure 3 represents an increase in production brought out by sharing of roles between *P* and *S*.

As a result, the author reaches the following conclusion.

Sharing of Roles Makes Both *P* and *S* Richer

This is the conclusion obtained by following the comparative advantage theory, and it can be restated as

follows when being interpreted from an angle of economics: Distribution of roles among different economies, or trade, makes all the concerned countries richer.

This leads to another conclusion as: A policy of globalization, instead of a policy of national isolation, can make all the concerned nations richer.

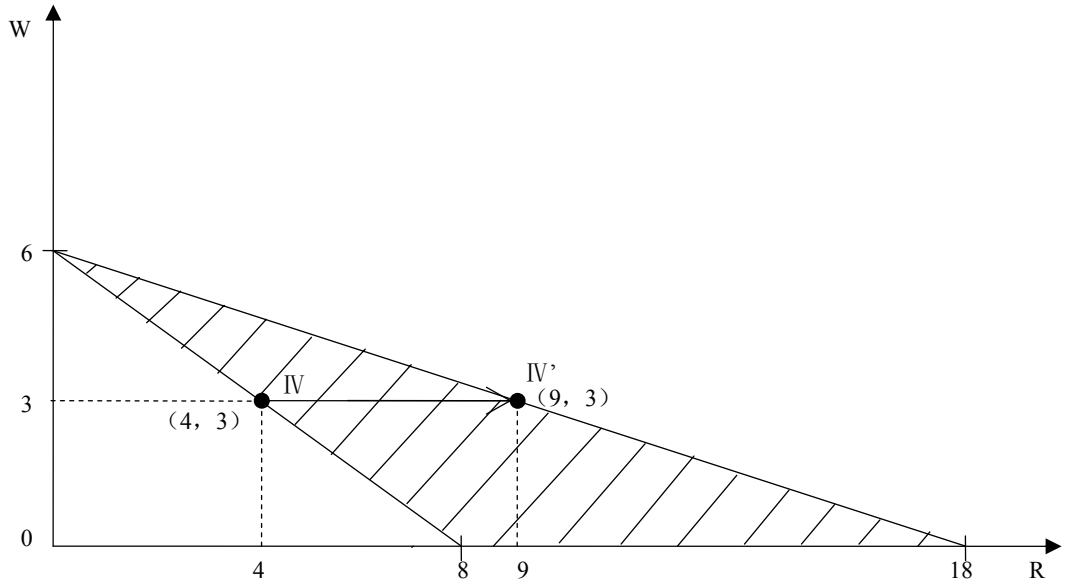


Figure 3. Improvement in production efficiency in *R* and *W*.

Globalization Is Justifiable Only Under a Primal Problem Economy

Then the next question is, whether the conclusion "a policy of globalization, instead of a policy of national isolation, can make all the concerned nations richer" in the previous chapter, obtained through Ricardo's theory of comparative advantage, is true or not.

There is no doubt that Ricardo's comparative advantage theory was inspired by Adam Smith's *The Wealth of Nations*. In fact, Ricardo was a genuine classical economist, who followed in the footsteps of Adam Smith's philosophy. In other words, Ricardo's comparative advantage theory is valid, and trade is proven advantageous, only in a primal problem economy. This constitutes a necessary and sufficient condition for "market fundamentalism" as asserted by classical economists. A primal problem economy, is a version of an expression quite common in OR (operations research). It signifies an economy where private corporations with good financial conditions invest in plant and equipment and work towards the goal of maximizing profits, which leads to the overall economy to expand.

That is to say, the validity of free trade is proven, and a policy of globalization is justified only in a primal problem economy, as it is demonstrated in Table 6 (Kinoshita, 2009a, 2011). Furthermore, it is valid only when it is controlled by the invisible hand of God, when economic entities focus their efforts on maximizing profits, when Say's law is applicable, when monetary policies are proven effective, financial economy functions under normal interest rates, when there is no unemployment, and also when savings are allotted to corporate investments.

In the past, there were many countries which achieved great success by adopting a policy of globalization:

Japan's high economic growth after the Second World War; U.S. financial-economic boom before it collapsed a while ago; China's economic breakthrough beginning in the 21st century; Great Britain's prosperity as "queen of the seas" particularly in the 19th century; the prosperity of the Netherlands in the 17th century, and that of Spain during the 16th and 17th centuries, as well as Portugal during the 15th and 16th centuries; ancient Greece between the 8th century BC through to 146 BC, and the Roman Empire from 27 BC through to 476 AD (when the Western Roman Empire collapsed); Japan's trade with China's Song Dynasty during the Heian era (from 794 through around 1192), also with China's Ming Dynasty during the Muromachi era (from 1336 through 1573). Ambitious Japanese leaders like Oda Nobunaga and Toyotomi Hideyoshi, who reached the pinnacle of power through their efforts to unite the war-torn country, also chose a policy of globalization.

The choice of leaders in the above-mentioned cases to globalize their countries through trade was proven valid in a primal problem economy, which benefits all the participants, as represented by the upper right shaded part in Figure 4 (Kinoshita, 2009a, 2011). In other words, Ricardo's comparative theory proved the mechanism of "a win-win economy", in which all the players gain.

Table 6

Summary of Duality in Macro-economics

	Primal problem economy	Dual problem economy
(1) Law	The invisible hand of God	Fallacy of composition
(2) Behavioral principle	Economic entities' maximization of profit (utility)	Economic entities' minimization of debt
(3) Say's Law	Supply creates demand	Not effective Results in insufficient demand
(4) Principle of effective demand	Not effective A shortage in supply, i.e., crowding out may be possible	Demand creates supply
(5) Monetary policy	Effective	Not effective Lowering the interest would not tempt corporations to borrow money
(6) Financial policy	Not effective	Effective The government is the biggest consumer
(7) Interest	Normal rate (inflation)	Ultra-low rate (deflation)
(8) Unemployment	None	Present
(9) Savings	Savings are invested	Savings will not be invested
(10) Trade	Free trade	Protected trade
(10) OR analysis	Primal problem in linear programming	Dual problem in linear programming

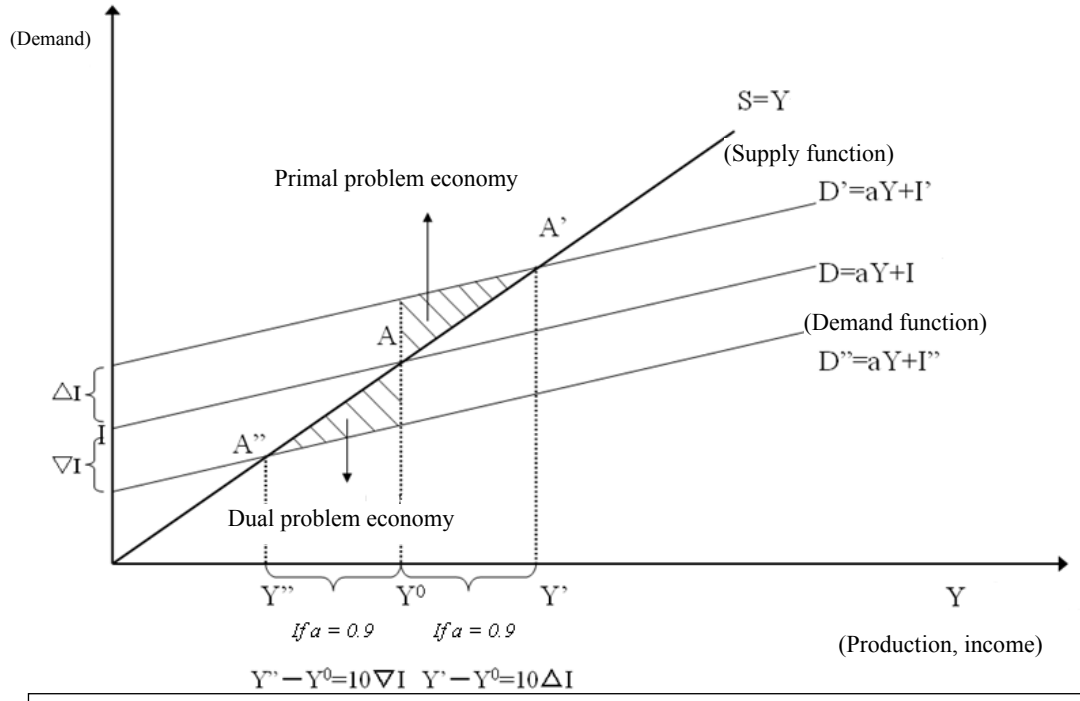
However, a policy of globalization and free trade is invalid in a dual problem economy, or an economy suffering from the "fallacy of composition". That is to say, such a policy is not justifiable when economic entities focus their efforts on minimizing debts, when the principle of effective demand is applicable, when the government's financial policy (increasing public spending) turns effective, and when financial economy functions well with ultra low interest rates, where there is unemployment, and when savings are not allotted to corporate investments. A dual problem economy, is also a version of an expression quite common in OR. It signifies an economy where the value of assets purchased on credit during the bubble period collapses, and the efficiency of investment drops below the market interest rate for corporations with debt. As a result, corporations stay away from capital expenditure and shift their priorities from profit maximization to debt minimization.

Socialist countries in the past, having recognized such economic circumstances as stated above, adopted a policy of national isolation as a precautionary measure to minimize its adverse effects. Likewise, in Japan, the Kamakura Shogunate during the Kamakura era (around 1185 through to 1333) and the Tokugawa Shogunate during the Edo era (from 1603 through 1868) adopted a national isolation policy. This is because a policy of globalization in a dual problem economy, represented by the lower left shaded part in Figure 4, could cause all the participants a loss. Under this circumstance, a policy of national isolation is valid.

This brings us to the following conclusion:

(1) In a primal problem economy, where Ricardo's comparative advantage theory is applicable, a globalization policy, or a policy of free trade, is the right choice, which would benefit all the players;

(2) On the other hand, in a dual problem economy, where Ricardo's comparative advantage theory is not applicable, and a free trade policy is not justifiable, an isolation policy is the right choice. If a globalization policy is adopted under such economic phase, all the players would suffer a loss and become poorer.



The primal problem economy and the dual problem economy in the chart show a relationship of duality.

Figure 4. The primal economy and the dual economy. *I*: Investment; *Y*: Gross domestic product; *D*: Demand; *S*: Supply; *a*: Consumption coefficient.

The rapid increase in the number of subprime mortgages provided to consumers in the United States fueled a housing bubble in the beginning of the 21st century. Then subprime mortgage-backed securities were issued and distributed all over the world. In other words, Ricardo's theory of comparative advantage was put into practice on a highly-leveraged scale with the help of the Internet, driving a bubble to explode to an excessive level.

However, any bubble can burst. As a result of the global downfall in stock prices, triggered by the September 2008 U.S. sub-prime loan crisis, the world economy, namely that of the United States and Europe, shifted from a primal problem economy to a dual problem economy. There are two points which make the current

global economic slump essentially different from the four collapsed bubbles in the past ("Tulip mania" in the Netherlands in the 17th century, "South Sea Bubble" in the first half of the 18th century in Britain, Black Thursday in 1929 in the United States, and Japan's Heisei Depression which followed the Tokyo stock market crash in 1990): One is the fact that it was brought on by globalization which swept through the world (because of the Internet); The other is the fact that a highly-leveraged, extremely-expanded multiplier effect (because of financial engineering) exists behind the current slump. Those two operators plunged the world into a dual problem economy, and caused a global recession.

Conclusion

The following points have been clarified in this thesis:

(1) A policy of globalization is justified by Ricardo's comparative advantage theory;

(2) The validity of Ricardo's model was proven by applying the author's original approach;

(3) However, Ricardo's model works only under a primal problem economy;

(4) A policy of globalization, or free trade, is not justifiable in a dual problem economy.

The following two issues need to be discussed in the future:

(1) The factor which drives the current economic boom of China needs to be disclosed by applying the model proposed in this thesis;

(2) The essence of the current global dual problem economic phase needs to be identified by applying the model proposed in this thesis.

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