

Risk Analysis of the Public Rental Housing Construction Based on the BOT

Mengmeng Li ^{1, a}, Hongyong Liu ^{1, b} and Deng Li ^{2, c}

¹School of Civil Engineering and Architect, Southwest Petroleum University, Chengdu 610500, China

²Sichuan Changhong Property Limited, Mianyang 621000, China

^a1569476949@qq.com, ^blhy78512@163.com, ^c12819209@qq.com

Abstract

Advantages of application based on the BOT model: Reducing the funds pressure on the government, Sharing the project risk, Improving the efficiency of project operation and so on. BOT construction model has been widely used in large-scale infrastructure construction, and get good grades. However applying to the construction of public rental housing is still in the immature stage. The article will start from the definition of BOT and analyze the characteristics, and identify the risk factors in each stage of the public housing BOT project, and construct flow chart of the risk sharing of the public housing BOT project from the three main stages of risk sharing. Preparing to avoid the risk or share the risk and Providing convenience for taking appropriate measures according to different risk factors, so it can reduce the incidence rate of risk and let project avoid suffering heavy losses.

Keywords

public rental housing; BOT; the risk of BOT; risk sharing

1. Introduction

BOT that is the Build-Operate-Transfer^[1]. It is a construction model designed to provide high-quality public service, with public-private partnership for the construction of infrastructure. Commonly known as the "concession", it refers that the host government or local government departments signed a franchise agreement with the private enterprises, the project will be granted to special project company established by the project sponsor, within the concession period, the project company has ownership of the project investment and construction (not the full sense of ownership), and it is responsible for project investment, financing, construction, operation and maintenance, the project company can repay the loans in financing through collecting fees from users or selling products, and therefore earn profits. Upon the expiration of the concession period, the item company will transfer the project to the government without compensation.

2. Characteristics of BOT construction mode

(1) BOT construction model is mostly applied to large public infrastructure projects^[2], such as roads, bridges, public rental housing and so on. These projects' large demand for funds, the long repayment period of financing and high risk, which make the financing difficult and cost of financing high, moreover the financing needs to implement earmarking.

(2) franchise. The government signed a franchise agreement with item company, the right of operating and constructing of the project will be handed over to the item company, the item company will turn the project over to the host government after the expiration of the concession.

(3) multi-participation subject. The government and the project company as the main body reached cooperative intent through the concession agreement, the project company reached a cooperation agreement on loan, the design, supply, construction and operation with commercial banks, design

units, equipment suppliers, contractors and operators respectively by the loan contract, contract design, supply contract, construction contract, management contract.

(4) non recourse project financing. BOT project financing is off-balance-sheet financing, the creditor only need to consider the project feasibility, project their own assets and future earnings of observability, no need to consider the sponsor credibility, cash flow, and other problems. As a creditor in the recourse debt, only have limited recourse, without recourse to other assets of the project sponsor, the cash flow of the project itself and future income become the only source of repayment of the debtor.

(5) BOT financing mode, and gets rid of the characteristics of risk concentration and difficult to disperse in the traditional financing model, successfully allocates the risk to the project stakeholders [3], the various types of risk are spread to the project stakeholders that more suited or have the ability to undertake, so as to ensure the project smooth implementation.

(6) Project using BOT financing mode, the government does not give guarantee funds, only provide project loan guarantee, but can participate in project finance loans as the identity of the investment, the funds required for the project are all from financing loans of domestic and foreign investors.

3. The main risk factors for public rental housing BOT projects

(1) preparation phase

1) project approval risk

Public rental housing BOT project has close relationship with the government from the project to the construction, during this period, concession agreements and other license approval shall be must be approved by the government, once delayed, it will affect the project's overall progress, so that the projects can not be conducted in accordance with the original plan.

2) project decision-making risk

Before the construction of project, the local government and relevant departments need to make decisions. they begin to analyze the feasibility of economy, technology and environment of the project, and then evaluate them. In addition, its impact on national economy will be assessed. The reasonable investigation, the unscientific evaluation methods and misconducted audit will have an important impact on the decision, which will cause risk to the project financing decision, production operation, and even cause great losses to the local economy.

3) The bidding risk

The bidding stage before the project construction is necessary, the government as a tender, the bidding may fail when bid preparation is insufficient, the qualification of bidders is incomplete or the deviation of the bidder's understanding of the bidding documents.

(2) the project construction phase

1) government risk

Too much interference, the incorrect guidance and mismatch from government will affect the schedule of the project [4], and that the government commonplace corruption in the project makes it difficult to target to the normal direction of development. Furthermore, the risk of land supply caused by the oversight of the work of the government exists, the government should be ready for the construction land before construction, if the supply of land delays, it will hinder the overall progress of the project.

2) financing risk

The financing of public rental housing project BOT needs the support of the government, the government provides credit guarantees for banks for the item company, the credit level also determines whether banks are willing to lend money to the project; project construction funds rely on bank loans, the project construction rely on bank loans for capital turnover, once the banks don't supply in time, it will affect the progress of construction projects and cause losses; the unreliability of

the equity side in item company and the unfulfillment of supply of funds will increase the risk of financing; the other financing ways, such as public rental housing bonds and real estate stocks, can't raise funds successfully due to insufficient credit of item company.

3) item company risk

Item company itself has the risk of operation. BOT application in public rental housing in our country is a relatively new type of things, there is still a lack of experienced managers to organize and coordinate all aspects of the work. Facing the complex organizational structure, if the responsibility of partners can't be distributed reasonably and the interests of the shareholders can't be coordinated or the relationship between all the parties concerned can't be distinguished, it will cause the failure of the project company operating, which leads to the failure of the public housing project.

4) contractor risk

Item companies in the selection of the contractor, need to consider its practical experience, economic conditions, and choose the contractor qualified for public rental BOT project who has a good reputation. If they choose the wrong, the Contractor's own lack of funds will lead to costs arrears associated with the project, thus affecting the progress of the project; poor reputation, cutting corners will make the quality of project damaged. In addition, there are some common risk: construction cost overrun risk, substandard quality risk, the risk of raw material supply, major accident risk, risk of production conditions, duration delay risk and subcontractor risk.

(3) Operation stage

1) government behavior risk

Government behavior risk is divided into many kinds, public rental housing BOT project is a public-private partnership projects, the government's inaction or policy changes will affect the operation of the project. Government promises the project company to give him the right of land priority development along the line, but does not guarantee its only development, which causes the future project earnings cannot be predicted; the related tax relief is one of the government's guarantee measures of the BOT project of public rental housing, tax increases will make the project less profitable or even at a loss; operational stage; there is also the expropriation risk of public rental housing by government, resulting in the limited profit.

2) financial risk

Most of the project working capital source is derived from the loan, and the project cycle is very long, bank loans during the period of financing may lead to operational risks because of fluctuations in interest rates. An increase in interest rates will increase the cost of construction and operation of projects with floating interest rates, and a decline in interest rates will increase the opportunity cost of projects that use fixed rate loans. The stocks, securities and real estate commodities and other investment objects issued during the financing stage may unwind the shipment in the normal price or delay realization due to changes in the way of the realization, so that the project is damaged. If the funds are not properly used in the operational phase, the cost of financing will increase; the improper management of operation and maintenance will lead to increased operating costs, resulting in operating cost overrun, which thereby affects the project revenue.

3) market risk

The location of public rental housing and the market positioning will have a great impact on rental and sale of built housing. Public rental housing is mainly aimed at the people of middle and low income, if the project site is inappropriate, the price is too high and the quality of housing is very poor, it will affect the rental and sale of housing, thus affecting the investment efficiency of the project^[5]. In addition to the above risks, there is a risk of competition in the project operation stage, the lower the price of competitors housing prices will lead to a decline in the overall price of public rental housing, thereby affect the project revenue.

(4) transfer phase

After the expiration of the franchise, the project company must transfer the completed projects to the government free of charge, and the corresponding risks are also transferred to the government, in the process of the government's acceptance of the project, if the government adopts unreasonable procedure to evaluate the value of the project, it will damage the interests of the project company; at the same time at this stage, the problems of property rights, ownership, management rights often appear.

The above risks are discussed from each stage of the public rental housing BOT project, in addition, there are some risks that more or less exist in various stages, such as: political risk and force majeure risk [6].

1) political risk

Instability in the country, regime change and changes in the international situation will cause social unrest, the economy will be damaged and the staff will be injured. Public-private partnership of public rental housing BOT projects will be affected by it, and the projects may be terminated or even be recovered by the government. Some policies, laws and regulations change will also affect the project normal operation, because the application of BOT in the construction of public rental housing is only at the starting stage, it is not mature, and relevant policies, laws and regulations have yet to be perfect, if there is no related law to solve the problem of disputes, benefit distribution, the responsibility of the parties during construction and operation of the project, the project schedule will be affected, so that the project's overall revenue will be affected.

2) force majeure risk

The risk of force majeure refers to the risk that the project participants are unable to foresee and can not avoid and overcome causes damage and destruction to the project. The risks are divided into two categories of natural risk and social risk. Natural risks can be divided into natural disasters and weather risks. Disaster risk is generally fires, floods, earthquakes which can cause devastating damage to the implementation of public rental housing BOT project; risks of bad weather are generally storm, gale, heavy snow and so on, which have a slight impact on the project implementation^[7]. The social risks are caused by war, civil strife, strike etc., and they will also affect the normal implementation of the project.

4. Risk sharing

Risk management is the core of the active control, that is to say find out the risk factors and find the way to solve the problem, and then reduce or avoid the loss caused by the occurrence of risk events. Therefore, after the completion of the identification of risk factors in the last section, risk factors, the probability of occurrence of risk and the degree of impact should be analyzed, which prepare for the next step: risk assessment, determine whether risk is necessary to resolve by comparing the risk cost and risk investment return. For the risk factors that urgently need to resolve, they need to be resolved through consultation with related parties, and the risks will be shared to the most suitable party through the project franchise rights agreement and the relevant contracts signed by the interested parties. In the actual work, risk identification and risk sharing are the first important works to complete in the risk management, the following is the introduction of risk sharing of BOT public rental housing construction:

There are a lot of research methods of risk sharing of the BOT project, such as: case analysis method, statistical analysis method and the game model, moreover, the risk allocation proportion can be found out by a game model of the cooperation, which can make the government and item company cooperate with the highest efficiency and risk premium minimum.

For the principle of BOT risk sharing, the academic community has reached the following consensus:

- 1) the risk should be borne by the party with the lowest control ability or the lowest cost;
- 2) the risk taken should be matched with the proceeds;
- 3) the principle that the risk of the private sector should have the upper limit;

4) with the emergence of new risks and other unpredictable changes, risk sharing need to follow the principle of dynamic.

Based on the above risk sharing principle, the risk sharing of public rental housing BOT project can be divided into three stages: initial sharing stage, full sharing stage and tracking and re-sharing stage. Figure 1 is the flow chart of the risk sharing of the public housing BOT project.

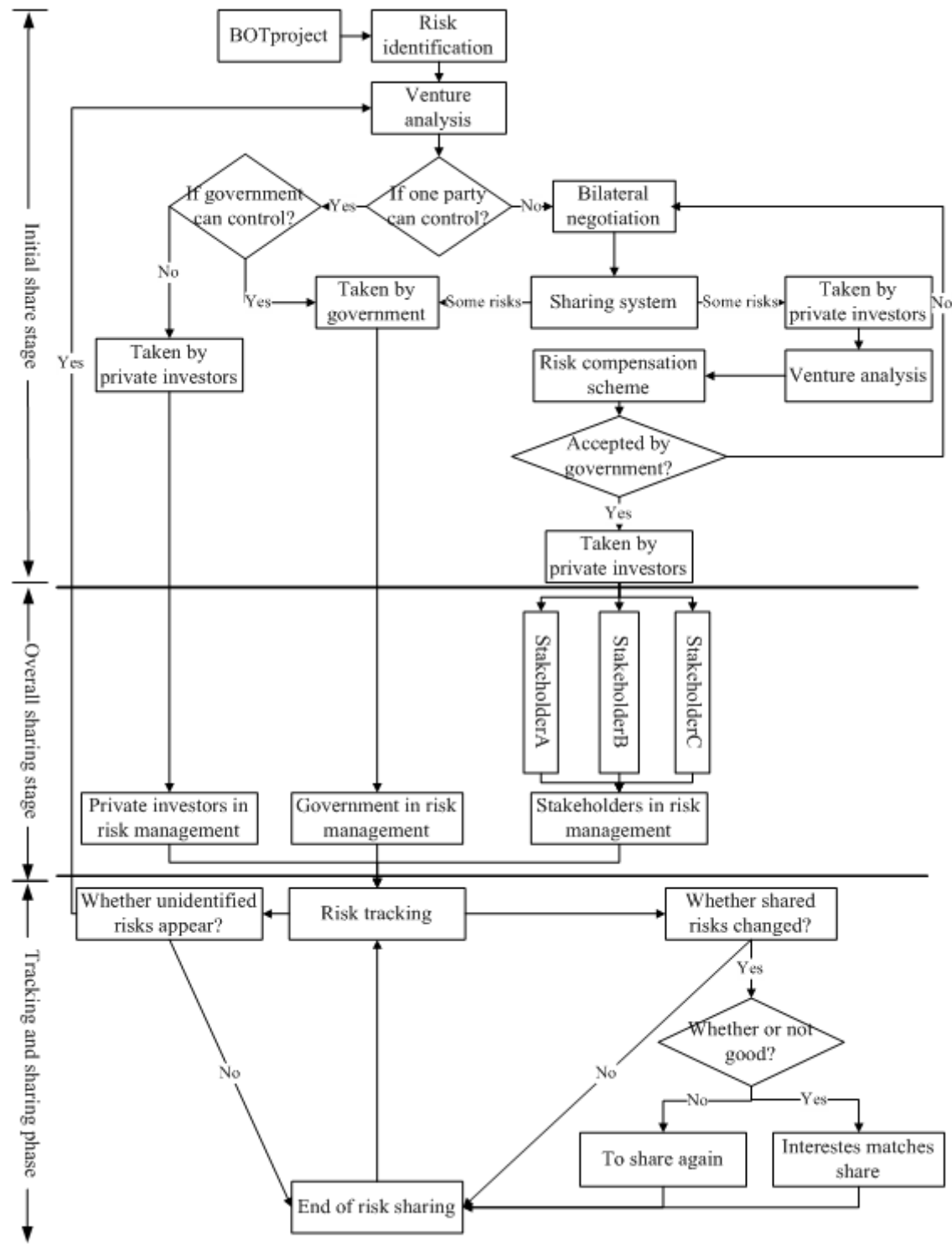


Fig.1 Flow chart of the risk sharing of the public housing BOT project

(1) initial stage of sharing.

The government and private investors should be firstly considered at the initial stage of BOT risk sharing. The risk identification and analysis of public rental of BOT project must firstly be considered at preliminary sharing stage, according to the principle of risk sharing and risk assessment, it can be

determined which risks are borne by one party and which risks need to be shared by the government and private investors after negotiation. Risks within the scope of control of both parties will be solved at this stage. If one party cannot adopt the method of risk retention, it will be negotiated by two parties to discuss the sharing ratio and the compensation required by the item company; risks outside the scope of the two sides will be left to the next phase to resolve.

(2) overall sharing phase.

There are a lot of subjects of risk sharing at this stage, mainly composed of stakeholders of public rental housing BOT project, such as: item company (private investors), lenders, equipment and material suppliers, builders, insurers, etc. At this stage, risks will be fully shared, after self evaluation of item company, he will negotiate with other stakeholders to get the proportion that both parties are satisfied by means of contract agreement, and the risks are shared to the parties who are able to control well. The risks at this stage are widely shared to the government departments, private investors and other stakeholders, so that the risk is fully shared.

(3) tracking and sharing phase.

The main task of this stage is that the the process of risk management must be tracked all the time during the the risk management period, unexpected changes can occur in project construction and operation period at any time, and it will be checked whether there are unrecognized risks appearing and the risks shared have changed through risk tracking, and then the unrecognized risks repeat the share of risk on the above two phases; risks that have changed need to determine whether they are towards the favorable direction, if it is favorable, the income distribution where distribution and benefits are equal will be made, On the contrary, risks will continue to be shared.

5. Conclusion

Risks in construction projects often exist, and application of BOT in public rental housing is a new project, because of the policy instability, the immaturity of the technology and the lack of experience, the risks are inevitable. This article analyzes from the various stages of the project construction, analyzing risk factors that may exist in the preparation stage, the construction stage, the stage of operation and transition phase, and then identify the main factors for analysis. After analysis of unique risk factors in each stage, then find out the common risk factors in various stages. In order to provide an important prerequisite for risk assessment, risk sharing and other risk management measures, and allocate the risk factors reasonably to the responsibility that is appropriate and capable to bear risks to ensure the smooth implementation of the project.

References

- [1] Zhu Q Q. Feasibility analysis of public rental housing in BOT model [D]. Xi'an: Chang'an University.2013.
- [2] Chen Y. Risk Management Research of BOT Project [D].Shandong: Shandong University.2008.
- [3] Wang Z K. Study on the Risk Management of BOT Project Financing [D].Xiamen: Xiamen University.2009
- [4] Yu Y. The risk management research of China's public housing projects in PPP financing model [D].Shandong: Shandong Jianzhu University.2014.
- [5] Huang K. Research on the Application of BOT to the Development of Public Rental Housing [D].Shandong: Shandong University.2012.
- [6] Gu L H. risk analysis of BOT construction model [J].China Electric Power Education, 2006, S2:84-85
- [7] Zhang G. Risk Management and Case Study on BOT Project in China [D].Chongqing: Chongqing University.2006.