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Economic Competitiveness, Knowledge Promotion and Educational Back Shot Wave

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ABSTRACT

This paper analyzing the relationship in Resource-exhausted City's educational foundation and development abilities, we made an empirical study on the economic development of Cities on how to promote urban area economic development continuously. According the past two decades information from the cities, we have using the main data indicators and education to get the input and output relevant indicators with VAR quantitative antics. And from the perspective of harmonious development, we have using new economic growth model, city economic growth theory and higher vocational education interactive development to analyze the dynamic changes; from the factors of economic growth variables on the change degree, we achieved cumulative effect actively results. Finally, the paper puts forward the management measures of higher education and urban economic development upon the Resource-exhausted cities.

Keywords: resource-exhausted cities, higher education, economic development, empirical research, coordination degree

INTRODUCTION

Many economists have published their own insights with the use of Western education and economic theories. Such as: the famous economist Li Yi-Ning put forward: "Education economics is the study of education in economic growth and social development in the role of science." Mr. Wang Yu-Kun proposed: "education economy Learning is a science that studies the interrelationship between education and economy and its laws of motions." their results are all bring out the roles of Education economics. That means it mainly the use of economic theory and methods to study the relationship between education and the economy including its changes with the development of law, research in the field of education resources and the law of output science. It mainly includes the following: the relationship between education and economy, the cost of education-the analysis of income, the efficiency of educational investment, the salary and salary system of teachers, the proportion of education and economic growth, education investment, distribution and raising things.

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State of the literature

- The role of education in economic growth used to explain the theory of human capital generally, popular in the 20th century, 60 years ago from Schultz, Denison, Becker and other scholars as the main representative through different methods of human capital on the economy Development of the study. The view can be summarized as that the higher education level of workers can get higher income; macro level of a country's human capital stock can effectively promote economic growth. The theory of the background is that economists in the search for the source of economic growth, found the role of education on economic growth, and try to be separated to quantify the factors. Such as Schultz researches through education investment rate of return of income derived from the education created by the national income accounted for the United States in 1957, the total national income increment was 0.33 per ratio; Denison obtained the contribution of education to the growth rate of US national income in 1985 was 13.7% through the education of simplified coefficient method. The results of these statistical dates promote the spread of human capital theory development. But the same question for the resource absent cities researches was not enough.

Contribution of this paper to the literature

- In general, the evolution of industrial structure and economic growth have a lot of internal relations, the internal structure of the industry's high change often bring rapid economic growth, on the contrary, high economic growth can also promote the industrial structure of the high transformation, with the economy of the further development in the division of labor within the industry, it will be more and more fine, and these internal factors will also be on the industrial structure, to give the economic development of great significance. On the face of it, the financial subsidy is due to the imbalance between the central and local governments or the horizontal imbalance between the local governments, and from the deep level, the reasons for the financial subsidies are multifaceted based on the needs of social public services, the local government's social responsibility and the need for stable economic development. And the health of the industrial structure directly affect the speed and potential of local economic development, for most resource-exhausted cities, the industrial structure development mostly as follows: a weak foundation for industrial development, low level of modernization of agricultural mechanization: secondary industry development Rapid, but often high consumption of low-output heavy pollution-based industries, and the proportion of the economy is too high leading to economic imbalances: the three industry development speed and degree are relatively low, seriously lagging behind. The realization of industrial transformation is the key to solve the economic development of the current resource-exhausted cities.

But how does higher education interact with economic development? The quality of education as a necessary stage of economic development to a certain stage and regional economic competitiveness is always an ambiguous question among the researchers. Especially for resource-exhausted cities combine with the economic transformation in special timing period? This paper attempts to solve this perspective theoretical and empirical analysis within definite cities.

THEORETICAL OVERVIEW AND ISSUES RAISED

From the latest domestic researcher's views, the contribution of education contribution to China's economic growth is quite different. Shen Kun-Rong (1999) argued that 76.7% increase in China's economic growth from 1953 to 1997 was caused by an increase input of factors of production, while the increase in overall factor productivity was only 1.8%. Xiong Jun-shun (1999) results shows that from 1985 to 1995, China's education development contribution to economic growth was 30.7%. Lin Rong-Ri (2000) concluded that the actual contribution rate of Chinese education to economic growth from 1982 to 1995 was 10.46%. An Xue-Hui (2002) analysis China's primary, secondary, higher education contribution to economic growth were 16%, 10%, 12% from 1978-1995 period. Although these studies have adopted different methods such as labor simplification coefficient method, total quantity production function model and quadratic optimal fitting goodness function, there are obvious differences in the result of the time interval. Song Guang-Hui has made a more detailed analysis of the role of education in China's economic growth since the reforming and opening in China. There has little and concrete researches on the development of the original backward urban education among cities, especially in the underdeveloped areas or urban cities. Resources cities, small town area, limited economic development pattern,

the traditional industrial structure and redundant situation is particularly seriously absent, we call them a special name "Resources city transformation" According to the classical theory of economic growth and factor-driven development model, this dynamic factor of education has indeed played a key role in the development of Resources city's economy over the past decades. This article is a profound analysis the Resources city education, especially higher education as a dominant external indicator on how to promote the development of Resources city economic, to explore the overall factors of education and other factors of urban development complement each other achieving a more stable and stable economic development, to achieve development "new normal" and "new steady state" required by the policy design and supporting support to build as the goal of economics development.

Industrial structure is simply referring to the national economy and the proportion of the composition of the industry and the distribution of each individual economy which will have his own unique industrial structure, a region of economic structure or health will have a lot of specific Measures, such as the rate of measurement (economic aggregate), the rate of economic development (economic increment), or the proportion of industrial structure. W. Petty first discovered that the development of the national economy and the level of people's living standards and a country's industrial structure that has a great relationship each other, in his 1672 book "political arithmetic", he put forward the conclusions: in the industrial contribution value, Industry is greater than agriculture, commercial and industrial. In the "Wealth of Nations" which clearly put forward the meaning of industry structure. And after 1930's, it is the formation of industrial structure theory period. Because of the Great Depression of the world economy in the twenties century, the industrial sector experienced a sharp recession, and the benefits of the service industry were so obvious what the Petty theory of the seventeenth century was brought to the attention of economists at that time, most notably from the New Zealand economists Summer, he first divided three major industries, industrial structure theory is basically formed. During 1950s and 1960s period, there were two main academic school thoughts. The first is the mainstream economic experts represented by Lyndon, Hoffman and Ding Bogey. They use input-output Model, which the industrial structure and economic growth directly linked. The second are based on Lewis, Rostow, Chenery as the representative of the development of economic research aspects, they were using dual structure analysis and unbalanced development of analytical ideas to study the industrial structure of economic growth contribution.

EMPIRICAL STUDY FROM SAMPLE CITIES

Model Settings, Variables and Data Selection

The new economic growth theory indicate that technological progress is mainly reflected through the human capital, this part of the use of City's University students (X_s) and City's higher education expenditure (X_f) as the Resources-exhausted city higher education development indicators to represent human capital (Not to remove inflation) to reflect the city's economic development (growth) indicators. The investment in fixed assets (X_t) is used to reflect the input of material capital. The sample period for the analysis was from 1991 to 2015. Using method $\times 11$ pairs seasonally adjusted for y, X_s, X_f, X_t and the adjusted data are taken from the natural logarithm, that is: $\ln y, \ln X_s, \ln X_f, \ln X_t$ and all datas come from the city's Statistical Yearbook (calendar year), Provinces Statistical Yearbook (calendar year). Analysis software is E-views version 5.1.

According to the above description, the model is set as: $\ln Y = \beta_0 + \beta_1 \ln X_s + \beta_2 \ln X_f + \beta_3 \ln X_t + \epsilon \dots \dots$ (1) ; Among them, $\ln Y$ on behalf of Resources city calendar year GDP (nominal GDP), $\ln X_s$ on behalf of Resources city College students in the number of students on behalf of Resources city, $\ln X_f$ higher education expenditure, $\ln X_t$ on behalf of Resources city, the total investment in fixed assets.

In order to study the dynamic change of the interactive development between higher education and Resources city, we choose VAR model: it includes the vector K autoregressive model and the variable order P model can be expressed as follows:

$y_t = C_t + A_1 y_{t-1} + A_2 y_{t-2} + \dots + A_p y_{t-p} + \epsilon_t$ or $\phi L(y_t) + u_t \dots \dots$ (2); Among them: L is a hysteretic parameters, $\phi(L) = 1 - \phi_1 L - \phi_2 L^2 - \dots - \phi_p L^p$, $L y_t = y_{t-1}$, $L^2 y_t = y_{t-2}$, $L^p y_t = y_{t-p}$, $u_t \sim N(0, \Omega)$.

Table 1. ADF test results for each sequence of variables during 1991-2015

Sequence	ADF Test value	1% Critical value	5% Critical value	10% Critical value
L_y	-3.3732 (C, T,2)	-3.4352	-3.6746	-3.7238
ΔL_y	-3.6238(C,0,3) *	-4.28737	-4.0231	-3.4722
LX_s	-1.3473(C, T,2)	-3.8938	-3.8364	-3.5833
$\Delta LX_s(-1)$	-3.8495(C,0,5) **	-3.6648	-2.1273	-1.8387
LX_f	-1.6474 (C,T,2)	-4.1934	-3.4556	-3.6899
$\Delta LX_f(-1)$	-6.8384(C,0,3) **	-5.1844	-3.1776	-3.3841
LX_t	-2.1953(C, T,3)	-3.0942	-2.8933	-3.6981
$\Delta LX_t(-1)$	-3.9837(C,0,2) **	-3.7782	-3.6942	-3.5787

Table 2. Johansen cointegration test results

Root of unity	Trace statistics	5% Critical value	Null hypothesis
0.73994	53.73843	44.37384	None *
0.59377	26.33891	27.83472	At most 1
0.47734	8.746826	14.68901	At most 2
0.06478	0.346783	2.63776	At most 3

Table 3. Granger causality test

Hypothesis	A is not the cause of the change B			B is not the cause of change A		
	$\ln X_s$	$\ln X_f$	$\ln X_t$	$\ln X_s$	$\ln X_s$	$\ln X_t$
B L_y	0.04673	0.04745	0.03026	0.88198	0.06608	0.05676

Note: The latency of the $\ln X_s, \ln X_f, \ln X_t$ Granger causality test is 5, 4, 3. The value of the third line in the table is the value.

Empirical Test of the Model

In this paper, the unit root of the ADF test (Augment Dickey-Fuller) to test the variables, test results shown in **Table 1**. From the test results, we can see that the original value of all variables cannot refuse to exist in the unit root of the original hypothesis, so are non-stationary. Variables, the first order difference, respectively, variable: y, X_t at 5% and 1% of the significance level for the stationary sequence. While the secondary difference of the other variables is a stationary sequence at 1% significance level.

Note: ** (*) indicates that the unit root is rejected at a significance level of 1% (5%), ie the sequence of variables is stable at a significance level of 1% (5%); indicates a difference; The three characters in parentheses indicate that the unit root test contains the intercept, the time trend item, and the lag order, and 0 indicates that the time trend item is not included.

To test whether the linear combination of each variable is a long-term equilibrium relationship, it is usually a co-integration test method. In this paper, the Johansen co-integration method is used to test the linear combination of variables. Among them and the results are shown in **Table 2**.

It can be seen from the test results that $53.73843 > 44.37384$, that is, whether there is no covariate relationship between several variables, the 5% significance level has been rejected, indicating that there is a co-integration relationship between them, that is, Long - term equilibrium relationship.

Although there is a long-term stable relationship between the above variables, but there is a causal relationship between the explanatory variables and the explanatory variables, further verification is required. The following is verified by Granger causality test. The results are shown in **Table 3**.

From the value in above table we can see: (1) $\ln y$ is the Granger reason of $\ln X_s, \ln X_f, \ln X_t$, it shows that the economic development led to the expansion of the scale of higher education in Resources city, the increase in

investment in education and the expansion of fixed asset investment; (2) $\ln X_s, \ln X_f$ are the reason of $\ln y$, which shows that the increase in government investment in higher education and the expansion of the scale of fixed asset investment have promoted economic development. However, the $\ln X_s$ is the reason for $\ln y$, this test is not very significant, that is, the scale of higher education development represented by the number of “college students” do not significantly contribute to economic development (which, in contrast to the fact that the number of undergraduates in the above-mentioned competencies was used as an indicator to make the results obscure). Therefore, the following model VAR is used to analyze the interaction between Resources city higher education and its economy from a dynamic perspective.

Estimation VAR Model and Analysis

For the choice of model VAR lag, according to the same and other statistical evaluation indicators AIC and SC, VAR(2), are considered to establish the model, therefore, select the model optimal lag for $p = 2$. The following uses EViews5.1 software to estimate the model, the results are as follows:

$$\begin{bmatrix} \ln Y \\ \ln X_s \\ \ln X_f \\ \ln X_t \end{bmatrix} = \begin{bmatrix} 0.202908 \\ 0.307938 \\ -0.206921 \\ 0.423177 \end{bmatrix} + \begin{bmatrix} 0.869058 & -0.197135 & 0.154904 & 0.110852 \\ 0.052803 & 1.739313 & -0.149206 & 0.263577 \\ 0.044826 & -0.001539 & 1.084032 & 0.504170 \\ 0.266840 & 0.119767 & 0.022149 & 0.773352 \end{bmatrix} \begin{bmatrix} \ln Y(-1) \\ \ln X_s(-1) \\ \ln X_f(-1) \\ \ln X_t(-1) \end{bmatrix} \\ + \begin{bmatrix} 0.009309 & -0.022428 & 0.007133 & -0.041121 \\ 0.008734 & -0.879631 & 0.331160 & -0.104592 \\ 0.019646 & 0.299681 & -0.238784 & 0.329244 \\ -0.152677 & -0.129731 & -0.101117 & -0.541962 \end{bmatrix} \begin{bmatrix} \ln Y(-2) \\ \ln X_s(-2) \\ \ln X_f(-2) \\ \ln X_t(-2) \end{bmatrix}$$

From the regression results of each regression model: equation residuals, equation standard error, F statistic, maximum likelihood test, etc. Results show that the regression equation is set correctly, from the overall evaluation of the estimated results and the residual sequence of the multivariate autocorrelation test VAR shows that the model parameters are stationary during the observation period. At the same time, it can be further seen from the estimation results that Resources city’s GDP has a significant positive impact on the number of freshmen in Resources city and the investment in higher education funds in Resources city. that is, Resources city, although train so many college students each year, but because of the economy and the province overall development of the situation compared with the surrounding provinces, the single structure of the industry led to employment space is still narrow, and thus more serious brain drain, a large number of high-quality talent to the periphery, especially the more economically developed eastern and southern coastal provinces; at the same time because of higher education consumption. To meet the expenditure of higher education, residents will reduce the consumption of housing, insurance, consumer durables and other aspects of consumption, resulting in the expansion of the scale of higher education did not lead to educational consumption, to meet the expenditure of higher education on the role of economic growth.

That means, the original urban resident’s reasonable consumption growth capacity and the degree of compression in exchange for higher education on economic development to promote the realization of Resources city economic development by leaps and bounds especially since 2004. That is, Resources city’s higher education, especially the higher vocational education by leaps and bounds squeeze the Resources city, the normal development of economic development from other industries achieve a reasonable scale and level. Although in a brief time it can make the city development to achieve a rapid “new Trend”, but with the “harmonious” development and factor synergy theory, it is a continuation of a development model. Therefore, it should be great practical significance to explore the “turning point” or “ceiling” effect of the development of Resources city higher education to promote economic development to verify the reasonable industry to stimulate the economic development policy to exit or turn.

ECONOMIC COMPETITIVENESS AND EDUCATIONAL DEVELOPMENT COORDINATION

Construction of Index System and Calculation of Composite Index

According to the basic principles and requirements of the index system and the connotation of economic development and the development of higher education, this paper combines the relevant indicators from the "China Education and Human Resource Development Indicators Design Framework" (2010), the establishment of the following indicators to measure the economic growth of Resources city and higher education development.

1. Calculation of comprehensive indicators of economic development

We named the following eight economic indicators: the regional GDP: X_1 , the whole society investment in fixed assets: X_2 , per capita GDP: X_3 , per capita fiscal revenue: X_4 , the per capita residents of urban residents disposable income: X_5 , the residents consumption level: X_6 , the proportion of the secondary industry to GDP: X_7 , the proportion of the tertiary industry in terms of GDP: X_8 . It was found that there were significant correlations between several economic indicators from the results of the relevant tables, indicating that they had overlapping information (specific data analysis Process can be obtained from the author), the KMO value of the data and Bartlett's value indicate that the principal component analysis works well. We construct two principals component factors (denoted by F_1, F_2 respectively) from eight original indicators, which reflect 97.635% of the information. Therefore, we were using two principal component factors instead of the original eight variables. Two principals component factors explain the intensity of the eight original indicators, through the data processing, we get the final economic value of the standard (recorded as F_e) figuration. Which X_i^* is the value of the X_i indicator after the standardized treatment, according to Table 5, we can name the economic development level named F_1 ; named financial support factor F_2 . Therefore, we come to the comprehensive economic development of Resources city indicators. Resources city 1993-2015 comprehensive score of economic development, Resources city, the overall level of economic development has maintained an upward trend.

2. The measurement of the comprehensive indicators of higher education

In the same way as the analysis of economic indicators, we have named the five educational indicators respectively. The number of students in each school is as follows: Y_1 , the number of R & D is: Y_2 , personnel in higher education is: Y_3 , the proportion of high-level students is: Y_4 , the average burden of each teacher is: Y_5 . With SSPS17.0 software, the data of Resources city from 1993 to 2015 were processed to show the explanatory force of one principal component factor to five original indexes. Through data processing, we obtained the final value of education: F_{edu} Expression.

Estimation of Coordination Degree between Economic Development and Higher Education Development

The coordination index of the comprehensive index of economic development and the comprehensive index of higher education development is: $C_s = \min(u_1, u_2) / \max(u_1, u_2)$, among them: $u_1 = \exp[-(F_e - f_1)^2 / S_e^2]$, $u_2 = \exp[-(F_{edu} - f_2)^2 / S_{edu}^2]$, where the economic development for the development of higher education is: u_1 ; for the development of higher education for the development of economic development: u_2 ; for the return to the regression coefficient of the estimated value: f_1 as the regression F_e to F_{edu} . f_2 will be the regression coefficient of the estimated value: F_{edu} to F_e . The generally defined are as $0 < C_s < 0.5$, $0.5 \leq C_s \leq 1$ for coordination.

From 1993 to 2015, the comprehensive index of economic development and the comprehensive index of higher education development are drawn on a table. We can see that the overall economic development and educational development of Resources city are increasing trend. However, 2003 is a turning point, before 2003, the level of education development has been better than the economic level, and after this rapid economic development, better than the level of education development. Therefore, the development of Resources city education in recent years seems to have no better reason for the past.

Table 4. Resources city 1993-2015 comprehensive index of economic development and education development of comprehensive indicators of coordination

1993	0.039043642	2004	0.602659345
1994	0.042063428	2005	0.971438334
1995	0.123937432	2006	0.724528343
1996	0.112073284	2007	0.569132734
1997	0.157862834	2008	0.319834421
1998	0.205545934	2009	0.086694923
1999	0.226293439	2010	0.022682345
2000	0.233548395	2011	0.013452378
2001	0.253239434	2012	0.016623845
2002	0.224464855	2013	0.016989344
2003	0.342974594	2014	0.017495638
		2015	0.017467833

From the above results, we can see the coordination degree between economic development and higher education development in Resources city from 1993 to 2015 is fluctuating. According to the coordination of the two we can divide into three stages: the first stage of 1993-2004, economic development and higher education development in a state of uncoordinated, combined can be inferred at this stage Resources city economic development, education more economic development the second stage is from 2005 to 2009; the third stage for 2010-2015, due to the rapid economic development, the coordination of the two indicators is declining.

CONCLUSIONS AND RECOMMENDATIONS

To analysis how the economics can get the promotion continuously in urban areas. We made a considering main body of the interaction between higher education and urban economy, there are government, enterprises and colleges or universities. Only three of them are closely linked. Resources cities which we using as an example in the relationship between the three undoubtedly have a better start, but the problem is still mainly in:

- (1) The government should guide the development direction of higher education, should be based on the actual situation of local economic development to develop appropriate policy measures. Resources city municipal government should integrate existing resources; actively promote higher vocational education, focusing on construction the existing four key vocational colleges, a vocational college, each student and strive to stabilize more than 10,000 people. This is still considered from the scale of large Resources city, higher education, but the empirical analysis, the government investment in Resources city higher education and economic promotion role level is still not very significant. Therefore, the government should do the role of policy planners, rather than active participants. Consider establishing a stable cooperation between school enrollment and business employment to promote better education endogenous economic growth.
- (2) Resources city local enterprises should be in close cooperation with the university to jointly develop personnel training program, and in accordance with the needs of their own development to the university to raise the relevant professional personnel training requirements, colleges and universities for enterprises "tailored" to train the necessary personnel, To attract and retain the local colleges and universities of high-quality personnel, so that enterprises can get high-quality human resources, on the other hand also saves the enterprise recruitment, pre-job training and job candidates to adapt to the cost.

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