

Job-housing imbalance and commuting of coastal industrial town in Liaoning province, China

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Abstract. During the Twelve Five period, China promulgated industrial policies promote the energy-intensive industries relocate to coastal areas in order to utilize marine shipping resources. Consequently, some major state-owned steel and petrochemical enterprises have relocated and resulted in a large scale coastal area development. Restricted by the port construction, most of the coastal industrial areas are located in the outer suburbs. To balance between employment and housing, new industrial coastal towns were constructed. In this paper, we adopt a case-study approach to analysis some typical industrial coastal towns of Liaoning Province situated in the Bohai Bay, which is currently under rapid economic growth. Our investigations reflect the common phenomenon of long distance commuting and massive amount of vacant residences. More specifically, large plant relocation caused hundreds of kilometers of daily commute and enterprises had to provide housing subsidies and education incentives to motivate employees to relocate to coastal areas. Nonetheless, many employees still refuse to relocate due to job stability, diverse needs of family members and access to convenient services. These employees averaged 4 hours of commute daily and some who lived further had to reside in temporary industrial housing units and subject to long-term family separation. As a result, only a small portion of employees purchase new coastal residences but mostly for investment and retirement purposes, leading to massive vacancy and ghost-town phenomenon. In contrast to the low demand, coastal areas tend to develop large amount of residences prior to industrial relocation, which may be directly related to local government finances. Some local governments have sold residential land to developers to general revenue to support the subsequent industrial development. Subject to the strong preference of ocean-view, residential housing developers tend to select coast-line land to construct new residential towns, which further reduces the access of marine resources for major industrial enterprises. This violates the original intent of developing industrial coastal towns and drastically limits the availability of marine resources. Lastly, we analyze the co-existence of over-exploiting residential areas and massive vacancies in reference to the demand and supply of land, as well as the demand of residential housing units with the choice criteria of enterprise employees.

1. Introduction

During 12th Five-Year, China issued a number of economic and industrial plannings which not only proposed the development goals of the coastal industry, but also advanced a high energy consumption industry to the coastal area of the spatial layout strategy. *People's Economy and Social Development 12th FYP Outline (2011)* and *Industrial Transformation and Upgrading Plan (2011)* mentioned the major projects utilized imported resources will be arranged along the coastal areas priority. And *Steel Industry Restructuring and Revitalization Plan (2009)* proposed the production capacity of steel enterprises along China's east coast and Yangtze River should account for more than 40% of the



nation's whole counterparts. Under the guidance of these industrial policies, many inland large steel-oil enterprises moved to coastal areas, and most of them are state-owned enterprises with thousands of staff and workers. These large enterprises usually sprawl several square kilometers, and the relocation pushed large-scale development of coastal areas. Meanwhile, it also brings large-scale commuter traffic.

2. Outer suburb coastal industrial town

Restricted by the port construction, coastal industrial areas are usually located dozens of kilometers away from the urban area and take on the typical commuter traffic belongs to the outer suburb industrial area. To balance between employment and housing, new industrial coastal towns with public service facilities and residential areas were constructed. Similar to some new industrial towns, there are job-housing imbalance and long distance commuting phenomena, and the situation are even more serious.

In this paper, we adopt a case-study approach to analysis some typical industrial coastal towns of Liaoning Province situated in the Bohai Bay, which is currently under rapid economic growth. Since 2000, Bohai Bay has become China's third largest economic growth pole following the Yangtze River Delta and the Pearl River Delta. Liaoning province has 2178 kilometers coastline, accounting for about 42% of Bohai Bay's total. Liaoning has high quality coastal for port construct, but in the past years, only Dalian and Yingkou had built some coastal industrial projects, while other coastline have not developed for industry. Since the beginning of 11th Five-Year Plan(2006), under the guidance of the national port planning and industrial adjustment planning, Liaoning coastal areas developed rapidly, some high-quality coastline have been over-exploited even. For example, three ports each with 100 million tons throughput capacity stand within 100 kilometers of Panjin-Yingkou coastline, and industrial and residential areas fill up the coastline, and this coastline planning been called *one hundred kilometers seamless development*. Besides these large port industrial areas, there are also some small industrial areas just relying on small size port or even fishing port. In this paper, we select the coastal industrial towns with heavy chemical industrial, such as steel and petrochemical projects. The new towns' scales and distances to urban are counted and listed in Table 1. The new coastal towns are quite far away from the main urban areas with the general distance of more than 40 kilometers. Therefore, the vast distance bring huge challenges to unity urban functions.

Table 1. Overview of Some Coastal Industrial Towns in Liaoning Province

City	Coastal Industrial Town	Scale ^a (km ²)	Distance (km)	Main Industry
Jinzhou	Jinzhou Coastal Economic Area	161	20	Mechanical
Panjin	Liaodong Bay New Area	306	40	Petrochemical
Yingkou	Bayuquan Economic and Technological Area	268	50	Iron and steel
Yingkou	Xianren Island Energy and Chemical Area	159	60	Petrochemical
Dalian	Taiping Port Economic Area	275	100	Logistics
Dalian	Changxing Island Coastal Industrial Area	349.5	90	Petrochemical
Dalian	Dalian Pine Island Chemical Industrial Area	35	68	Petrochemical
Dalian	Dengshahe Port Industrial Area	50.6	70	Iron and steel
Dalian	Huayuankou Coastal Industrial Area	34.5	110	Biological

^a The coastal industrial towns' scale data come from the publicity planning document on government websites.

3. Long-distance commuting of coastal industrial town

The employees in coastal industrial districts mainly come from the relocation enterprises. In the next three subsections, we will introduce the typical long distance commuting cases.

3.1. Long-distance commuting with large state-owned enterprises outer-city relocation.

Bayuquan district, established in 1984, is 58 km away from southern of Yingkou downtown. The Bayuquan Port is the most convenient marine passage in northeast China. *Anshan Iron and Steel Company*, the second largest iron and steel enterprises in China, was 120 km away from Bayuquan district. In order to set up steel production line that relies on overseas raw materials through shipping, the company built an iron and steel base in Bayuquan district covers 8.32 km². The project started in 2006 and completed in 2008. This project stimulates employment and also leads to residential explosive development. In the past few years, the residential land expands 1.5 times than before. Although the new factory has brought a large number of employees, but new housing idle seriously. The percent of households in most residential areas are less than ten or even lower.

Although it only takes 40 minutes from original factory to the new one through high-speed rail, the whole single trip nearly 3 hours when calculate the transfer time and the time from high-speed railway station to factory. *Anshan Iron and Steel Company* has 105 thousand employees. Since 2008, the company has issued a number of policies to encourage thousands of workers allocate to Bayuquan, including settlement fee, 1.5 times salary, off-site work allowance, housing purchase discount, wife job offer, children education and other kinds of welfare. And the company even built its own neighborhood with convenient business facilities, but the buyers live alone and will not move their families. We found in the field investigation, many houses pasted with housing sell advertising.

The company also hired a large number of local employees who come from nearby rural areas and have houses in rural areas. Subjected to low economic capability and job stability concerns, they rarely buy a house near the new factory.

3.2. Long-distance commuting with large state-owned enterprises intercity relocation

Dalian Petrochemical Company located in Dalian city center with workers lived nearby. In 2009, the whole company moved away from downtown, and part of it moved to the Pine Island Petrochemical Area which is 65 km from its former site. Pine Island Petrochemical Area covers an area of 35 square kilometers. In order to solve the commuting problem, since 2009, there are 44 shuttle buses owned by the company to transfer nearly 2000 workers every day. The shuttle buses start at 6:40 in Dalian, and back to Dalian at 16:30. Due to traffic congestion, one-way travel time nearly costs 100 minutes. Calculating the transfer time, the commute time will be more than 4 hours every day.

Commuter Traffic Statistics (2015) showed that the average distance of Dalian workers commuting is 13.53 kilometers, with an average travel time of 37 minutes. Then, the commuting distance of the employees in *Dalian Petrochemical Company* is almost 5 times of average distance, and the commuting time is nearly 3 times than the average date. Workers have to endure long-time daily commuting.

At the beginning the factory relocation, the government built a large scale residential area 10 kilometers away from the industrial area with convenient traffic. There are many high-quality education and medical facilities, such as the Beijing Normal University High School, Dalian Medical University Hospital, Dalian Science and Technology Museum and Dalian Library and etc. The average price of the housing is about 5,000 RMB less than the average price of 14,000 RMB around the original site. However, the local housing management authority said that although enough supporting facilities and low housing prices benefits, the majority of workers would rather endure long-distance commuting than buying a local house.

We get the occupancy rate of 30% from the residential management department, but we took field investigations during May and August in which period the foreign property buyers usually live in and the residential population is largest. We believe that the occupancy rate is seriously overvalued after count the occupancy number of each residential building. Many high-rise residential over 30 floors

have only a dozen households and the actual occupancy rate is less than 10%. The few property buyers are mainly strangers in purpose of investing and pension, and some are from the nearby towns purchasing houses for children's education. Thus, the phenomenon of the job-housing dislocation has been formed, which is *the house owners live here but don't work here, the people who work here but don't live here*. This job-housing imbalance phenomenon exists in many new industrial areas^[1,2], and especially serious in coastal industrial areas.

It is a common phenomenon that employees have to stand long distance commuting due to the enterprises relocation in coastal areas of Liaoning province. Another typical case occurred in Panjin, which sets up a new district named Liaodong Bay Coastal Area in the distance of 45 kilometers from urban areas. Based on the Traffic Statistics from *Panjin Planning and Transportation Department*, there are nearly 9400 jobs in the coastal area, and employees take commuter buses between the new coastal district and urban areas everyday. The average commuting time is about 78 minutes and the job-housing imbalance feature is similar to the *Dalian Petrochemical Company*.

3.3. Long-distance commuting with small and medium enterprises intercity relocation

Besides the relocation of large state-owned enterprises, there are many small and medium enterprises settled in coastal industrial area. We investigated two outer suburb coastal industrial areas, one is Changxing Island Coastal Industrial Area with 90 kilometers away from urban area, and the other is Huayuankou Coastal Industrial Area which is 110 kilometers away from urban area. These two industrial areas have been completed for nearly ten years and attracted a large number of enterprises including large state-owned enterprises and many small and medium-sized enterprises.

It is difficult for small and medium enterprises to enjoy the preferential purchase and commuter bus service like large state-owned enterprises. Workers in these enterprises mainly commute by customized shuttle buses. Constrained by traffic cost, it shows the characteristics of job-residential space regional separation^[1], that the employees living in the servants' quarters during working days, and return home at weekends. Usually these enterprises establish turns expatriate and incentive management in order to creating a long-term motivate and improve performances. Specifically, workers be expatriated to coastal industrial areas in turn, and transferred back to urban areas after two years outer suburb service. For small and medium-sized enterprises, it is an effective measure not only solves the enterprise assignment problem, but also decomposes the outstanding contradiction of the job-housing separation.

4. Influence factors of job-housing imbalance

It is a long process for coastal industrial town to change from single industrial function to general town, which is composed of forming stage, growth stage and maturity stage. During these processes, the job-housing space tends to be balanced, and it is a slow and gradual process.^[4,5] At present, the coastal industrial towns in Liaoning are just in the early stages and rely on the enterprises relocation, which lead to the separation of job-housing. Although many new projects are establishing large-scale coastal settlements, the job-housing separation in coastal areas is increasing. The authors analysis the factors for separation including land supply, build time, resident type from the government, developers and property buyers.

4.1. Land finance raise the residential proportion

The funds for the industrial areas construction mainly come from national finance or local finance. Some national projects, such as Tianjin Binhai New Area, Caoheidian Industrial Area, these projects obtain the National Special Construction Funds from national treasury. But there are still many other non-national projects, which is provincial or municipal projects must collect funds from local government finances. The most effective and convenient financing way for local government to raise funding for the subsequent industrial development is sell residential land. China's local governments rely on land finance to development after implementing tax sharing system in 1994. There are so many related papers about tax system and land transfer policies^[6,7], the authors will not repeat. For many

local projects, governments have sold residential land to developers to general revenue to support the subsequent industrial development^[1,2,8].

Subjected to the land finance, residential land tend to take high proportion in the coastal industrial town and occupies fine coastline land to construct which will further reduce the access of marine resources for major industrial enterprises. In some projects, it even occupied most of the coastline. This violates the original intent of developing industrial coastal towns and drastically limits the availability of marine resources.

4.2. Land finance raise the residential proportion

In order to recover funds quickly, developers construct large residential projects before industrial projects, almost for high-grade residence and large units. However, from the investigated to the companies, we found that the small units and rental housing are more popular with property buyers. House purchase is affected by various factors including family income, public services, education condition, medical level, community culture and even household registration. In the early stage of industrial town construction, the relevant supporting facilities are not constructed and the workers worry about the employment stability, and consider of the other family members employment, job selection diversity and the perfect urban services etc^[9,10], employers prefer long-distance commuting rather than house-moving.

4.3. House purchase policy promote the housing mismatch

The government imposed *Purchase Restriction Policy* to address the overheated housing market in 2010. According to the regulations, the minimum down payment for second-home raise from 40% to 70%, and the third-house purchase is prohibited. This policy is considered effective in control housing prices. The policy execution is just the time for the large-scale coastal industrial town built. In order to promote coastal development, the local government has selectively implemented the restriction policy. Specifically, the policy been implemented in high housing price urban areas, but not implemented in the low price areas and the new towns, that also includes the coastal industrial towns. In these areas property buyers can enjoy lower down payment and preferable loan discounts.

5. Conclusion

There are many studies on job-housing imbalance on inland industrial areas, however the coastal industrial areas are more particularity. Firstly, the outer suburb location decided that it is difficult to rely on the urban complete facilities, so it has become a common practice that set up a coastal town with residential, commercial, educational, and medical facilities to provide the necessary living needs. This development model can meet the needs of both industry and supporting life, and it also establish the foundation for the industrial area develop to general coastal town. Secondly, during the initial stage of the coastal industrial town construction, the relocation of enterprises bring a large number of input employees that ensuing drive a long distance commuter and job-housing separation even more seriously separate weekly or monthly. Thirdly, directly related to local government finances, residential land proportion is too large and it occupies high quality coastline. Attracted by the discount purchase policies, the small number of property buyers are not local workers, but housing investors who do not live here, or just the non industrial employees who want to enjoy educational resources by buy a house. All these leading to massive vacancy and ghost-town phenomenon and job-housing imbalance. Job-housing imbalance is a common phenomenon in the early stages of industrial areas development, but the imbalance situation can be alleviated through the construction time control and housing purchase identity restriction, all these require the government strengthen the land development and management especially for residential land.

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