

Overview of Diamond Coconut Model and Its Realistic Analysis

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Abstract: This paper aims to outline the diamond coconut model and to sort out the development of employment theory. Based on the model, a third macroeconomic factor influencing employment is proposed: the difficult trading in multi-person cooperative economy. Then the practical significance of the model in the third-party market is discussed, and the current situation of unbalanced development of the primary and secondary markets is pointed out, finally, the government's role in macro-control is put forward. The paper hopes to propose some suggestions for the follow-up research on the model.

1. Employment Theory Overview

Employment has been the important issues discussed by scholars, which is always one of measure criteria of economic conditions. The classical theory of employment is mainly based on Say's law that "supply will create demand on its own," and Pigou also put forward the theory of "voluntary unemployment" and "friction unemployment", which advocates that the employment should be increased through the function of the market rather than the government. Keynesian fundamentally shaken the view of classicism and put forward the government's important role in the employment problem, of which the theoretical basis is the effective demand theory. In terms of this theory, the changes in aggregate demand is analyzed based on marginal propensity to consume, marginal efficiency of capital and liquidity preference, and the state intervention is advocated to raise employment, and then the neo-classical synthesisists put forward the issue of "structural unemployment".

2. Diamond Model that Goes Beyond Keynesian Theory

In the traditional view, the macro-unemployment will not exist when prices and wages are fully elastic and correctly predicted. However, the Diamond's article points out that there exists a third factor resulting in the macro-unemployment problem: the difficulty in cooperative deals in the multi-player economy.

Given that a barter and personal risk-neutral economy, where transactions in the economy are randomly matched. There are two states in the model: multi-state equilibrium and non-effective non-corner point equilibrium, and the partial inefficient equilibrium is the external transaction; the multi-steady equilibrium is the positive feedback of the externalities. This externality comes from the assumption that an increase in the number of potential trading partners leads to easier transactions, and positive feedback is such an easier trade and therefore makes the production more profitable.

In the model, the transaction process is institutionalized, and the production decision is the unique willing that can be searched and controlled by individual. When individuals optimize their decisions to influence trading opportunities, the profits made during the transaction may increase as more potential trading partners become available. That is to say, the increased externality (positive feedback) of production willingness cannot be corrected by the friction of privately variable behavior in the cooperative transaction. However, the goal of macroeconomic policies should guide the economy to develop to the best rather than the lowest natural employment rate after major macroeconomic fluctuations.

Diamond explained the economy with a natural jobless rate close to zero joblessness, who first

constructed a basic model: assuming that there is an island where there are many individuals who look for coconuts near palm trees, of each branch is hung with the same number of coconuts but the height of branches is different. When a branch is found, people decide whether to climb the tree, and there is a ban that people cannot eat coconuts picked by themselves. After climbing the tree, people started looking for deals-trading coconuts for coconuts, which is also the consumption. The difficulty level of finding a trading partner depends on the number of potential partners. There are no restrictions on free trade, and the forecast time for the completion of the transaction is accurate. Once the one find a coconut, he will exchange that with others immediately, and then find the next coconut. The searchers do not communicate with each other, but interact with each other by mutual actions, to form an irrational herd mentality of herd behavior, thus forming a gathering externality that everyone makes impact on others' choices while optimizing their own choices, thus affecting the final configuration results. In this assumption, the state of holding coconuts can be considered as the exchange state, and the state of picking coconuts can be considered as the production state, where the search for coconuts is deemed to be an economic behavior. Once the one find a coconut, he will exchange that with others immediately, and then find the next coconut.

The search equilibrium model assumes that all individuals are similar, of which the utility satisfies the relationship of $U=y-c$, and y represents consumption; c represents production cost (labor's negative utility). The lifetime utility satisfies the relationship of $V = \sum_{i=1}^{\infty} e^{-rt_i} U_{t_i}$, which is used to obtain the utility that people maximize their lifetime. Supposing that the production chance obeys the Poisson distribution, and everyone gets the production opportunity with probability a . Each opportunity has the output of y and the cost of c , and y is assumed to be constant for all projects and c is assumed to change with the assignment of G ; each of opportunity is a random distribution of G .

There are two limitations for individual behaviors: 1, individuals cannot consume the goods they invest and must trade with their own output with the production of others, to exclude the trading model of self-sufficiency. 2, if the one has not sold production output, he cannot engage in new production activities, which simplifies the model to a transaction between the individual and the inventory. Therefore, individuals will be assumed to have 0 or y to sell, and the former is unemployed and looking for production opportunities; the latter is hired and want to sell their own output, of which the basic difference between is that only the latter has the purchasing power. There are three states of joblessness, production and trade, and the production has a lag in demand. The lag in the transaction is the time it takes to sell the product, and therefore the time it takes to sell inventory will increase as the sales rate decreases; the opportunities of search for production and the decision to engage in production are the driving forces of the model.

In the transaction process, each person find the potential trading partner with the relationship of $b(e)$, $b' > 0$, which satisfies the distribution of cypress, and e represents the person employed in the transaction, that is, the person who can trade the inventory. When the exchange is completed, the employment rate will drop, and it will rise again when the production opportunities are found. Supposing that all the production opportunities are obtained at the cost c^* , it can obtain the derivative of employment rate to time: $\dot{e} = a(1-e) \cdot G(c^*) - e \cdot b(e)$, which means that the employee of $(1-e)$ can find the chance with the probability of a , and the employee of e can find the deal successfully with the chance of b . Under steady state ($\dot{e} = 0$), the unemployment rate under equilibrium can be obtained as follows:

$$\left. \frac{de}{dc^*} \right|_{\dot{e}=0} = \frac{a \cdot (1-e) \cdot G'(c^*)}{b(e) + e \cdot b'(e) + a \cdot G(c^*)} > 0 \quad (1)$$

The model shows that the only decision that needs to be made is to determine which production opportunity should be taken. Assuming a steady-state equilibrium, the expected discounted value of the lifetime utility of employment and unemployment are defined as W_e and W_u respectively. Employers have trading opportunities that make consumer spending and unemployment conditions change. The unemployed accept production opportunities with the opportunity of a and have a

negative effect of c , to change their employment status. The unemployed accept all opportunities that increase their expected utility, which meets the relationship of $\frac{dc^*}{de} > 0$.

$$\begin{cases} rW_e = b \cdot (y - W_e + W_u) \\ rW_u = a \cdot \int_0^{c^*} (W_e - W_u - c) dG(c) \\ c^* = W_e - W_u = \frac{by + a \int_0^{c^*} cdG(c)}{r + b + aG(c^*)} \end{cases} \quad (2)$$

The steady state is the optimal production decision of Eq. (2) and the constant employment rate of Eq. (1)=0, which is shown in Fig.1.

If $c^* < c$, the stable employment rate is equal to 0. If people want the current jobless rate unchanged, the economy should always be in the optimal stable production decision described by Eq. (2). As seen in the Fig.1, there are multiple equilibriums. If there are economic stochastic fluctuations in the model, then the economy may stay in one of the multiple equilibrium states as shown in Fig.1.

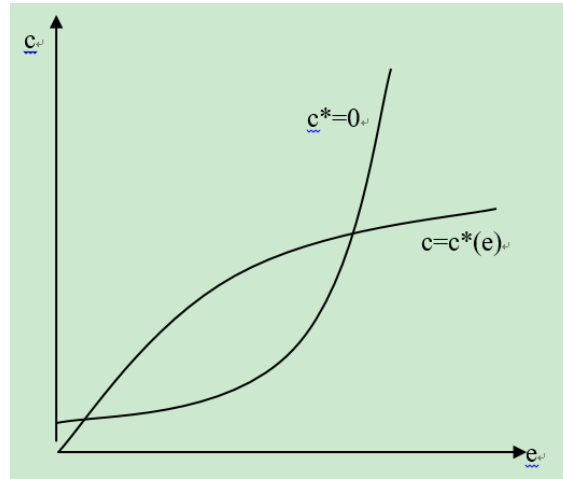


Fig.1 Steady State Schematic Diagram

The static model can be extended into a model with public goods, of which the total cost equation is:

$$c = f(y) \quad (f' > 0, f'' > 0) \quad (3)$$

Where $p(y)$ is the probability of the successful sale, g is the amount of consumed public goods, and $V(g)$ is the public consumption added to the social welfare. Assuming the lump-sum tax economy works, the cost of public spending can be added to the production cost of private spending. Assuming the transaction may increase with the increase in aggregate demand, the aggregate demand would become $y+g$. The social welfare function is similarly expressed as:

$$U = y \cdot p(y+g) - g + V(g) - c \quad (4)$$

Then, the following equation can be obtained:

$$V' = 1 - y \cdot p' \left(1 + \frac{dy}{dg} \right) = 1 + \frac{y \cdot p' \cdot f''}{p' - f''} < 1 \quad (5)$$

Therefore, an increase in government demand leads to an increase in production profits, which leads to higher optimal public consumption and more production to the externalities of trade in turn. From the perspective of long-term stimulus, the permanent increase in c^* leads to an increase in the

expected utility of human life and an increase in total welfare. From a short-term stability policy, government policies play an important guiding role.

3. The Practical Significance of the Model

Because of the process, formatting and cumbersome of the transaction process, the third-party market to facilitate economic and commercial transactions appears, and the Shanghai Stock Exchange, Shenzhen Stock Exchange as well as the new Third Board market are all forms of third-party markets. The formation of a third-party market is a pareto improvement of utility that gives economic activity new value beyond the exchange value of the commodity itself. In this case, the division of labor in the primary market and the secondary market highlights the difference between a market maker and a market maker. The primary and secondary markets are an important constituent of the securities market, which serves as a whole, unified and efficient market structure. The primary market is the prerequisite for the existence of the secondary market, and the secondary market is the guarantee for the good circulation of the primary market. It can be seen from the model that the balanced development of primary and secondary markets is the prerequisite for maximizing returns. The Diamond model satisfies the relationship of $b \cdot (1-u) = a \cdot u \cdot G(c^*, u)$ under the equilibrium conditions, which means that the probability of finding coconuts is equal to the probability of producing coconuts.

Next, the aforementioned conclusion is considered to be applied in the first and second-tier markets: assuming that the function $G(c, u)$ represents the distribution of the starting costs of the market when the unemployment rate is u , which is monotonically increasing and satisfies the relationship of $0 < G(c, u) < 1$.

The employment rate $p_1 = a \cdot u \cdot G(c^*, u)$, and the unemployment rate $p_2 = b \cdot (1-u)$. If u increases, p_1 will increase and p_2 will decrease; if $p_1 > p_2$, the u and p_1 will decrease, and p_2 will increase until $p_1 = p_2$. In the same way, the output volume of the primary market is equal to the transaction volume of the secondary market at equilibrium. If the output volume of the primary market is more than the secondary market, the cost will be reduced and the primary market will shift to the secondary market and vice versa. Finally, the same result can be obtained that the output of the primary market is equal to the transaction volume of the secondary market.

If the primary market is not balanced with the secondary market, it will bring very serious adverse consequences. The stock market of our country is not yet mature, and the shareholding system reform is still in its developmental stage. The current economic system determines that the development of the primary market is limited, and there is still a big gap compared with the developed countries. However, the secondary market is even more developed. Compared with the secondary market, the primary market lags behind and the market price is unbalanced, namely the unbalanced development of the primary and secondary markets has led to some problems. As the number of shares issued in the primary market is under control, the size of the secondary market can be restricted. In fact, the rapid development of the secondary market will cause the contradiction between supply and demand in the secondary and secondary markets. At present, the depth and breadth of China's stock market are not enough, resulting that the scale effect cannot be formed. The market will show dramatic fluctuations for the changes in external factors, which is the inherent reason for the existence of the secondary market fluctuations.

The fluctuation in the price of the secondary market can affect the primary market in turn, resulting in the issuance of difficulties in the primary market. The deviation between the issue price and the circulation price makes the price of the primary market increase sharply after the listing of the stock market, and the demand of the primary market increases, which also cause the imbalance of the supply and the disorder in subscription. At the same time, the unbalanced development of the primary and secondary markets lead to the lack of effective utilization of funds, and the stagnation of secondary market funds stagnate as well as the lack of funds in the market. As a result, how to coordinate the development relationship between the primary market and the secondary market

needs to be focused on.

In order to solve the aforementioned problem, many important efforts have been made at the national level, including efforts to form the economic pattern of "one province and one market", to promote the development of the new third board market, to establish and improve the property rights trading market, and to establish a multi-level capital market. Taking the property rights exchange market as an example, the economy state of property rights clarification, diversification of property rights, and collectively-owned enterprises demutualization can complete the supervision of listed companies better, to ensure the quality of listed companies. The establishment of a multi-level capital market is the most important issue for the future development of the market economy in China. The rationality of the multi-level structure of the capital market can meet the diversified market demand with the greatest possibility, which also can improve the operating efficiency of the economy, improve the operating environment of joint-stock companies, and promote the development of the joint-stock economy.

4. Conclusions

The Diamond model proposes that when the economy reaches a steady state, there is more than one equilibrium point, but there is a case of multi-stable equilibrium. This kind of multi-steady state equilibrium leads to the fact that the equilibrium solution is not necessarily the optimal solution. People's emotions affect the final allocation of resources, and the coordination failure leads to the macro-unemployment problem. Then the importance of government policy intervention is put forward, and the macroeconomic policies are deemed to guide the economy from a bad equilibrium to a well-balanced equilibrium.

With regard to the Diamond model, the author himself pointed out that it merely introduces a multi-person economic model without adequate consideration of the multi-commodity economy. In this model, the authors assume that the one-size-fits-all policy is used in the taxation, and if the assumption changes, and what effects of tax policy changes on the conclusions will come out is not discussed. The author of this article has also been emphasizing the importance of government policies and macro-control. However, the failure of government policies may lead to greater externalities. In a view of solving the practical problem, the macroeconomic policies adopted by some countries have developed a good employment structure, and it is necessary to study the links and characteristics among these policies, and then find out the laws guiding policy and the ways to guide the economic development better. The aforementioned questions deserve to be explored and discussed in the future research.

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