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Game analysis and system construction for socialization of employment service system of college students From view of multi-objective decision

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ABSTRACT

The socialized service system for employment of college students is one key support to maintain the rights and interests of college students and promote employment. The governmental and university's employment service organizations of college students and socialized employment agents of college students have different targets. They will directly game with each other. The game results are the key for implementation of the multi-objective utility. This paper analyzes the game balance and proposes to construct the socialized employment service system of college students by deepening the socialization philosophy of the employment service system of college students, scientific orientation of the governments, further mining of social resources, and establishment of socialized network of the service system.

KEYWORDS

Socialized employment service system of college students; Employment agents; Multi-objective decision; Game analysis.



INTRODUCTION

It is an important strategic idea to realize institutionalization, specialization and socialization of the employment service system based on the development trend of the current employment service system in China. The employment service system of college students is very important in the whole employment service system. It has important theoretical meaning and practice meaning for promotion of better employment of college students in China to carefully explore the specific features of the socialized employment service system of college students, find the law of the socialized employment service system of college students, and correctly recognize and handle the actual problems in socialization of the employment service system of college students.

MULTI-OBJECTIVE UTILITY MODEL OF SOCIALIZED EMPLOYMENT SERVICE SYSTEM OF COLLEGE STUDENTS

Socialization of the employment service system indicates to transform the government-dominated commonweal employment service functionality to the comprehensive employment service system of college students in which the government acts as dominant roles, related companies, associations and cooperative organizations participate in the commonweal employment service functionality, and other agents and social forces carry out business service functionalities by adjusting the institutions and mechanisms of the employment service of college students. All parties will complement and perfect each other.

The socialized employment service system of college students include the governmental employment service organizations of college students, university's employment service organizations of college students, socialized employment agents of college students and different social forces will provide the combined commonweal and business service system. This system can transform one large part of the employment service functionalities undertaken by the governments and universities to the social organizations, so it can reduce the governmental intervention in actual operation of the employment service system of college students to most extent, perform weaknesses of governments and universities, fully exert the role of the social employment service organizations, and improve the quality and efficiency of the employment service system operation of college students. This system can make the employment service system of college students meet the current requirements for social informatization, economy globalization and employment marketing of college students in specific service objects, service contents, service modes, evaluation supervision, organization and coordination and comply with the requirements of actual conditions in social economy transformation in China. However, some "profit antinomy" phenomena will occur avoidably due to too many composition elements of the employment service system of college students and extensive service fields, which will threaten existing interest of different departments, make them conflict with each other, and can not form effective joint force, so the key is to construct a scientific and reasonable multi-objective utility model of the socialized employment service system of college students.

V.Pareto, a west economist, constructed the multi-objective decision model earliest. Generally this model is used for decision when multiple targets conflict with each other and compete with each other. Given that there are n targets in decision. P_n is implementation degree of $i(i = 1, 2, \dots, n)$ th objective. The multi-objective expected utility can be expressed with the following functions:

$$\max E\{U(p_1, p_2, \dots, p_n)\}$$

Keeney (1974) pointed out that the utility function can be added when multiple targets are independent of each other. Given that the decision targets of the social employment service system of college students are independent, the expected utility function can be expressed as follows:

$$U(p_1, p_2, \dots, p_n) = f\{h_1(p_1), h_2(p_2), \dots, h_n(p_n)\}$$

$$\sum_{i=1}^n \omega_i = 1 \quad U(p_1, p_2, \dots, p_n) = \sum_{i=1}^n \omega_i h_i(p_i)$$

when the weight ω_i is met, we can get

Based on the current employment conditions of college students in China, the social service system of college students should pursue for four targets, including network organization maximization, risk minimum, collaboration maximum and system operation cost maximum. The network organization maximization aims to "cover all college students". The collaboration maximum aims to "improve quality and efficiency". In addition, the risk minimum target and system operation cost minimum indicate scientific development, reasonability and feasibility of the socialized service system of college students. Based on the above conditions, the multi-objective utility model of the socialized employment service system of college students is expressed with the following function:

$$\max U = \omega_1 h_1(p_1) + \omega_2 h_2(p_2) - \omega_3 h_3(p_3) - \omega_4 h_4(p_4)$$

GAME OF BUSINESS AND COMMONWEAL SERVICE IN SOCIALIZED EMPLOYMENT SERVICE SYSTEM OF COLLEGE STUDENTS

Under a perfect state, the business service is undertaken by the social employment agent of college students or companies and the commonweal service is undertaken by the government and university’s employment service organization of college students in the socialized employment service system of college students. It is very important to grasp the above multi-objective game model and study the game state of action bodies pursuing multi-objective utility. The decision bodies of the commonweal and the business service game include governmental and university’s employment service organization of college students and social employment agents of college students. Given that they are “mediator” under the ideal state. the governmental and university’s employment service organization of college students pursue for social profit maximization. the social employment agents of college students pursue for self profit maximization according to the demands of the employment market and self-preference. We think that the governmental and university’s employment service organization of college students have dominant or non-dominant strategy for socialized employment service of college students in game. The social employment agents of college students select if to participate in the socialized employment service system of college students based on the demand of the employment market or cost.

Assuming that profits of the social employment agents of college students are only from the service field in this game model and the agent uniformly pays the resource use tax R in operation in this game model. If the social agents do not participate in the socialized employment service system of college students, the state will collect the service fee a_1T . If the social agents participates in the socialized employment service system of college students, the state will collect the service fee a_2T . The governmental and university’s employment service organizations of college students will generate the fixed fee G in domination process. If the agents do not participate in socialized employment service system of college students, the state finance authority will pay the socialized service cost b_1C_1 for employment of the college students. If the agents participate in socialized employment service system of college students, the state finance authority will pay the socialized service cost b_2C_1 for employment of the college students. $b_1 > b_2$ is obvious. The agents can maximize the self-utility by participating in the business service in socialized employment of college students, assuming that the socialized employment service system of college students will pay the related cost C_2 and the get the profit P due to effective employment market demand.

We can get the payment matrix of the governmental and university’s employment service organizations of college students and socialized employment agents of college students in the socialized employment service system of college students, shown as follows (refer to the TABLE 1):

TABLE 1 : Payment matrix of governmental and university’s employment service organizations of college students and socialized employment agents of college students

Governmental and university’s employment service organizations of college students Socialized employment agents of college students	务 Dominated	not dominated	
	Participate	$P - a_2T - R - C_2, R + a_2T - G - b_2C_1$	$P - R - C_2, R - b_2C_1$
	No participate	$- a_1T - R, R + a_1T - G - b_1C_1$	$- R, R - b_1C_1$

Assuming that the probability of the socialized employment agents of college students for participating in the socialized employment service system of college students is P_1 and the probability for not participating in the socialized employment service system of college students is $1 - P_1$. The probability for governmental and university’s employment service organizations of college students for dominating the service system is P_2 and the probability for not dominating the service system is $1 - P_2$.

The profits of the socialized employment agents of college students participating in the socialized employment service system of college students and not participating in the socialized employment service system of college students are described as follows:

$$\text{Profits for participation: } profit_1 = p_2 \times (P - a_2T - R - C_2) + (1 - p_2) \times (P - R - C_2)$$

$$\text{Profits for not participation: } profit_2 = p_2 \times (-a_1T - R) + (1 - p_2) \times (-R)$$

For governmental and university's employment service organizations of college students, the profits of the social employment agents of college students belongs to the optimal domination probability of the governmental and university's employment service organization of college students when the social employment agents of college students participate in the game balance of the socialized employment service system of college students, namely $profit_1 = profit_2$, we can get

$p_2 = \frac{C_2 - P}{T(a_1 - a_2)}$. The above part describes that the governmental and university's employment service organization of college students have certain discounts when participating in the socialized employment service system of college students, we can know $a_1 > a_2$.

The profits of the governmental and university's employment service organization of college students are described as follows under the dominant and non-dominant strategy:

$$profit_3 = p_1 \times (R + a_2T - G - b_2C_1) + (1 - p_1) \times (R + a_1T - G - b_1C_1)$$

$$profit_4 = p_1 \times (R - b_2C_1) + (1 - p_1) \times (R - b_1C_1)$$

For social employment agents of college students, when the profits of the governmental and university's employment service organization of college students are consistent under dominant and non-dominant strategy, the social employment agents of college students can get the optimal probability in game with the governmental and university's employment service organization of college students when participating in the socialized employment service system of college students,

namely $profit_3 = profit_4$, we can get $p_1 = \frac{a_1T - G}{T(a_1 - a_2)}$.

In a word, the Nash equilibrium solution of the game strategy is $\left(\frac{a_1T - G}{T(a_1 - a_2)}, \frac{C_2 - P}{T(a_1 - a_2)} \right)$.

RESULTS AND ANALYSIS

If the social employment agents of college students do not participate in socialized employment service system of college students, the state finance authority will pay the socialized employment service cost b_1C_1 of college students. If the social employment agents of college students participate in the socialized employment service system of college students, the state finance authority will pay the socialized employment service cost b_2C_1 of college students. The game Nash equilibrium solution is independent of C_1 , b_1 , b_2 , namely if the governmental and university's employment service organization of college students dominate the socialized employment service system of college students does not depend on if social employment agents of college students participate in socialized employment service system of college students. Based on the current mechanism, the governmental and university's employment service organization of college students should provide and dominate the commonweal service, should identify the responsibilities of the commonweal service providers, aim to construct the service organization, should not rob profits or avid shuffle and dispute, play dominant role in performance of the commonweal service, and embody the confidences of the state to maintain the employment interests of the college students.

The optimal probability of domination of governmental and university's employment service organization of college students is $\frac{C_2 - P}{T(a_1 - a_2)}$. Based on the specific analysis, we can know: first, the gap of the service fee collected by the state is

becoming bigger and the probability of domination of governmental and university's employment service organizations of college students become smaller. If the gap is smaller, the probability of domination of governmental and university's employment service organization of college students will become bigger. Under an idle state, operation of socialized employment service system of college students need not be dominated and intervened by governmental and university's

employment service organization of college students. The socialized employment service system of college students guided by the scientific development idea should be free game results of the employment demand market of the socialized employment service system of college students. In theory, if the $a_1 - a_2$ becomes bigger without limit, the governmental and university's employment service organization of college students mainly dominate in preparation of the corresponding laws, regulations and policies and guarantee of good operation of the employment market. Secondly, provided that the socialized service fee for employment of college students is standardized, if $C_2 > P$, the payment cost of the social employment agents of college students participating in the socialized employment service system of college students is higher than the obtained profits. The dominant role of the governmental and university's employment service organization of college students should involve in time to stabilize market operation and ensure interests of the social employment agents of college students. Otherwise, the social employment agents of college students will lose the driving and the incurred cost growth and profit antinomie will unexpected aftermath. Finally the governmental and university's employment service organization of college students should play the dominant role of the finance authority, guide the social employment agents of college students to construct to construct the multi-agent operation system, provide the financial allowance and loan interest discount, and gradually form a development mechanism for the direct investment of the social employment agents of college students to directly invest and efficient market operation under indirect guidance of the governments. More profits should be given to the social employment agents of college students or social forces undertaking partial commonweal services and their interests should be ensured.

The optimal probability of social employment agents of college students participating in socialized employment service system of college students is $\frac{a_1 T - G}{T(a_1 - a_2)}$, so we can conclude that the gap of the socialized service fee collected by the state

should be enlarged. In addition, the difference between the socialized service fee collected by the state and the fixed cost in the process dominated by the governmental and university's employment service organization of college students should be considered. This indicator requests that the governmental and university's employment service organization of college students should play dominant role. When the fixed cost G is fixed, the probability is and the socialized service charge

factor a is less than $\frac{a_2}{a_1}$. The probability of the social employment agents of college students for selecting the game strategy

in the socialized employment service system of college students under the dominance of the governmental and university's

employment service organization of college students depends on $\frac{T'}{T}$ and T' is associated with a_1 . The final conclusion

depends on the socialized service charge factor collected by the state, namely the tax discount and fund allowance of the social employment agents of college students participating in Socialized employment service system of college students should be embodied.

The game results indicate that the social employment agents of college students will have some strengths in construction of socialized employment service system of college students from the long-term view. The governments should perfect the corresponding laws and regulations and construct powerful market supervision and management mechanism in implementation of the social benefits and company's self profit balance. The social employment agents of college students should discard the self-interest maximization rule and realize the multi-agent revenue sharing contract mechanism. When the governmental roles are gradually transforming in the game model, more social functionalities should be undertaken by the participating agents such as social employment agents of college students, so they can share more interests and discount policies. In addition, the marginal utility of the business service and commonweal service should be grasped. When participating agents carry out the service, they should share the information and resources, cooperate with each other, actively communicate with each other, avoid conflicts and resource waste, and reduce the service cost as much as possible.

STRATEGY FOR CONSTRUCTING SOCIALIZED EMPLOYMENT SERVICE SYSTEM OF COLLEGE STUDENTS

Idea of deepening socialized employment service system of college students

To further drive socialized employment service system of college students, it is necessary to keep abreast with the pace of the current times and combine the actual conditions in China. all parties in the society should deepen the philosophy and cognition of participating in the socialized employment service system of college students, actively adapt the requirement change of the employment market in socialization of the employment service system of college students, focus on the talent orientation, improve service efficiency and quality, expand the service space for employment of college students, actively adapt the requirement change of the employment market, actively collect all employment requirement information on the market, analyze the specific change trend of employment requirements, actively adjust emphasis, direction and mode of employment service of college students, and publish the employment requirement information in time. All parties should stick to talent orientation idea, consider the root interests of the college students, actively provide high-quality service, improve service efficiency and quality, improve employment rate and quality of college students, expand the employment

service space of college students, coordinate the employment service resources based on the current service structure, provide the employment service in a planning and purposeful manner, adjust employment services according to different employment requirements of college students in time, improve employment service efficiency, and realize the effective communication between the service objects and service persons.

Scientific positioning of government

The government should know own functionalities and action and roles in employment service of the college students, transform own functionalities, focus on the service functionalities, innovate the service form, guide employment service of college students, utilize the employment policies, encourage and guide college students to work at the root posts, encourage college students to venture, realize diversified employment modes of college students, actively maintain the employment rights and interests of the weak college student group, organize social forces to participate in the employment service of college students, provide policy support for them, guide social forces to establish the employment market of college students, encourage them to provide different employment assistance and guide to college students, and expand employment means.

Further mining of resources for socialized employment service of college students

Different employment resources are the foundation to carry out employment services of college students. To better realize socialized employment service system of the college students, it is necessary to mobilize more social resources for the employment service system of college students, track the different resources for employment service in time, mine development potential of the social resources, create the social resource database for employment service of college students, and provide better employment services to college students. The potential social resources to investigation for social employment service include professional structure of employment service objects of college students, number of service objects, age condition, number of the employment service research organization and R&D force, staff composition and quality condition of human resource department in enterprises, and composition and quality of different employment service organization. It is necessary to mine potential social resources for employment service market of college students, regard it as one important part to construct the employment service system of college students, and facilitate implementation of the social comprehensive employment services of the college students.

Establishment of socialized network system for employment service system of college students

To develop modern service industry in the new age, the informatization is required. The employment service of college students should be also informatized and the corresponding socialized network system for the employment service system should be constructed. To realize informatized employment service system of college students, we should realize the following targets: first, we should jointly construct and use the socialized network system of the employment service system. The central government should lead this work and coordinate different employment service organizations to jointly construct and share the socialized network of the employment service system. Secondly, we should construct the employment service information management platform of college students, create a scientific, reasonable and operable information management system, and realize input, query, editing and statistics function of different employment service information resources. Thirdly, we should strengthen informatization facility construction of the socialized network system for employment service system, create and maintain the employment service websites of college students, provide employment service information such as employment policies and regulations, recruitment information, employment condition, job training and venture guide of college students, and fully exert the employment service functions of these websites.

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