

Effectiveness Analysis of Economic Transition of Resource-Exhausted Cities - Tongling as An Example

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Abstract

The only way that resource-based cities relying on mine must take is to gradually abandon the dependence on resource and choose transitional development. The paper analyses the economic transition path from the diversified upgrade of resource-based industry, the development of non-resource-based industry and the process of circular economy, studies the effect and situation of transition and briefly analyses the thinking on economic transition of resource-based city based on the current transitional effect, which supplies consultancy and suggestion for the following urban economic transition.

KeyWords:resource-exhausted cities; transition path; effectiveness analysis

1. Introduction

Resource-based cities spring up because of the exploration of resources with the resources as the driving force for the springing up and development of cities. However, resource's un-producible nature and quantity' finiteness expose resource-based cities to exhaustion of mineral resources. Long-term exploration and

continuous fall in quantity of resource have limited the resource-based cities outside and cities have realized the unsustainability and risk of development singly depending on resource and that the transition must be imperative. The economic development is the main backbone of urban development; therefore, the economic transition is necessarily the forerunner of urban development.

2. General economic situation of Tongling

Situated in the south of Anhui Province, Tongling City sprung up for the copper mine and is a typical resource-based city with a solid industrial foundation. It is one of birthplace of bronze culture with long history dating from Shang and Zhou Dynasty and thriving in Tang and Song Dynasty. Currently, it has formed a relative complete system covering selection, rough and refined smelting and further processing with international advanced level on copper smelting technology. The Tongling government devotes itself to exploit the copper advantage to the full, supports the development of copper industry to create the world-class copper industrial base. Tongling Nonferrous

Metals Group, the main large-lot producer, is the fifth in large copper refining enterprises in the world and one of the top 500 enterprises of China; Tongling Master Corporation's electromagnetic wire is the No.1 in China and the fourth special electromagnetic wire producer in the world. The new copper-based materials enterprises develop quickly. Tongling is also one of the important sulfur phosphorous chemical bases with Tongling Chemical Industrial Group as the pillar enterprise of Anhui's fertilizer industry and Tongling's local economy.

For a long time, Tongling stimulates economic growth relying on industry (mainly resource-based industry). In 2012, Tongling Statistical Yearbook shows that the ratio of tertiary industry is 1.9: 73.4: 24.7 with industrial added value taking up 68.1% of gross regional product; Anhui's ratio of tertiary industry in 2012 is 12.7: 54.6: 32.7 with industrial added value taking up 46.6% of GDP, which shows Tongling's economic further relies on heavy industry than Anhui and the whole country. Long-term resource exploitation and utilization make Tongling exposed to exhaustion of resource and deterioration of natural condition and the State Council confirmed it to be the second batch of resource-exhausted cities. Under the severe situation, Tongling turn to economic transition. In October, 2005, Tongling was chosen as the first national batch of circular economy pilot city and Tongling Non-ferrous Holding Company was chosen as the first batch of circular economy pilot enterprise. The "Double Pilot" presents the chance to Tongling' economic transition.

3. Main path of Tongling's transition

Tongling started early to explore the transitional way of resource-based cities. In 1980s, after the municipal government realized the development limitation, they adjusted spontaneously with most adaptive adjustment; since the new century, according to policies and guidelines and thread for the rise of central China and developing the circular economy, the Party Central Committee and the State Council have given Tongling more support from policy, funding and construction layout of major project, which indicated directions for mineral resource-based cities and steps into strategic adjustment.

Tongling's economic transitional process is not simply an economic transition model of the complete replacement, but shifts the strategic focus to higher-level and higher value-added industry system adhering to develop the current pillar industry with the strength as the main attack direction of leading industry and continuous industry and social and environmental transitions as the target to comprehensively promote the resource-based cities transition.

3.1. Diversified extension of resource-based industries

Resource-based industry, on one hand, mainly transform to diversification avoiding the disadvantages of single dependence on cooper industry; on the other hand, it transfers to higher-level and higher value-added industry from the internal. The competitive copper industrial transition relies on extension of the current leading industry chain, that is, making the copper industry and electronics

bigger and stronger, developing vigorously further copper processing and at the same time, fostering traditional industry transition, highlighting fine chemicals, advancing the industry structure, enhancing the added value of products, extending continuously industry chain; transforming the development of traditional resource-based industry with rich water resource, convenient transport conditions and impeccable power transmission network and cultivating and developing extended industry of resource-based industry such as materials industry and electronics.

3.2. Upgrade of non-resourced-based industry

The transition of non-resource-based industry mainly relies on upgrading whole industry covering machinery manufacturing industry, agriculture and services. To drive the development of raw materials industries, it promotes machinery manufacturing industry transforming to advanced equipment manufacturing and large equipment industry forming distinctive equipment products group; agricultural transition relies on continuously advancing agricultural structure, promoting agriculture industrialization, establishing agricultural circular economy demonstration base, which makes traditional agriculture transform to be modern and effective; the service industry such as logistic, commerce and trade, tourism and real estate transforms to modern one with the marketization, industrialization and socialization as the direction and improves competitiveness and Tongling's new industries like environmental protection and pharmaceutical industry begin to take shape.

3.3. Developing circular economy to promote transition

In October, 2005, Tongling became one of the first national circular economy “double pilot” cities and the circular economy brings opportunities for Tongling’s economic transition. In industrial area, Tongling Nonferrous Holding Company forms 3 eco-industrial chains centering on comprehensive utilization of copper, iron pyrite and lime rock; it establishes 2 sites including Binjiang circular economy industrial experiment district and Henggang circular economy industrial demonstration zone cultivating a group of industries characterized by circular economy; Tongling established colored circular economy district developed downstream fine chemical industry with the waste of production as raw material of extended production, resource circularly utilized and energy cascade utilization. Circulation can be realized inside industry and intra-industry and industry circulation industry chain utilizes metabolic and symbiotic relationship among industries even extending to service. The elimination and movement of pollution industries, technology improvement and technical innovation on current industries and developing economic as environmental requirement promote economic growth and decline distinctly environmental pollution.

4. Analysis of Tongling’s transition effect

In recent years, taking the transition of the resource-based city as the goal, Tongling focuses on building an ecological copper capital, upgrading traditional industries and cultivating new industries. Through Tongling’s economic data of the

recent years, it can be found that the resource-based industry is still a pillar of the economy though its structure has been optimized, and non-resource-based industries continue to grow and upgrade effectively.

4.1 . Structure-optimized resource-based industry, occupying economic pillar position

- Resource-based industry's high ratio, occupying economic pillar position

Tongling is a typical city rising with the industry. Tongling Statistical Yearbook from 2003 to 2007 shows that the ratio of the tertiary industry changed from 4.9: 58.0: 37.1 in 2003 to 2.7: 67.8: 29.5 in 2007, and from 2.6: 67.1: 30.3 in 2008 to 1.9: 74.7: 23.4 in 2011, the gross industrial output value (GIOV) in gross regional product(GRP) changed from 44.81% in 2003 to 69.67% in 2011, and the gross mining output value (GMIOV) of GIOV rose from 53.15% in 2003 to 71.69% in 2011, in which the proportion of 2005 to 2008 increased significantly.

In recent years, with the rapid growth of gross industrial output value (GIOV), and its increasing share in Tongling's economy, and the small and declining primary and tertiary industrial output values, Tongling is still an industrial city. The mining industry is Tongling's industry pillar. Due to the extension of the mining industry chain, the gross mining industry output value (GMIOV) grows rapidly, making an increasing contribution to the growth of GIOV, and sharing more important economic status. Therefore, resource-based industries still occupy the pillar position of Tonglings' economy and are a major driving force for local economic development.

- Continuous extension of the industrial chain and the rapid growth in value-added products

The extension of Tongling's competitive copper industry has developed rapidly. The output value of non-ferrous metal smelting and rolling processing industry increased from 5.807 billion Yuan in 2003 to 94.049 billion Yuan in 2011. Non-ferrous industry output value increased faster than the growth of the gross industrial output value, sharing an increasing proportion of the gross industrial output value, which accounted for 74% in 2011. Although the mining selection industry output value (MSIOV) grew fast in recent years, from 0.299 billion Yuan in 2003 to 1.904 billion Yuan, it shared a small proportion of the gross industrial output value with in 2011 .

Traditional and competitive chemical industries are continuously transforming to the fine chemical industry, whose output value in 2012 was 13.15 billion Yuan, accounting for 8.1% of the gross industrial output value. The growth of the output value of the city's strategic emerging industries is significantly faster than that of the gross industrial output value. In 2012 , the city's strategic emerging industries' output value was 38.21 billion Yuan, with an increase of 34.3%, which was 26.9% higher than the growth rate of the gross industrial output value. [8]

In 2011, the output value of traditional and competitive resource-based industries shared 86% of Tongling's gross industrial output value. The gross industrial output value is mainly made up of the output value from the extension of resource-based industries — non-ferrous metal smelting and rolling processing industry, the chemical industry, and the energy industry. During the economic transition, Tongling shifted the strategic focus to higher-level and higher value-added industry system adhering to develop the

current pillar industry, which are so significantly efficient.

4.2. Orderly upgrading and rapid development of non-resource-based industries

The manufacturing industry of Tongling developed rapidly in recent years. With the 13.192-billion-Yuan output value in 2011 accounting for 8.86% of gross regional product, the electrical machinery industry and the equipment manufacturing industry become Tongling's important non-resource-based industries. The general equipment, the professional equipment, and the electronic communication equipment manufacturing industry have become Tongling emerging industries with their high growth in production value.

Tongling attached great importance to optimizing the agricultural structure and develop farming, aquaculture, and fisheries coordinately. In 2011, the product value of agriculture, forestry, animal husbandry and fishery reached to 1.1 billion Yuan, increased by 3.8 % compared with last year and 1.16 times compared with 2003, and accounted for 1.90% of the gross regional product (GRP). The product value of the tertiary industry in 2011 was 13.539 billion Yuan, which accounted for 28.60% of GRP, and was 3.28 times over 2003. Industries like transportation, wholesale and retail, and real estate developed rapidly, making a considerable contribution to the tertiary industry. The rise of Tongling manufacturing industry makes the industrial chain extend to the terminal. Focusing on whole machine products, improving the product level and value-added products, and inspiring technological and technical innovation, the manufacturing industries is a

key one for resource-based industries to upgrade overall and realize economic transition and development.

In contrast with the agriculture accounting for a high ratio in the economy of Anhui Province, Tongling has a relatively low agricultural economy. In these years, the agriculture was optimized as a whole and for agricultural diversification from a small-scale to large-scale farming, and agricultural technologies were introduced with the drive of the circular economy. As the tertiary industry develops rapidly with more and more investment, it is conducive for Tongling to improve the function of Tongling City and optimize industrial structure.

4.3 . Formation of circular industry chain, driving other industries' development

It was 3.528 billion Yuan that the output value of comprehensive utilization of waste resource industry of Tongling in 2011. Tongling has formed three circular industry chains—the copper and copper processing, the parathion chemical, and the cement ; It established the circular economy in Chengbei industrial zone and Henggang industrial zone; Meanwhile Tongling increased scientific investment to the circular economy, set up China's first circular economy cooperative union, and provided special subsidies for the research cooperation. Tongling created the circular industry chain in the agriculture sector, formed circular links between farming, aquaculture, and processing of agricultural products, and completed the circular agricultural economy pilot area. At the same time, to guide the development of the circular service industry, since May 2007, Tongling tried to supply the circular industrial condensate water to the service industry, which realized the

circulation of the inside industry and intra-industry, and promoted the city's circular economy continued to develop further.

5. Consolidating transition achievements, building an ecological Tongling

Transition achievements are the results of many years' efforts. How to consolidate the achievements and continue walking along the established transition direction is the key to achieve coordinated development across the region and to build ecological Tongling.

5.1 . Develop non-resource-based industries coordinately, form firm replacement industries gradually

Developing non-resource-based industries and optimizing the industrial structure will play a crucial role on economic stability, security and development. When consolidating the traditional advantages of the copper industry and the chemical industry, Tongling should achieve the coordinated development between the primary industry and the tertiary industry, develop the high-tech industry actively, and look for replacement industries for achieving the transition from resource-based industries to diversified industries, building a reasonable industrial system, and laying the foundation for Tongling's sustainable development. Resource-based regions have clearly insufficient attractiveness to non-resource-based industries, which are reflected on the lock-in effects of talents and investment and cognitive effects. When guiding the development of industries, the gov-

ernment should strengthen public relations, and attract the investment of non-resource-based industries and welcome talents from outside; meanwhile the government should strengthen the policy to support and guide and give funding and technical support to actively promote the development of non-resource-based industries.

5.2. Improve the industrial structure and the industrial products level

Tongling's economic transition should shift the strategic focus to higher-level and higher value-added industry system when adhering to develop the current pillar industry. Tongling should highlight the brand effect, extend to the terminal of the copper industry chain, and expand the pan-copper industry to form a copper chain with obviously competitive advantage. Tongling also should consolidate and strengthen the industry of electronic basic materials, develop new electronic components and new copper-based electronic materials, make efforts to introduce and foster electronic machine products, and improve products level and the added value of products.

5.3. Develop the circular economy and improve the development quality

Circular economy let Tongling tasted the sweetness of economic, social and environmental benefits. With continuing to develop the circular economy in the future, Tongling should transform and elevate the chemical, energy, and building materials industry, making the economy developed both in quantity and quality. With the promotion of the circular economy, Tongling should continue to elimi-

nate the backward production capacity, utilize resources comprehensively, reduce the pollutant emission, and build ecological Tongling centered on the harmony of economy with society, and the harmony of human beings with nature to promote the sustainable development.

5.4. Diversify sources of raw materials, ensure resource security

The output value of non-ferrous metal smelting and rolling processing industry shares over half of the industrial added-value of Tongling, and the industry is highly concentrated. However, the copper reserves of Tongling are inadequate and the self-sufficiency rate of concentrated copper in 2011 was only 5.7% so that the raw materials of the copper industry, the concentrated copper and the crude copper, are from the outside of Tongling. This not only reduces the copper industry's revenue, but also greatly weakened the competitiveness of the copper industry. Besides, deeply affected by the international economic factors, resource-based industries are unstable and risky. Therefore, Tongling need to strengthen the management of resources, and the construction of deep exploration and recycling non-ferrous metals to improve the level of comprehensive utilization of resources. And encourage qualified enterprises to invest and establish production bases, research and development institutions and economic and trade cooperation zone at abroad, conduct foreign cooperation in resources development to improve resource self-sufficiency and guarantee the security of the raw materials supply.

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