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Research on regional economic development of human capital competitiveness

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ABSTRACT

This paper analyzes the development of the six central provinces in China, trying to analyze the principal component of the six central provinces to figure out the human capital competitiveness and build its evaluation system. A comparative evaluation from certain perspectives with the developed provinces makes it clear that the most important factor impacts the regional human capital is the level of human capital investment and efficiency meanwhile provides policy basis for the sustainable economic development of the central six provinces in China.

KEYWORDS

Six central provinces in China; Human capital; Level of competitiveness; Principal component analysis.

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INTRODUCTION

Schultz believes that human capital is embodied in the knowledge and skills of a person, and it is the most important resources and the most critical factor for sustainable economic development[1]. Meanwhile, in the process of regional economic growth theory study, the fact that regional economic growth also shows that in the process of economic growth, the contribution of human capital is much larger than physical capital. Generally speaking, the larger the impact of human capital on the regional economy abundances, the higher economic growth rate will remain in a given period, the more obvious influence on the long-term regional economic development of human capital.

At present, Chinese economy is at a critical stage of structural adjustment on the way to promote economic growth from the previous extensive, polluting, conquering types to the harmonious, construction and restoration types, the most fundamental is to change the mode of economic promotion-from the consumption of resources to the promotion of the development of human capital. Since the Central Plains Economic Zone was approved as a national strategic economic area, economic development of the central region plays an increasingly important role in the economic development. Six central provinces located in the plains, as large agricultural provinces, economic development has always been the first industry-based, moreover, agricultural population and population density is relatively large, therefore, the pressure on the transfer of agricultural labor is relatively great. According to the survey, the transfer of rural surplus labor force in the country's central region accounted to 60%, which is a staggering figure in the large population basis of central provinces. As the major agricultural provinces, the population density in six central provinces in the process of development accelerates the transfer of surplus labor through a variety of ways, and improves the quality of human capital in six provinces during the process. The transfer of surplus labor is also crucial in the process of economic take-off on forced economic system reformation. Schultz (Schultz, TW) had asserted: " The decisive factor to improve the welfare of the poor is not only space, energy and arable land, the decisive factor is to promote the knowledge and the quality of population."[1] This paper studied the regional economy in the central region-the six central provinces on this basis.

Researchers generally used to analyze the relationship of human capital from internal relations with economic growth. As for general researchers, whether it is the study of human capital on economic growth, or on the relationship between the two factors are inevitably inseparable from the development of human capital and the level of competitiveness. One part of the theoretical analysis focusing on human capital is economic factor-through the research on human capital to find the determinants of regional economic development; and the other part will focus on human capital as it is a scarce resource, and through the research to find the suitable incentive system of human capital to enrich the accumulation of human capital investment policy. Therefore, in order to provide policy support for the sustainable economic development, we have to do more in-depth study of human capital, this study is not only limited to theoretical research, but also the practical application.

In summary, this paper tries to solve the construction through the level of human capital development in six provinces in central evaluation system. Through the theoretical analysis and comparison, the paper tests the levels of human capital development with a view of central six provinces to accelerate their development, and provides theoretical support and viable policy to accelerate the development of the whole region of the six central provinces.

LITERATURE REVIEW

Human capital theory was first expounded by Theodore · W · Schultz. Human capital refers to migrate through education, training, health care, and labor, the sum of condensation in the skills, knowledge, and health status and health level of workers. In general, it can be measured by health care, nutrition, their health status, and the degree of educational and training aspects. And, the level of human capital development of a region can be seen from the combined effect it played in a certain area. Generally, the larger or more concentrated the human capital can play a role, the level of human capital development would be relatively higher.

Based on the components of human capital above, it is difficult to quantitatively measure them. In actual research and practice, although there are many researchers attempt to establish a unified metrics and methods, the effect is not satisfactory for various reasons. Accessing to existing literature, most researchers measure the human capital through investment levels of it. For example, Zu-Hui Shi (1998) focused on the formation, inputs and outputs of human capital[2]. Rong Peng (2007) proposed the evaluation of human capital, divided them into three aspects, the level of education, health and technological innovation, and stated them respectively[3]. Xue-Ya Qian pointed out that, "Since human capital depends on workers, which is flowing, the actual level of human capital may be different from the potential one ", therefore, she distinguished "potential resource" and "actual running resource", and attempted to analyze them[4].

From the long-term research and practice of human capital studies, we found that only consideration of investment in human capital is not enough, with one-sidedness. Because we know that only by constantly investing in human capital, it can be accumulated, but during this period, the current social environment is changing while the labor force is constantly transferring and flowing. Therefore, it is inevitable that the difference between the cumulative investment in human capital and the stock of human capital accumulation occurs. Especially for the six central provinces, the Peacock Flies to Southeast phenomenon is more obvious, a lot of high-level personnel gradually flow to Jiangsu, Zhejiang and other eastern coastal areas. Therefore, while study the relationship between human capital and economic growth, to make clear of this point is particularly important.

In the specific study, we use Xue-Ya Qian's sub-index classification system. But for selected sub-indexes, we make full consideration of the special nature of the six central provinces, re-organize and construct them by optimal combination. For example, in the study of Xue-Ya Qian's sub-index classification system, the human capital operational efficiency is embodied by human capital productivity[4], while in this study, more factors on the human capital operational efficiency are considered. We distinct some important objects, lay emphasis on the analysis of "system, the environment and economic development", and give full consideration of factors, such as the mutual-influence between the discrepancy and productivity of the human capital. The sub-index's constraints could be reflected by forceful statement, analysis and results. Based on the full consideration of the above factors, we conduct a comprehensive analysis and summary on the situation of "human capital investment" and "human capital accumulation" of six central provinces, and try to establish a comprehensive sub-index evaluation system of human capital for this region.

THE SELECTION AND CONSTRUCTION OF SUB-INDEX SYSTEM

Currently, many researchers are trying to construct the sub-index system, valuating the competitiveness of the human capital, but do not have done a more systematic research. In order to have a better scientific study of the connotation of human capital, fully reflect the development of human capital, be able to study more scientific and practical guidance, facilitate comparison, evaluation in different regions, and make the entire region play an important part in promoting economic development, we follow the four principles of scientific, interoperability, comparability, and dominating in analyzing and selecting of index. Through the analyzing and summarizing of the data related with the six central provinces of China Statistical Yearbook in recent years, combing the early literature on evaluation system, selecting 43 as the statistical source, and the frequency of these 89 indicators that appear in the literature were calculated, and selecting high frequency indicators in accordance with the level of human capital performance characteristics, meaning, taking into account of the standard system mainly to analyze them from original 15 indicators such as human capital stock, the level of investment in human capital, human capital efficiency levels. To make the final results are comparable over 15 indicators used in all or relative per capita GDP, specific indicator system filters out some of the indicators which can measure resistance, build human capital in the initial competitiveness evaluation index system. It refers to Figure 1.

THE EMPIRICAL ANALYSIS

The using of analysis

The analysis in this paper is carried out by principal component analysis. Such a method is a multivariate statistical analysis technique to process the data dimensionality reduction mainly through the integrated variables or indicators regroup, and take some indicators to reflect the original variables from the combined consolidated variables or indicators, so you can achieve the purpose of simplifying the data and succinctly revealing the relationship between the variables at the same time[5].

We have a detailed understanding of the principal component analysis through the study of the analysis steps.

(1) alternate data for research which is dimensionless and standard;

(2) calculate the correlation coefficient matrix R, in order to determine the correlation between the indicators;

(3) analysis of the obtained characteristic value R eigenvectors;

(4) the number of the selected main ingredient selected eigenvalues principle > 1, the cumulative contribution rate of> 85%;

(5) Write an expression based on the selected principal component of each main component F_i; $F_i = x1 \times a1i + x2 \times a2i + ... + xp \times api$, where x1, x2, ..., xp is a dimensionless vector after treatment, a1i, a2i ......, api is the i-th principal component of the variable coefficient vector;

(6) F can be calculated based on results of the principal components, and calculate the final score of Comprehensive Index System.

Empirical analysis process and results of the analysis

(1) the source of the underlying data

In this paper, the relevant data of the six provinces in central and eastern provinces for statistical analysis and comparison are from Chinese Statistical Yearbook and the statistical yearbook of the provinces in 2012[6-7]. (the software and version for data analysis: SAS6.12).

(2) An Empirical Analysis

According to the index system established and calculated in accordance with relevant indicators Statistical Yearbook data, we use SAS software for principal component analysis. Its feature values is shown in Figure 2.Eigen values of the correlation matrix in TABLE 1

We can see from TABLE 1, the first principal component feature is 11.0343, it is> 1, the cumulative contribution rate is 0.725222; characteristics of the third main component is 1.7301, which is> 1, the cumulative contribution rate is 0.842627. Accordingly, we can see more than one of the main ingredients as a good and complete reflection of the original data; from the above analysis we can determine the index system has two main components. From the foregoing analysis, we could not only calculate the principal components of the

feature vector, but also draw the normalized principal component scores, and thus used to determine the 15 indicators. TABLE 2.
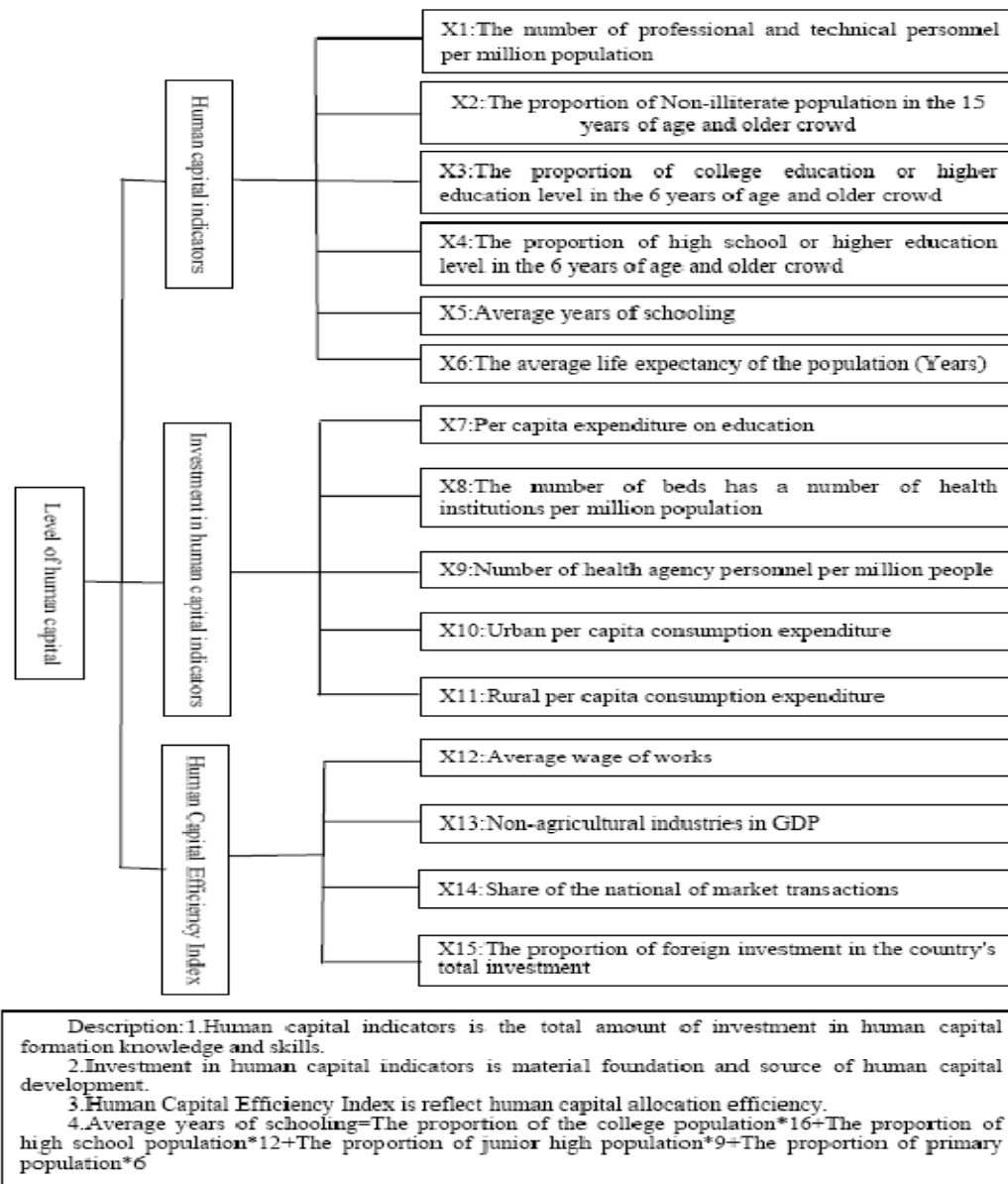

Description: 1.Human capital indicators is the total amount of investment in human capital formation knowledge and skills.
　　2.Investment in human capital indicators is material foundation and source of human capital development.
　　3.Human Capital Efficiency Index is reflect human capital allocation efficiency.
　　4.Average years of schooling=The proportion of the college population*16+The proportion of high school population*12+The proportion of junior high population*9+The proportion of primary population*6

Figure 1 : A specific indicator system diagram

TABLE 1 : Eigenvalue of the correlation matrix

	Eigenvalue	Difference	Proportion	Commulative
PRIN1	11.0343	9.22327	0.725222	0.725222
PRIN2	1.7301	0.88763	0.115305	0.842627

　　From TABLE 2 and the main component expression Fi to calculate the principal component scores, it is shown in TABLE 3.
　　From the results of the above data, we can calculate the specific functional through a certain function. To make it clear, it is the adoption of a comprehensive indicator of to sort the human capital development in six central provinces, the number of rights of the composite indicator function provides variance contribution rate for the main ingredient, and the specific composition of the function is:

$Y = 0.725222PRIN1 + 0.115305 PRIN2$

From the point of comprehensive volume, Y is the level of human capital development in the provinces. Y and the level of human capital development are proportional. The level of human capital development in the six central provinces is shown in TABLE 4 and TABLE 5.

TABLE 2 : Eigenvectors

	PRIN1	PRIN2
X1	0.253014	-.332673
X2	0.212609	-.082003
X3	0.290967	-.150199
X4	0.282219	0.042811
X5	0.280757	-.162592
X6	0.203356	0.351857
X7	0.291482	-.077308
X8	0.283091	-.156102
X9	0.278390	-.259502
X10	0.263069	0.251198
X11	0.248097	0.262312
X12	0.292060	0.134293
X13	0.261035	0.145348
X14	0.257086	-.143649
X15	0.115764	0.646980

TABLE 3 : Standardized principal component scores

OBS	PRIN1	PRIN2
1	-1.02554	0.03022
2	-0.60062	-0.47433
3	-0.72264	-0.53268
4	-0.93689	-0.61049
5	-0.65105	-0.36953
6	-0.27528	-0.74237
7	0.20755	1.87937
8	0.02592	1.55558
9	2.26672	-1.73228
10	0.74348	-0.68402
11	-0.52711	-0.19168
12	1.79122	1.05657
13	0.31222	0.92995
14	-0.60797	-0.10890

TABLE 4 : Ranking of the first principal component of six central provinces

Provinces	PRIN1
Anhui	-1.02554
Jiangxi	-0.93689
Henan	-0.72264
Hubei	-0.65105
Hunan	-0.60062
Shanxi	-0.27528

TABLE 5 : Ranking of the total score of six central provinces

Provinces	Scores
Jiangxi	-0.76021
Anhui	-0.75153
Henan	-0.59349
Hubei	-0.52196
Hunan	-0.49692
Shanxi	-0.28833

We can see from TABLE 4 and 5 that whether it is the first principal component analysis calculated the six central provinces of human capital level of competitiveness rankings, or the level of human capital development in accordance with composite indicator derived, it is almost the same with little variation. The actual development of the conclusions and the six central provinces are relatively consistent according to TABLE 4 and 5. Therefore, it can be proved that we can make the evaluation of the level of human capital development of the six central provinces by principal component analysis.

CONCLUSIONS

1. From the analysis above and other analytical study of the eastern provinces, we can conclude that the level of human capital development is not high in six central provinces to a certain extent, and there is still a certain amount of gap with eastern provinces, especially in the first principal component score, the comprehensive index score is basically negative, that it is below average. On the level of human capital development, the six central provinces still have a lot of work to do to narrow the gap in constant development gradually, and even catch up with the east.

2. Levels of human capital development of the central six provinces also have their own advantages, namely the human capital stock is higher, and the development has inherent advantage. To improve the competitiveness of human capital, there must be a certain stock of human capital as a foundation first.

3. From the investment of human capital indicators, we can see the gap is not only with the developed eastern provinces, but also among the six central provinces themselves. Especially in education expenditures, health care expenditures and consumptions. From the human capital efficiency indicators, due to limited economic strength of the six central provinces, it cannot be at ease in the development of talent on the introduction of preferential policies, thus results in the high-level talented people flow to developed eastern provinces. On the one hand, it cannot make the policy maintain a better coherence; on the other hand, it also makes the level of competitiveness of human capital fall directly. In this aspect, while in the development of the economy, the six central provinces should increase investment in human capital and issue a variety of preferential policies to provide a relaxed environment for the development of the talented to raise the competitiveness of human capital. It is the only way, and also the unique way to improve the competitiveness of human capital.

REFERENCES

[1] Schultz; Human Capital Investment,Beijing Institute of Economics Press, **(1990)**.
[2] Shi Zuhui; Foreign Scholars on Human Capital Measurement,Foreign Economics and Management, **01**, 21-24 **(1998)**.
[3] Peng Rong; A Comprehensive Evaluation of the Level of Human Capital-Principal Component Analysis,Statistical Education, **10**, 37-39 **(2006)**.
[4] Qian Xueya, Deng Na; Human Capital Level Measurement System,Zhejiang Journal, **06**, 212-215 **(2004)**.
[5] Yu Xiulin, Ren Xuesong; Multivariate Statistical Analysis, China Statistics Press, **8**, **(1998)**.
[6] China Bureau, Chinese Statistical Yearbook, Beijing: Chinese Statistics Press, **(2012)**.
[7] Anhui, Jiangxi, Henan, Hubei, Hunan; Shanxi Statistical Yearbook, Beijing: China Statistics Press, **(2012)**.