



The Social-Economic Influence of Developing Mineral Resources in Yan'an City

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Abstract

As a city rich in petroleum and coal, there are two pillar industries in Yan'an city. This essay is going to analyze the long term effect of mineral resources development on the city's economy in respect of regression analysis method and on its fiscal revenue and expenditure employment and resident's income, ecological environment, and the development differences among each area countries in terms of qualitative analysis method. The aim of this essay is to analyze the influences and the effects of mineral resources development on Yan'an overall society and economy so as to provide testimonies for the significant effects of mineral resources development in regional social and economic development.

Key words: Exploitation of mineral resources; Yan'an city; Development; Influences

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INTRODUCTION

Yan'an City belongs to Shaanxi province of China, which is located in the Shanbei loess plateau hilly-gully, and governs one district and twelve counties, with a total area

of 3.7 square kilometers and the total population of 2.19 million. It is the holy land of the Chinese revolution and thus has very important position in china. This city is rich in mineral resources. In 2010, it reserves of 1.38 billion tons of petroleum, 4.5 billion tons of coal, more than 2000 cubic meters of natural gas. It has become an important energy connection fields in China.

However, the first piece of petroleum of China was found in Yanchuan County, Yan'an City in 1907, and mined it officially in 1911, the city's petroleum production was less, and the role of the petroleum field to local economy had been very small for a long period. The city was in the edge of the poor. In 1984, six counties of Yan'an City were identified as the national key support counties¹, including Zichang County, Yanchang County, Yanchuan County, Wuqi County and Yichuan County. In recent years, with the increase of mining investment and the improvement of the mining technology, mineral resources development has been promoting year by year and Yan'an City's economy has made great strides in development. With petroleum and coal primarily mineral resources development, the one-time poor and old revolutionary base areas have been changed. In 2010, the city's per capita GDP reached more than 40,000 Yuan, higher than the national average per capita GDP.

Some scholars have studied the mineral resources development of Yan'an City. Mining industry is the advantage industry of the city (WEI & LI, 2004), and the exploitation of mineral resources have enhanced its pillar position of secondary industry (HAO *et al.*, 2004). The main development of Yan'an City's mineral resources is petroleum and coal. Petroleum industry is led by two big enterprise groups, including Chang Qing Petroleum Field Development Company and Yan Chang Petroleum Field Development Company, and realizes the intensive management (ZHAO *et al.*, 2004); Coal mining is mainly

¹The national key support counties are the poor areas that Chinese State Council supports to help develop their economy, and who are determined by the per capita income of the local residents. The standard in 1984 was 199.6 Yuan.

focus on Huangling Coal Group Company, others for small coal mines. The exploitation of mineral resources has promoted economic development of the city, but at the meanwhile, it has also caused negative influence to the city's environment (KUO *et al.*, 2005), making each area county's economic development differences expand as a result (HAO *et al.*, 2003). To realize the sustainable development is an important subject of Yan'an City's economic development (JIA *et al.*, 1999), but in the city with the rich mineral resources, its economy is not appear "resource curse" phenomenon (HE & ZHANG, 2011).

However, there is no comprehensive analysis of mineral resources development's impact to the economic-social development of Yan'an City, so this paper is on the basis of predecessors' research results for that.

1. THE INFLUENCES OF MINERAL RESOURCES ON YAN'AN CITY'S ECONOMIC DEVELOPMENT

With the mineral resources development, the second industry of the city holds dominant position gradually. Petroleum and coal industries have become the city's two largest pillar industries. According to the statistical data, the city's second industrial proportion was only 27.3% in 1978, and from 2000 to 2009 the proportion grew to 60% above. In 2010, it already amounted to 71.77%.

The development of petroleum and coal resources has promoted the city's economic growth. In 2010, the production of its petroleum yield was 16.0201 million tons, and the total output value was 84.649 billion Yuan, which accounted for 68.97% of total industrial output value. The production of coal mining yield was 25.5993 million tons, and the total output value was 12.526 billion Yuan, accounting for 10.2% of total industrial output value.

Petroleum industry is the City's main growth of GDP. Within Yan'an's annual 14.7% GDP growth from 2006 to 2010, the petroleum industry has a 9.5% regional economic pulling power, and a 64.02% average annual contribution rate. Because the petroleum industry plays a supporting role, the petroleum price has a great influence on the economic development of Yan'an City. In these five years, the crude petroleum price drives 7.67% growth of the city's petroleum industrial output.

Therefore, we select the city's GDP, crude petroleum production, raw coal production and crude petroleum price index for variables in the establishment of quantitative model to analyze the impact of mineral resources development on economic development. Time series start from 1978 to 2010, a total of 33 sets of data. In order to overcome the phenomenon of heteroscedasticity, time series are taken the natural logarithms, and then the first-order differences. According to the integrated series, we try to establish a long-term equilibrium logarithmic VAR model. Finally, we will explore a long-term economic

influence of developing mineral resources in Yan'an City. In the regression analysis, we assume that the resource utilization rate of the city's mining industry has little influence to the economy, the same as the natural growth of the population.

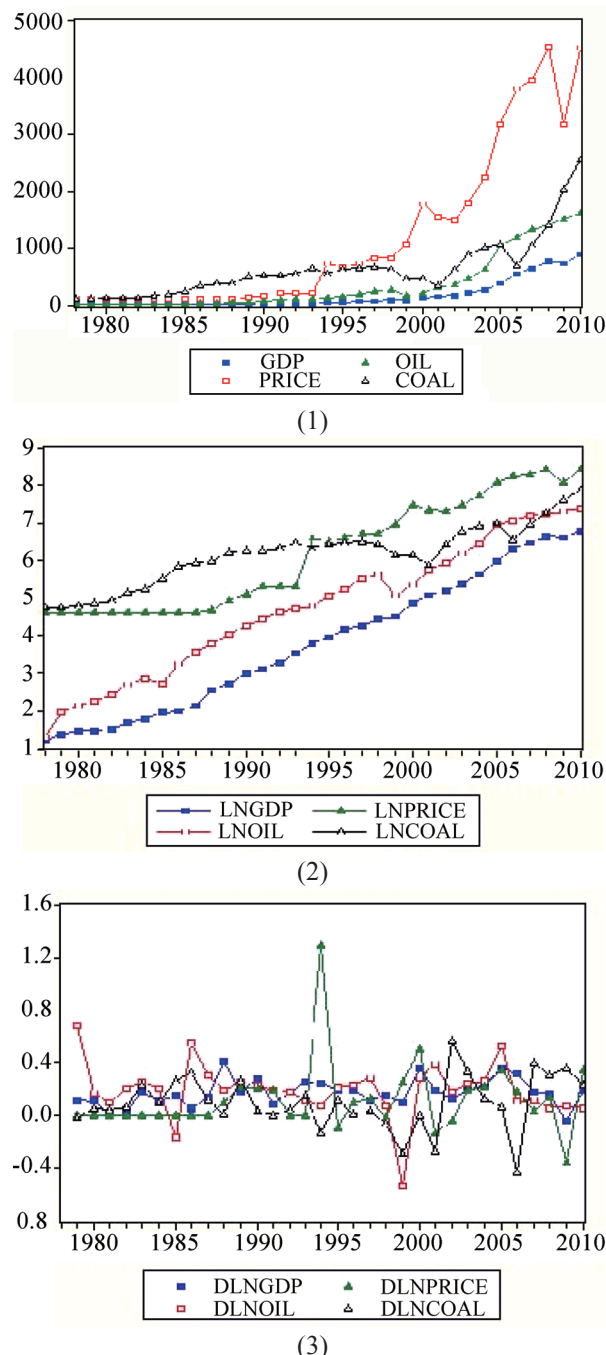


Figure 1
GDP (Unit 0.1 Billion Yuan), Crude Petroleum Production (Oil, Unit Ten Thousand Tons), Raw Coal Production (Coal, Unit Ten Thousand Tons), Crude Petroleum Price Index (Price). (1) The Natural Logarithmic Series (2) The First-Order Difference Series (3) The Year 1978 Is The Basic Value 100 of Crude Petroleum Price Index

First, we carry on the granger test of causality to analyze the relationship among variables. Test results show that petroleum yield is the GDP's granger cause and GDP is not the granger cause of petroleum yields. The petroleum price is the GDP's granger cause. The raw coal mining and GDP do not have the relation of granger.

The main reasons why the raw coal mining is not GDP's granger cause are: the coal price is low, so the production value is small even though a large quantity of coal mining and direct contribution to the city's economy development is not obvious. The development of the coal industry is a development mode of high investment and extensive type. Coal industrial economic benefits are not good. From 2006 to 2010, the coal industrial investment accounts for 10.19% of the total industrial investment, but the production value accounts for only 6.67% of gross industrial production. An average annual growth rate of coal industrial investment is 48.46% in the period, but its production value only grows 36.45% every year. Industrial investment is significant to coal mining. Without thinking its economic benefits, coal mining is still important to the

lives of the residents as well as the fourth major industries of power in Yan'an City.

To sum up, the city's economy is characterized by the petroleum industry as the main body. Petroleum production is a key driver to economic growth. And the petroleum price fluctuations have a great impact on the city's economic development.

In order to test the stationary of time series and avoid "spurious regression", we apply unit root test to lnGDP, lnoil, lncoal and lnprice. The test results show lnGDP~I(1) lnoil~I(1), lnprice~I(1). Yan'an's economic development and the exploitation of petroleum may have a long-term stable equilibrium relationship. For analyzing the possible equilibrium relationship, we establish a long-term equilibrium model: $\ln GDP = \alpha + \omega \ln oil + \phi \ln price$.

Model estimation results:

$$\ln GDP' = -2.244934 + 0.67168 \ln oil' + 0.46165 \ln price' \quad (1)$$

$$t = (-11.39905) \quad (9.980554) \quad (6.203925)$$

$$2 = 0.994558 \quad DW = 1.956225 \quad F = 1889.621$$

The estimation result of model (1) is effective. Then we use ADF test for the residual of model (1).

Table 1
The Result of ADF Test of the Model (1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.223438	0.001
Test critical values:	1% level	-4.28458	
	5% level	-3.562882	
	10% level	-3.215267	

The residual of model (1) is a stationary sequence (Table 1). So, lnGDP, lnoil and lnprice have a long-term equilibrium relationship.

The long-term equilibrium equation shows that the long-term elasticities of the city's economy growth on petroleum yield and petroleum price are 0.67168 and 0.461652. Over a long period, petroleum development has a stable promotion to economic development in the city.

2. THE INFLUENCE OF MINERAL RESOURCES DEVELOPMENT ON THE CITY'S FINANCIAL REVENUE AND EXPENDITURE

Mineral resource development has contributed to the long-term growth in Yan'an City's financial revenue,

which is made up chiefly by the leading coal industry and petroleum industry. In 2010, the total financial revenue hit 33.651 billion Yuan and was increased by 27.88% than that in 2009, of which the two mentioned industries had achieved 21.745 billion Yuan, accounting for 65.62% of the total financial revenue, while the proportion of the petroleum industry reached 55.45%.

It is the increasing financial revenue that not only provides financial benefits to Yan'an City government in the livelihood projects as well as public services, but also promotes the social harmonious development in the city.

During the decade of rapid economic development, the financial expenditure of the city adds up to 84.4515 billion Yuan, showing an average annual growth of 28.11%, which is a powerful guarantee for the livelihood development. For instance, the government of Yan'an City has spent 29.76% of the financial revenue on the livelihood development project in 2010.

Table 2
The Main Item of Yan'an City Financial Expenditure in 2010

Absolute amount unit: billion Yuan	Absolute amount	2010	
		Proportion	Growth rate
Financial expenditure	19.271		22.80%
Public service	4.031	20.92%	14.40%
Social security and employment	1.449	7.52%	19.50%
Health	1.296	6.73%	29.90%
Environmental Protection	0.865	4.49%	35.40%
Education	3.026	15.70%	15.80%
Forestry and water affairs	3.021	15.68%	36.30%

According to the Table 2, it can be concluded that financial expenditure makes a contribution to people's social benefits. The city's financial expenditure in livelihood development from 2006 to 2010 exceeded 21 billion Yuan, of which the expenditure on education rose up by 22.31%, playing a major role in livelihood development. Official figures show that in 2010 nine-year free compulsory education was firstly made available to the city's students in Shaanxi Province and the city government even plans to extend a 12-year free compulsory education. Meanwhile, owing to the financial expenditure to be guaranteed, Yan'an has achieved a new type of social insurance system, including Endowment Insurance, Unemployment Insurance, Employment Injury Insurance, Maternity Insurance as well as Medical Insurance.

Especially, social welfare in several developed counties is much more and earlier. Such as Wuqi, it was the first county to start practicing 12 years free education in China since 2007. And it achieved 15 years free and mandatory education in 2010. Zhidan and Huangling are also achieved 12 years free education. In order to decrease

500 Yuan of each hospitalized patient, Zichang invested 50million Yuan which from public finance to carry out medical reform scheme.

3. THE INFLUENCE OF MINERAL RESOURCES DEVELOPMENT ON EMPLOYMENT AND RESIDENTS INCOME IN YAN'AN CITY

Mineral resources development increases the employment and residents income in the city. In 2010, coal and petroleum industrial employment was 63,427, accounting for 28.63% of total employment in Yan'an City. Average remuneration of coal and petroleum mining and processing industries is 6014.5 Yuan higher than the whole City. Development of mineral resources drives the improvement of people's income. The average annual GDP growth of coal and petroleum industries reaches 19.85% from 2006 to 2010 while the average annual growth rates of disposable income of urban residents and rural per capita net income are 19.16% and 18.79%.

Table 3
In 2009, the Employment and Income of the Mining Industry and Related Manufacturing in Yan'an City

	Year-end number of employment	Average remuneration(Yuan)
Mining industry	58232	41530
# Coal mining and washing industry	10386	52220
# Petroleum and natural gas extraction	47846	39170
Manufacturing industry	10011	36591
# Petroleum processing	5195	52365
All social employment	221534	33046

The total amount of remuneration of coal and petroleum industries counts for one-third of the social workers labor remuneration.

Revenue growth of residents has improved residents

consumption level, development of service industries and employment. Such as total retail sales of social consumer goods in 2009 increased by 10.42%. More than half of total employment is gathered in service sector.

4. THE INFLUENCE OF MINERAL RESOURCES DEVELOPMENT ON ENVIRONMENT IN THE CITY

The heavy environmental pollution in the city has been caused by the exploitation of mineral resources. With the large mining and processing of coal and petroleum and development of processing industry, the negative impact caused by the exploitation of mineral resources on the local environment are becoming more and more serious, such as noxious gases, vegetation damage, solid waste, water pollution, land collapse and so on. In 2009, the discharged volume of industrial waste gas reached 18,853 tons with 10.75 million tons of industrial waste water and 2,500 tons of industrial solid waste.

The average annual value of TSP (dust pollution) in Yan'an City is always higher than the three grade standard for suitable habitat stipulated by the county. And the industrial emission is the main source of pollution. The disposal rate of the industrial SO₂ in the city only reaches 24.72% with 9,128 tons of industrial SO₂ unresolved. Due to the large-scale mining of petroleum and coal resources, the rivers, reservoirs and groundwater resources have been polluted subjected to different degrees. There are 1.335 billion cubic meters of equivalent water resources in the City, but only 51% can develop utilization, and the per capita water resources is only 29.5% of the national per capita (WANG, 2009). The exploitation of mineral

resource occupies much land and destroys vegetation, which makes its ecological environment more vulnerable. The forest cover rate dropped from 60% in early stage of reform and opening to about around 40%.

5. THE INFLUENCE OF YAN'AN CITY'S MINERAL RESOURCES DEVELOPMENT ON DIFFERENCES OF COUNTIES

Because of the uneven distribution of mineral resources, mineral resources development exacerbates economic imbalance among the counties in the city. The counties with abundant mineral resources have not high GDP, more finance revenue and expenditure, but high employment and income of residents. By contrast, economic development of the counties lack of mineral resources is relatively backward: GDP is lower, revenue and expenditure are less, and employment and residential income are lower, too (Figure 3). Because of concentrating distribution of petroleum processing in Luochuan and Yanchuan, the economic aggregate of these two counties is large as well.

In general, the mineral resources have promoted the counties' economic development. From the 1980s poverty to the present prosperity, the counties such as Zichang County, Ansai County, Yanchang County, Yanchuan County and Wuqi County have been prosperous due to development of mineral resources.

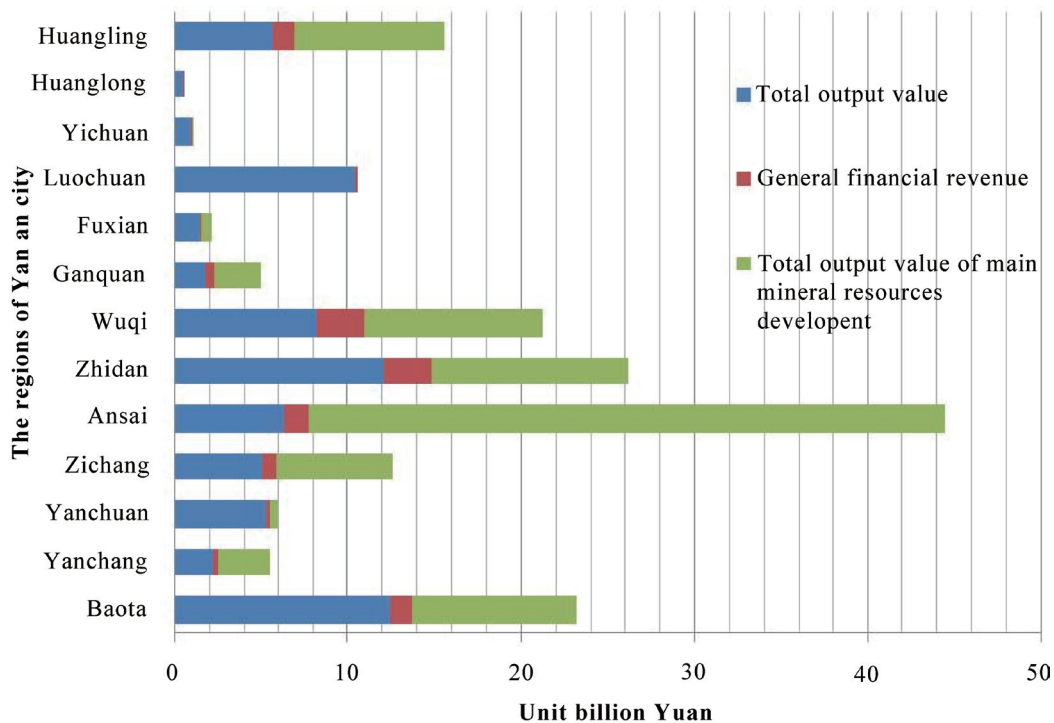


Figure 2
 The Numbers of Total Output Value, General Financial Revenue, and Total Output Value of Mineral Resources Development in Different Counties. The Main Mineral Resources are Petroleum and Coal

The more financial revenue, the more expenditure will be made. And financial expenditure increases people's social welfare. Take as example the development of the counties with largest financial revenue in recent years, such as Wuqi County and Zhidan County. In 2007, Wuqi County practiced 12-year free education to create a national precedent for 12-year free education. In 2010, the county achieved 15-year free education. Zhidan County and Huangling County had achieved 12-year free education successively. In 2008, Zichang County invested financial 50 million Yuan to implement health care reform. The project has reduced the 500 Yuan expenditure of each hospitalized patient.

CONCLUSION

Results of this study show that mineral resources development has a huge role in promoting the economy in Yan'an city. Mineral resources development has increased its economic development level, government revenue, resident's income, and employment rate. Social welfare of the City's residents has been gradually increased through fiscal spending.

However, mineral resources development has polluted and damaged the local ecological environment. And Yan'an City has single industry structure, so it strongly depends on the exploitation of mineral resources, particularly, the petroleum industry, which is easily influenced by petroleum price and market risks. Furthermore, the uneven distribution of mineral resources is widening wealth gap among rich and poor districts. Economic development among different countries is uneven, which limits the whole city's economic development. The major serious challenges facing the city the sustainable development of ecological environment, mineral resources development, ecological environment protection, and to narrow the wealth gap between both of them.

In order to promote sustainable economic development, the city should actively carry out energy conservation work, deepen the pollution control, and protect water head from being polluted. Secondly, the city should enhance the intensity of industry nurturing agriculture and develop characteristic agriculture, and support the development of tertiary industry, especially tourism. Finally, more policy support is needed by backward countries to promote their advantage industrial development.

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