A SUSTAINABLE FRAMEWORK OF BUILDING QUALITY ASSESSMENT FOR ACHIEVING A SUSTAINABLE URBAN ENVIRONMENT

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Keywords: information asymmetry, assessment tools, building quality, institutions

Summary

Information asymmetry in building quality has resulted in under-investment in building maintenance, which has a consequential negative impact on sustainable urban development. Devising and publicizing a building classification system can reveal “hidden” information to the public and lessen the problem of information asymmetry. However, if such a system is purely voluntary, property owners will normally adopt a wait-and-see attitude in view of the high cost of assessment and uncertainty of realizing any benefits. This will hamper the effectiveness of a building classification system.

This paper explores the possibility of “jump-starting” a voluntary system by synthesizing the resources of various stakeholders. First, universities can make use of their research capacity to develop an assessment scheme. Second, the government can make use of the building information it possesses to provide data for assessments. Third, private or community donations can be used as initial funding to operate the classification system. Once the system is jump-started, with its benefits proven, it will become self sustainable by a user pays mechanism. It is believed that the disclosure of more information on the quality of buildings on the market will lead to a solution that ensures a net welfare gain, and thus a more sustainable environment for society.

1. Introduction

Sustainable urban development should promote buildings that are healthy and safe, among other factors. However, the mass community outbreak of Severe Acute Respiratory Syndrome (SARS) in 2003, especially in densely populated cities like Hong Kong, has aroused public concern over building health and environmental hygiene. Worse still, this rising concern has been coupled with a prolonged neglect of fire risk and structural safety by owners living in multi-ownership buildings. Although the inadequacy of the current level of building management and maintenance is usually known to building owners, it may not be enough to compel them to improve on it if it cannot be easily revealed to other parties, such as prospective buyers, banks, insurance companies, and the government. This is a problem of information asymmetry in building quality, which will result in under-investment in building maintenance, and hence a consequential negative impact on sustainable urban development. To solve this problem, more information on the 'qualities' of buildings should be revealed to the general public. One possibility is to devise and publicize a building classification system that will not only give positive recognition and encouragement to properly-managed buildings, but also enable the screening of problematic buildings from the whole pool of buildings.

This paper has two objectives. One is to shape the building neglect problem in the context of information asymmetry, which is an idea developed by the Nobel laureate George Akerlof. His idea signifies the theoretical development of two broad types of market adjustment mechanisms, namely signaling and screening, to tackle asymmetric information. Based on the signaling concept, the other objective of this paper is to explore the possibility of "jump-starting" a voluntary building system by proposing a trilateral relationship among the government, the private sector, and tertiary institutions. Once the system is jump started, it will be self-sustainable with no further public funding required. This proposal is a win-win-win solution for the government, tertiary institutions, and building stakeholders such as developers, owners, banks, and insurance companies.

2. Informational Asymmetries in Building Quality

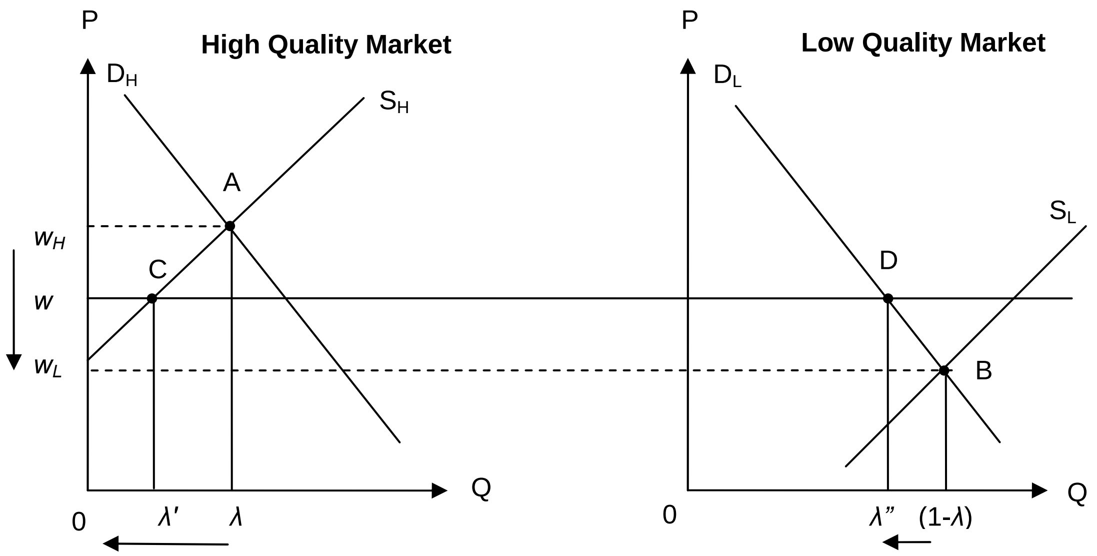
In an ideal mode of trade, the opposite parties (i.e., the sellers and buyers) are assumed to have equal information about the goods. In other words, information on goods is symmetric between both parties, be they equally informed or equally uninformed. However, there is seldom a market that allows such an ideal mode of trade. A varying degree of informational asymmetries in the market often exists. For example, sellers normally know more about the goods they sell than buyers. In this light, Akerlof (1970) studied the used car market in Germany to determine the relationship between informational asymmetries and the collapse of the second-hand market. He discovered the reason why people preferred to purchase new cars rather than used cars was their suspicion of the motives of used car sellers. In his paper, Akerlof not only explained how private information may lead to the malfunctioning of markets, but also points to the frequency with which such informational asymmetries occur and their far-reaching consequences.

The idea of asymmetric information proposed by Akerlof is potentially an issue in any market where the quality of goods is difficult to discern by anything other than close inspection. The property market is not an exception, and his idea is equally applicable here. Bröchner (2002) stated that buyers or tenants of properties are either not sufficiently supplied with information, or unable to interpret the information received due to a lack of experience with buildings. Apart from observable attributes, such as the locality and appearance of each building, there are certain characteristics that are not apparent, and such information is not readily available to the general public. These characteristics, which are, on many occasions, directly related to the standard of comfort in our living environment, may only be known to owners who have lived there for a long time or experts who have conducted a detail investigation of that unit/building. Health and safety conditions are typical examples. If no signalling or screening mechanism is in place to reveal the "hidden" quality of these characteristics, a collapse of the second-hand property market will result. This can be illustrated analytically by using the property market as a simple example.

Let's start with a case of symmetric information. Assume that apartment units are sold in indivisible units and are available in two qualities, high and low, in fixed shares λ and $1\text{-}\lambda$. All buyers have the same valuation of the two qualities so that in the low quality market, the market equilibrium will be at Point B in Figure 1 ($P = w_L$, $Q = 1\text{-}\lambda$), while in the high quality market, it is at Point A ($P = w_H$, $Q = \lambda$; where $w_H > w_L$). Each seller knows the quality of the units he sells, and values low quality units at v_L (where $v_L < w_L$) dollars and high quality units at v_H (where $v_H < w_H$) dollars. If there are separate markets for low and high quality units, every price between v_L and w_L would induce beneficial transactions for both parties in the market of low quality units, as would every price between v_H and w_H in the market of high quality units. This would result in a socially efficient outcome, with all gains from the transaction being realized.

However, in the case of asymmetric information, since buyers usually cannot observe a property's quality, unscrupulous sellers of low quality units would often choose to trade on the high quality market. In theory, the markets would merge into a single market with the same price for all properties, be they low or high quality. Suppose this occurs, and the sellers' valuation of high quality units exceeds the buyers' average valuation. Mathematically, this case is represented by the inequality $v_H > w$, where $w = \lambda w_H + (1\text{-}\lambda)w_L$. If transactions take place under such circumstances, rational buyers' expectations of quality would be precisely w. In other words, the market price could not exceed w. Some of the buyers of high quality properties would thus exit the market (Point A shifts to Point C; and the quantity of high quality goods transacted drops from λ to λ'). The cycle continues, and the average quality of properties will drop further. Eventually, all the buyers of high quality properties will leave the market, thereby causing the high quality market to collapse. This leaves only low quality properties (i.e., the lemons) in the market.

The above example shows that asymmetric information would lead to adverse selection. If buyers cannot distinguish quality until after a purchase has been made, there will be no incentive for sellers to provide good quality products, and the average quality of properties on the market will decline. Akerlof (1970) exemplified the informational advantage of sellers of used cars over buyers of used cars, which would force car buyers into the new car market and therefore exacerbate business-cycle fluctuations. The same is true for the property market. When buyers have imperfect information, sellers of low quality properties may crowd out sellers of high quality properties from the market, hindering mutually advantageous transactions. Theoretically, as this crowding out process continues, low quality properties would be further replaced by properties of even lower quality, and this would finally make the market collapse.



Key
D_H: Demand curve of high quality goods
D_L: Demand curve of low quality goods
S_H: Supply curve of high quality goods
S_L: Supply curve of low quality goods

Figure 1 Graphic illustration of how a high quality market collapses

3. The Building Classification System as a Signaling Mechanism

In reality, we seldom observe the complete collapse of a used goods market. Even used car markets exist. This is because market participants would not remain idle in the crowding out process, but will try to tackle the information asymmetry problem. Akerlof (1976) used illustrative examples to show how certain variables, called 'indicators', provide important efficiency-enhancing economic information. For example, guarantees were provided by some used car dealers. Spence (1974) also demonstrated that informed economic agents in such markets may have incentives to take observable and costly actions to credibly signal their private information to uninformed agents, so as to improve their market outcome. This important work demonstrates how agents in a market can use signaling to counteract the effects of adverse selection. In this context, signaling refers to observable actions taken by economic agents (sellers of high quality goods) to convince the opposite party of the value or quality of their products. Such actions must be costly enough so that they cannot be easily replicated by sellers of low quality goods (e.g. advertisements).

To tackle asymmetric information in the property market, it is necessary to have a mechanism for buyers to distinguish high quality properties from low quality ones. In this regard, Lützkendorf and Speer (2005) pointed out that informational asymmetries in the property market resulted from the failure of the supply side to meet the building information needs of the demand side in regards to the quality, performance, and service provided by a building. The problem was founded on the basis that no standardized form or structure has been agreed upon to show how building information can be structured and supplied to property buyers and tenants. To reduce the informational asymmetries within property markets, Lützkendorf and Speer suggested an information medium that could specify any required relevant building information. Therefore, a Building Information System (BIS) was proposed. The aim of the BIS is to create an all-embracing data pool of building information, from which certain information can be easily extracted, depending on the requirements of the different stakeholders for such information. Under the BIS, developers are required to submit information on their buildings for the construction of a database of various aspects of new projects. However, the BIS is tailored for new development, and it is difficult, if not impossible, to implement such a system for existing buildings, for which the problem of information asymmetry is the most severe. In fact, there have already been a number of well-established building assessment tools available for new or single-ownership buildings (e.g. BREEAM, GBTool, and LEED). A comprehensive review of these tools was done by Larsson (2004), and will not be repeated here.

In view of the pressing need to reveal the quality of existing multi-ownership buildings, Chau, et al. (2004) advocated the development of a building classification system as a signaling mechanism for the public. Following this line of thought, Ho, et al. (2004) devised a simple assessment scheme called the Building Health and Hygiene Index (BHHI) to evaluate the health performance of multi-storey residential buildings in Hong Kong. The BHHI is essentially an index that classifies buildings into different grades (A, B, C, and U) based on an individual building's level of achievement in safeguarding its health and environmental hygiene. In devising the assessment framework, Ho, et al. stressed the importance of generality, objectivity, practicability, and relevance to health so that mass assessments of residential buildings can be made with limited resources within a relatively short period of time. Compilation of the BHHI involved obtaining and analyzing observable characteristics of buildings from approved plans, site surveys, and other documents from various government departments. More recently, based on the experience of their BHHI study, Ho and Yau (2005) took one step further and developed another index named the Building Safety and Conditions Index (BSCI) for evaluating a building's safety performance. It is expected that all these indices are good examples of how a building classification system can be used as a signaling mechanism to tackle information asymmetry in the property market. More information on the quality of the living environment should benefit the community and assist various government bodies, developers, building designers, building constructors, and facility and housing managers in building a more sustainable city.

4. A Collaborative Approach to Implementation

The previous section outlined two types of building classification system, one for new or single-ownership buildings (mainly commercial buildings) and the other for existing multi-ownership buildings (mainly residential buildings). Since the latter suffers more from information asymmetry, it, in principle, is better suited for a signaling mechanism. However, most of the voluntary assessment schemes today mainly cater to developers and sole owners in the former market, as they are willing to pay for building assessments and for advertising and marketing their properties. Fragmented, and usually less financially able, owners in the latter market have been largely ignored. It is likely that any voluntary assessment scheme, despite its positive impact on sustainable urban development and potential total welfare gain, will not take place due to the high initial cost. Therefore, it is necessary to devise an effective way to implement a classification system for existing multiple ownership buildings.

Lützkendorf and Speer (2005) remained silent on how to implement their signaling mechanism. Certainly there will be problems with implementing a voluntary system, as owners of low quality buildings will not be willing to pay the cost of an inspection. Politically, it would be difficult to make this mandatory (although a mandatory housing inspection system for property transactions has recently come into place in the UK). Assuming a mandatory system is not feasible, hence making it voluntary, it is very likely that only a small (and biased) number of higher quality buildings will be assessed, which is of very limited value to the government and the community, as the root of the problems would remain unresolved. It must be emphasized that for an exercise like this, the information in the forest is more important than that in the trees. In sum, the idea of providing information on building quality (especially for those factors not easily observed) is a good one; the problem is its implementation.

The implementation of a building classification scheme is not without cost; the salary of assessors and costs of collecting data from various government bodies, etc. can be very substantial. The difficulty of voluntary participation is that only the good buildings will participate, and this is further conditioned on the possibility of a perceived tangible benefit to their owners, particularly an increase in the capital value of their properties after a positive assessment. Such an impact on property prices cannot be achieved without a critical mass of participants participating in the classification/assessment so that the market can factor the assessment results into property prices. It is impossible to achieve this critical mass without a large number of initial volunteers. The dilemma is that due to the high cost of assessment and the uncertainty of its popularity, everybody will adopt a wait and see attitude (including owners of high quality/performance buildings).

One way to jumpstart the process is to undertake a quick assessment of a large number of buildings within a relatively short period of time using a simplified framework (e.g. the BHHI and BSCI). This has to be done without a commitment of resources from building owners initially, and should be undertaken by a third party, independent, non-profit making organization that will construct and publicize a building performance database. Once the information is released, it will raise public awareness, as the results of the assessment may have an impact on property prices. Building owners who disagree with the assessment or who have invested much to improve the performance of their buildings may hire consultants to conduct a more detailed survey at their own expense. The building performance database will be updated with the new assessments submitted by building owners.

To make this jumpstart arrangement possible, the resources of various stakeholders have to be synthesized. First, the government can make use of the building information it possesses to provide data for assessments. In many places, the government keeps records of building information (e.g. building plans), which will readily form part of the input into the assessment system. Therefore, the success of this arrangement can be greatly enhanced with the assistance of relevant government departments, which can provide information for assessment free of charge and participate in approving assessments and devising detailed assessment schemes. In return, the government would benefit by having helped improve the living environment.

Second, universities can make use of their research capacity to develop an assessment scheme. We believe that universities can play a key role in solving the implementation problem and, in collaboration with other professional bodies, setting up a non-profit-making independent research institute to jumpstart the process by undertaking an initial assessment. The assessment will also foster deeper collaboration between tertiary institutions, professional bodies, and the government, and contribute to a better research profile for the participating universities. The data obtained from assessments can also be used by universities to carry out other research projects.

Third, government or community donations can be used as initial funding to operate the classification system. Its funding can come from various sources, including participating organizations, research grants, and donations. It must be emphasized this is not an applied research project with very specific aim(s) commissioned by one or more organizations, but an independent project with support from, hopefully, a large number of donors who will not be involved in the research project.

5. Conclusion

Obviously, the community can benefit from the above proposal, as the problem of asymmetric information is lessened at low cost to stakeholders. On one hand, owners need not pay for the assessment (at least not for the initial assessment). On the other hand, the government need not commit funds for the initial assessment except for the provision of information required for the assessment. This is timely in the sense that the government would unlikely commit funds to such a large project during its financial stringency. Finally, besides serving the community, participating tertiary institutions can have access to a vast volume of data that is very valuable for many research projects, since it contributes to knowledge and has practical policy implications. Other expected benefits include improved liquidity in the second hand property market, as more information is available to potential buyers, banks, and insurance companies.

Once more information is available on the market, there is likely to be a net welfare increase, although the gap in property values will widen. That is, the market value of buildings with a lower quality rating (not easily observable before the assessment, but the information will become public in the form of grades or index values after assessment) will decrease, while those of a higher quality will increase. However, the total value of all buildings will increase (total welfare gain). The assessment scheme can also motivate developers and building designers to develop higher quality buildings and assist in the development and promotion of the building care culture. Consequentially, this proposal entails a win-win-win solution for the government, tertiary institutions, and building stakeholders such as developers, owners, banks, and insurance companies.

Acknowledgements

We gratefully acknowledge the financial support provided by the Research Grant Council of the Hong Kong Special Administrative Region (HKU 7107/04E) and the Small Project Funding of The University of Hong Kong.

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