

The Reason of High Maintenance Price of Public Facilities in Residential Areas -- Based on the Analysis of Information Economics

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Abstract: In recent years, the maintenance price of public facilities in residential areas is generally high, which threatens the safety of residential maintenance funds. Although the reasons for the high maintenance cost of public facilities in residential areas are various, the information asymmetry is the most important. On the one hand, the maintenance of public facilities in residential areas covers a wide range of fields, with strong professionalism and high complexity, forming information asymmetry in the professional knowledge of the owners and maintenance parties. On the other hand, the disposition of maintenance location, long maintenance time, difficulty in maintenance supervision, and the lack of enthusiasm of the owner for maintenance supervision have caused information asymmetry in the maintenance process. It is the asymmetry of information that has become the main reason for the maintenance party to falsely report, take the lead, over-maintenance, and ultimately abuse and encroach on maintenance funds. The empirical analysis of the public facilities maintenance data of residential areas in Nanjing found that the higher the information asymmetry, the higher the quotation of the maintenance party, indicating that information asymmetry is an important reason for the high maintenance cost.

1. Introduction

In order to protect the safety and quality of life of residents' houses, in the "Management Measures for Maintenance Facilities Funds for Shared Parts of Residential Buildings" implemented in 1998, special maintenance funds for residential buildings were specially set up for the maintenance and renewal of public facilities and shared parts. Since this part of the funds is specially used for maintenance, renewal and renovation after the warranty period of the shared parts and shared facilities and equipment, the importance is self-evident, and it is generally called "house pension". However, in recent years, many residential community owners have reported that there are abuses and encroachment of maintenance funds in the maintenance of public facilities in the community. The maintenance fund supervision department also feels that the use of maintenance funds to falsely report prices and excessive maintenance is quite common. This situation not only jeopardizes the "household pension", but also often causes the community owners to either blame the community owners committee and the property service company, or the maintenance fund supervision department "does not act", causing unnecessary social conflicts and disputes.

Then, why is there a false report price and excessive maintenance in the maintenance of public facilities in residential areas? Why do government regulators recognize that there are such conditions but do not take measures to eliminate them? The reasons may be multi-faceted. However, this study suggests that the information asymmetry in the maintenance of public facilities in residential communities may be one of the main reasons. Therefore, this study attempts to use the relevant theories of information economics to theoretically analyze the information asymmetry in the maintenance process of public facilities in residential areas and its impact on the maintenance price, and use the data of Nanjing to conduct empirical analysis. According to the research results, this study tries to put forward policy recommendations to avoid the false report price and over-maintenance problems in the maintenance process of public facilities in the community.

2. Literature review

The discussion of the reasons for the high cost of maintenance funds in the existing literature mainly focuses on the maintenance and construction units and relevant government departments. For the maintenance and construction unit, Zou Yiyuan [1] pointed out that because the maintenance project quotation is difficult to follow the standard pre-settlement system, it is difficult for the concealed project to supervise and view according to the drawings, and the variety of maintenance materials is inevitable to cut corners, shoddy and other reasons, maintenance engineering often faced with the threat of engineering calculations and the “moisture” of material prices, the project cost is difficult to control, and eventually the situation of high maintenance prices is formed. In response to relevant government departments, some scholars [2, 3] believe that due to the current lack of ownership rights awareness, responsibility awareness and autonomy of the owners in the use of maintenance funds, the general autonomy of the owners cannot be achieved, so the administrative guidance supervision has become an important driver of maintenance funds to ensure the safety of maintenance funds. Zhang Yuan [4] believes that from the perspective of actively exerting government functions, relevant government departments should conduct effective audits on the final accounts and quality of projects involved in the use of maintenance funds. However due to the lack of professional competence of street workers and the cumbersome daily affairs, supervision in the process of using maintenance funds can't be guaranteed. Wang Yali [5] further explored the internal reasons for the lack of government supervision of maintenance funds, pointing out that the lack of utilization and supervision of the housing maintenance funds does not affect the government's interests, and because the government administers part of the maintenance funds, both the athletes and the referees So, there may even be room for rent-seeking and corruption.

In addition, the property rights of maintenance funds are owned by the owners. Therefore, Zhang Yongxing [6] pointed out that the supervision of the use of existing maintenance funds is mainly carried out passively by the competent government departments, ignoring the initiative of the owners' supervision and failing to play the role of the owners to supervise the maintenance funds. Chen Shuyun [7] partly attributed the misuse of maintenance funds to the fact that the developer didn't provide a long-term repair plan as a guide for residential maintenance, further complicating the maintenance of funds due to the lack of consideration of the full life cycle of the home during the residential maintenance process.

In general, the existing literature mostly analyzes the use of maintenance funds based on reality. The studies to discuss the high maintenance costs in the process of using maintenance funds using the theoretical analysis, especially the theory of information economics, are few. Only some scholars try to use the theory of information asymmetry to analyze engineering projects like residential maintenance, such as information construction and construction engineering. Feng Jingchun [8] analyzed the relationship between the owners and constructors in the project management information construction, believing that there are many information asymmetries in the principal-agent relationship. The owner may face the service quality degradation due to the hidden self-interested behavior of the constructions. Zheng Haixin [9] and Wang Qinghui [10] believe that in the bid of construction projects, the information advantage of the contractor causes the risk of inconsistency between plans and reality in the field of construction materials, construction personnel, construction methods and techniques, quality control procedures, etc. The studies above all point out that information asymmetry is an important reason for the “virtual high” of engineering project prices.

Based on the existing research results, this paper attempts to analyze from the perspective of information economics, in order to get the deep and fundamental reasons for the high maintenance price of residential buildings, and enrich the research results of information economics in this respect.

3. Theoretical analysis

3.1 Relevant theory of information economics

In the principal-agent relationship with information asymmetry, the objective function of the principal and the agent is not always consistent. In order to maximize the utility function of the rational agent, the rational agent often uses his own information superiority to adopt the “hidden action” that is difficult to be observed by the client, deviates from the action requirement for the benefit of the principal, and hinders the realization of the maximum benefit of the principal. Information asymmetry is one of the root causes of agency problems. To some extent, the degree of information asymmetry determines the severity of moral hazard problems. With the lengthening of the principal-agent chain, it is more difficult for the principal to obtain information, and the difficulty of the supervision of the agent by the principal is intensified. The opportunity for the agent to generate moral hazard also increases.

3.2 Reasons for high maintenance prices of public facilities in residential areas

There are mainly two kinds of information asymmetry in the maintenance of public facilities in residential areas. The first is that the maintenance unit and the community owner are asymmetrical in terms of expertise. Since most of the owners' groups lack professional knowledge and skills for public space maintenance in residential areas, it is obviously unrealistic to require owners to learn such knowledge. Therefore, this information asymmetry is often difficult to eliminate, which is also an important reason for introducing professional third parties in the future. The second is the information asymmetry caused by the regulatory difficulties in the maintenance process. The difficulty of supervision comes from two aspects. One aspect is that the maintenance project itself is widely distributed and has a long time. If the dispatcher is followed by supervision, the cost is too high. On the other hand, since the maintenance process itself is a public matter, the owner will have a “free rider”. "I don't want to be proactive to supervise." In addition, in the maintenance of public facilities in residential areas, due to the multiple entities involved in the owners, applicants, maintenance units, supervision units, and price-evaluating units, there has been a long chain of principal-agents (as shown in the following figure). The asymmetric information superposition between the subjects further increases this information asymmetry.

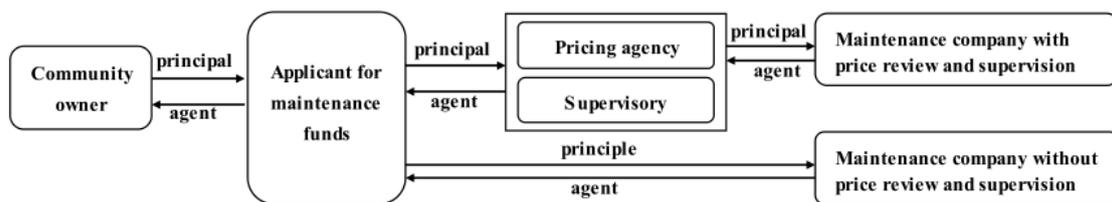


Figure 1. Principal-agent relationship in the use of maintenance funds

In the case of such a serious information asymmetry between the principal and the agent due to subjective and objective factors, the agent is likely to take “hidden action” by falsely reporting the workload or unit price of the material, or reduce the material. The two levels of agents even colluded with profit, eventually leading to high maintenance prices of public facilities in residential areas.

4. Empirical analysis

4.1 Ideas and steps

Since there is no mature indicator of information asymmetry in the process of repairing public facilities in the community, considering the availability of data, this paper qualitatively distinguishes the degree of information asymmetry according to the type of project. At present, the daily use of special maintenance funds for residential buildings in Nanjing involves elevators, fire protection, waterproofing, water supply, and weak electricity. As the applicants for maintenance funds, it is impossible to analyze the causes, construction plans, and required materials for each type of project.

Of course, applicants also can't scientifically and reasonably analyze the project cost. Compared with the maintenance of the waterproof layer of the external wall of the house, the maintenance knowledge and skills required for the maintenance of public equipment such as elevators and fire-fighting are more complicated and unfamiliar to the applicant. The information asymmetry between the applicant and the maintenance enterprise is larger. So, elevator, fire and waterproof layer maintenance projects can be used to represent different levels of information asymmetry.

The rate of reduction refers to the ratio of the unit price of materials and labor in the maintenance budget to the market price. The higher the rate of reduction means the greater the deviation from the market price, and the more likely the maintenance unit is to seek personal gain from it. Since each of the reviewed items has a testable rate of reduction, this paper selects the rate of reduction as an indicator of the maintenance price.

In this paper, spss22.0 is used to conduct an independent sample T-test on the reduction rate of elevator maintenance projects and waterproof layer maintenance projects. If the T-test passes, it indicates that the two samples have significant differences. And by comparing the mean values of the two, it is further explained that the higher the degree of information asymmetry, the higher the maintenance price.

4.2 Data Sources

The data in this article comes from the use of property maintenance funds from April to July 2019, which was publicized by the Nanjing Municipal Housing Security and Real Estate Bureau. In order to avoid repeated investigations, a total of 185 elevators, fire-fighting and waterproof layer maintenance records of the first publicity and one-time publicity were selected from 858 records. The name of the project under review and the rate of reduction were collected by reading the price review report.

4.3 Outcome of Practice

The reduction rate of elevator maintenance and waterproof layer maintenance is shown in the following table.

Table.1. Maintenance project reduction rate statistics

Reduction rate (%) Maintenance project	[0,6)	[6,12)	Above 12	total
Elevator repair	16	41	16	75
Waterproof layer repair	79	23	6	110

It can be found from Table 1 that the elevator maintenance projects are more distributed in the high level, while the waterproof layer maintenance projects are mostly in the low level, less than 6%. Further use the statistical software spss22.0 to investigate whether there is a significant difference in reduction rate between elevator and waterproof layer maintenance projects. The results are shown in the following table.

Table.2. Independent sample T-test for reduction rate

Mean of reduction rate		T	p
Waterproof layer repair(N=109) 5.47±3.96	Elevator repair(N=76) 9.43±7.28	-4.752	0.000

Table 2 reports the results of the independent sample T-test. The p-values are all less than 0.05, indicating that at the significance level of 0.05, the reduction rate of elevator maintenance is significantly higher than the reduction rate of the outer wall waterproof layer maintenance, and the maintenance of the enterprise in the warehouse. Reduction rate is significantly lower than that outside the library. The former indicates that as the difficulty of knowledge and skills required for maintenance increases, the maintenance cost premium increases. To some extent, the results of the

previous analysis are verified, that is, the information asymmetry between the principal and the agent is an important reason for the maintenance price premium.

5. Conclusions and policy recommendations

Through the above research, it is not difficult to conclude that information asymmetry has important explanatory significance for the high maintenance price of public facilities in residential areas. As the degree of information asymmetry in the maintenance project deepens, the price of repairs also increases. At present, the theory of information economics often narrows the degree of information asymmetry through the design of incentive mechanism and supervision mechanism, thus avoiding a series of agency problems caused by information asymmetry. In order to reduce the adverse effects of information asymmetry on the maintenance of public facilities in the community and promote the safe use of residential special maintenance funds, this paper believes that the following two aspects can be improved to reduce the two kinds of information asymmetry mentioned above: First, the government should hire professional third parties to reduce the information asymmetry caused by professional knowledge. Second, the government should standardize and format the operation process and application materials, establish a standardized online information disclosure platform, and narrow the information asymmetry caused by the inability to conduct on-site supervision. By reducing the degree of information asymmetry, it is expected to break the situation of the high maintenance cost of public facilities in residential areas.

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