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ABSTRACT

There is a series of different types of risk on the housing market and related industries. The six papers in this doctoral dissertation are about a number of the many dimensions of risk management on the housing market. The main message of this thesis is that it should be possible for different actors in the housing market to improve risk management. Indeed, the last years' financial turmoil has revealed that it should not only be possible, but also necessary, to improve risk management at all levels of the economy: at household, corporate, regional, national and international level. Although the complexity of the environment in which we live and act makes it very difficult to predict and quantify risk, the development of risk management techniques should make it possible to better indentify, and reduce risk.

The first paper provides a systematic overview of a wide selection of methods or strategies used in different countries to expand but also to maintain home ownership among low income households. The second paper further discusses mortgage and home equity insurance instruments discussed in the first paper. This paper also discusses how a rental insurance policy, as an alternative to traditional rent regulation, may be constructed. Paper 3 develops a formula that might be used in order to value the rental insurance option discussed in paper 2. The fourth paper focuses on the housing building sector by discussing potential benefits of strategic alliances that the different actors in the housing construction market may establish in order to pool resources and manage development risks. The challenge of constructing reliable home price indexes has attracted scholars for many years. Paper 5 develops monthly quality-adjusted price indexes for condominiums (housing cooperative apartments) based on a unique dataset covering sales in the whole of Stockholm municipality from January 2005 to June 2009. Finally paper 6 pays attention to the large increase in housing cooperative conversions sine the 1990s, by deriving a closed-form valuation formula that might be used to value the embedded option an owner of a multi-family rental property has to sell it to a housing cooperative.

Key words: housing risks, risk management, strategic alliances, housing construction, low-income housing, real options, tenure choice, rent regulation, housing cooperative conversion

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Han-Suck Song

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DISSERTATION SUMMARY

1. Introduction

There is a series of different types of risk on the housing market and related industries. The six papers in this doctoral dissertation are about a number of the many dimensions of risk management on the housing market. The main message of this dissertation is that it should be possible to improve risk management. Indeed, the last years' financial turmoil has revealed that it should not only be possible, but also necessary, to improve risk management at all levels of the economy: at household, corporate, regional, national and international level. Although the complexity of the environment in which we live and act makes it very difficult to predict and quantify risk, the development of risk management techniques should make it possible to better identify and reduce risk.

Several housing studies show that homeownership is a preferred mode of tenure for a number of reasons. The proposed advantages of homeownership over renting are many: homeownership is supposed to give households more basic security, freedom (e.g. to adjust their homes to their own tastes), self-esteem and financial advantage (e.g. benefits from sound maintenance and renovation decisions), as well as having a positive effect on both the individual and society as a whole (see Elsinga and Hoestra, 2005, and references therein). Elsinga and Hoestra (2005) find indications that homeowners in seven out of eight European countries are more satisfied with their housing situation than tenants. Furthermore, a large body of literature has demonstrated that families express greater desires for homeownership than singles (see Lauster and Fransson, 2006, and references therein; see also Dietz and Haurin, 2003, for a critical overview of social science literature describing the impact of homeownership).

However, homeowners face a number of financial risks, notably risks related to volatile home prices and mortgage interest rates, but also other risks such as maintenance and renovation risks. Home equity constitutes a major asset of household wealth. The unbalanced portfolio makes households' wealth holdings and risk levels of their portfolios very sensitive to price changes in their homes (see e.g. Englund et. al., 2002). Furthermore, (expectations of) home price depreciation might also affect consumption of other goods, since households can take advantage of (expectations of) home appreciation to take out a second mortgage in order to increase current consumption of other goods (Bourassa et. al., 2009 and references therein).

Declining home prices might also result in outstanding loan balances that exceed the current market value of homes (i.e. negative equity), increasing the risk of mortgage default (cf. Foote et. al., 2008). In other words, price risk and mortgage risk may be closely interrelated. Yet another common reason for mortgage default is homeowners' failure to meet instalment payments of interest and principal, which might result in foreclosure. Such mortgage defaults

might be caused by sharply unexpected increases in interest rates, stricter amortization requirements, and/or declining household labour incomes.

The large use of adjustable rate mortgages, high loan-to-value ratios, unbalanced household asset portfolios, in combination with complex relationships between the world-wide financial markets and the real economy, should increase the need for effective risk management of risks related to home ownership (cf. World Economic Forum, 2008).

In this dissertation, we discuss various risk management techniques that might increase homeowners' possibilities to manage different types of economic risks related to home ownership. In paper 1 and 2, we discuss possible solutions for households to transfer, or in other ways manage price risks. We bring up possible solutions such as home equity insurances against declining home prices, as well as how homeowners might prevent the severity of price depreciations on their wealth by selling a share of the home to institutional investors. Options and futures markets based on housing indexes might increase homeowners' possibility to achieve more efficient asset portfolios, as well as to enhance their opportunities to manage price risks on housing markets in general. The integrity of markets for home price index derivatives depends on reliable indexes. However, due to a number of reasons, the construction of indexes that accurately can measure the evolution of home prices is afflicted with different types of challenges and difficulties.

In order to mitigate the risk that households, as well as other actors, might make economic decisions based on information that gives a false picture of the housing market, researchers have for many years discussed different ways to improve home price indexes. In paper 5, we contribute to this literature by proposing better ways to construct price indexes for cooperative apartments.

Different risks related to mortgages are also of great importance. We therefore discuss various insurance alternatives that might prevent failures to meet mortgage payments (paper 2), but also different ways to increase low income households' possibility to accumulate money for down payment (paper 1). Indeed, for the purpose of mitigating low-income households' risk of being excluded from desired homeownership, we discuss in paper 1 different policies and instruments that might increase the possibility for such households to enter ownership more smoothly (though having in mind recent years sub-prime market crisis). A number of the discussed policies are similar to those concerning price and mortgage risks mentioned above.

Although there is evidence that most households prefer to own their homes, many households still prefer to rent their homes, or they may want to buy homes but are excluded from home ownership due to financial constraints. One purpose of different rent regulation policies is to protect sitting tenants against (major) rent increases, either related to increased demand or to the landlords' stronger bargaining position (see Lind, 2001 and references therein). However rent regulations might cause inefficiencies and disadvantages such as queues, black markets and an inadequate supply of rental housing. Therefore it is interesting to discuss more market-based alternatives to rent regulations. Consequently, in paper 3, we analyze option-based residential rent insurance contracts as an alternative to rent regulations. We also shortly

discuss rent-to-buy solutions (paper 1), which might be attractive to potential homebuyers that for various reasons want to postpone a home purchase. This is also an example of a (real) option approach to manage risks related to the rent or buy decision.

We also discuss risk from an investor or landlord perspective. In Sweden there is an ongoing debate about the advantages and disadvantages for tenants to purchase their currently rented homes through a condominium conversion process. Before deciding whether to purchase a condominium or to continue renting, many households consider risks related to volatile prices and mortgage payments. From a landlord's or property investor's perspective, the opportunity to sell the property to the tenants, constitute a strategic option, which typically should have a positive value when rents (due to regulations) are significantly lower than the market prices of condominiums. Using a real options approach in paper 6, we seek a formula that can be used to value income-producing rental properties that explicitly takes into account the value of the landlord's option to sell the rental property to the tenants.

How to manage some risks related to development of new homes is another area that we have chosen to study. Developers must take into account a large number of more or less interrelated risks. For instance, local market demand and supply as well as information and knowledge of local market conditions, land acquisition, planning approvals, financing, and construction (duration, cost and quality), constitute important sources of project specific risks (see e.g. Flanagan and Norman, 1993). Risks related to industry structure and above all competition in the house building industry constitute yet other sources of risks that affect the competitive advantage of not only developers and other industry actors, but also cities and whole regions. In paper 4, we focus on how different types of strategic alliances between developers and a large number of private and public actors involved in development projects might be structured in order to both reduce the different types of development risks that individual actors face, and to enhance the possibilities for individual actors to gain competitive advantage. For instance, joint ventures might be important to both share project risks, and to decrease the total investments a single developer has to make, but also as a mean to attack industry leaders (*cf.* Kogut, 1991; Porter 1985).

2. Research method

Given the very complex nature of risk management in general, and real estate risk management in particular, it may be fruitful to study these topics from different angles. In their discussion of rigorous research, based on the research philosophy espoused by James A. Graaskamp, Clapp and Myers (2000) state that the ultimate question for real estate academics is, "How should we act as scholars in a professional field?" (p. 356). In this context, they discuss the meaning of "rigorous research", contrasting rigor defined as *precision*, with a broader definition of rigor that includes *thoroughness*.

Clapp and Myers (2000) interpret rigorous research, when defined as precision, as:

“deductive, strictly bound by rules of a paradigm, often mathematical, and precise” (p. 356).

They characterize, however, rigorous research when defined as thoroughness, as:

“extensive problem analysis and literature review; careful evaluation of assumptions, including simplifying assumptions; alternative (inclusive) methods for problem solving; and/or multiple methods of measurement with possible inclusion of survey research approaches” (p. 361).

The appealing conclusion Clapp and Myers (2000) reach in their discussion, is that the two approaches to rigorous research should complement each other because

“research takes place on a continuum from pure theory to applied problem solving [...]. An important implication of this view is that those doing pure theory, and those working in the middle to bridge from theory to applications, should be fully aware of the applied end of the spectrum: these researchers would view their work as contributing indirectly to better problem solving. Likewise, those on the applied end would integrate some of the best theoretical and empirical tools into their analysis. Thus, problem solving and theory development would become complementary, cooperative efforts rather than being isolated from each other. [...] The complexities of modern economics require attention to applied problem solving and diverse research methodology” (pp. 361-362).

This approach to research indeed resembles the spirit of the strategic alliance paper (paper 4). Following this research spirit, I have together with my co-authors, studied and looked at different problems applying different research methods. In paper 1, 2 and 4, we apply an institutional approach, in which we undertake extensive literature reviews, in order to describe and reason about how to solve different types of housing problems. In paper 5, we collect data and use econometrics in order to improve home price index construction. In paper 3 and 6, we apply mathematical finance in order to value different types of embedded options. Naturally, I still have very much to learn about both understanding the meaning of rigorous research, as well as knowing how to do rigorous research. Therefore, I welcome writing more papers together with research colleagues, in order to pool and share know-how, in line with the arguments in the paper about strategic alliances.

3. Overview of papers

Paper 1: Policies to increase access to home ownership for low-income households

The first paper provides a systematic overview of a wide selection of methods or strategies used in different countries to expand but also to maintain home ownership among low income households. The strategies are divided into the four distinct time periods of a typical ‘housing career’: Down payment accumulation stage, transaction stage, ownership stage and selling stage. This article shows that there exist a large number of instruments that can be introduced if there is an interest in increasing access to home ownership for low-income households. One of the main messages delivered in this paper is that it is important to implement a set of measures that not only reduces the barriers to enter home-ownership, but also helps low-income households to handle the economic risks that home-ownership implies, in order for increased home-ownership to be sustainable. The risk mitigating insurance policies discussed in section 4 and 5 in this paper (i.e. mortgage and home equity insurance policies) might therefore be an important part of a package of measures to increase home ownership.

Moreover, considering the weak financial situation of most governments, direct subsidies and grants are probably not very interesting from a government perspective. Trends in housing policy also show that governments are relying more on markets to allocate living space among households. Policies that help the market to work better might therefore be more interesting, e.g. focusing on the households’ ability to signal their characteristics and strengthening various insurance markets so that they become open to more households at a reasonable price. The government would work more as a “facilitator” than as an implementer.

(This article has been accepted for publication in *Housing Theory and Society*.)

Paper 2: Mortgage and home equity insurances for home owners and rent insurance for tenants

Structural changes on the labour market (e.g. the growth of more temporarily forms of employment, self-employment and low paid work), an increasing number of relationships breakdowns, and deterioration of social security benefits are all examples of threats against sustainable ownership. Moreover, the sharp increase in real house prices the last eight years has resulted in more households being highly leveraged. Therefore, mortgage and home equity insurance policies presented in the first paper appear to be even more important. Thus this second paper discusses these insurances in more detail compared with the presentation in the first paper. In particular, problems and possible solutions associated with these insurance policies are provided.

Again, considering that trend in housing policy goes toward more reliance on markets’ ability to allocate resources, it is not unlikely that traditional rent regulation policies will be weakened in the future. Consequently, this second paper also discusses a rental insurance

policy as an alternative to traditional rent regulation. The essence of this policy is that landlords should be obliged to offer tenants rental insurance against strong increases in market rents.

The main instrument of the insurance policy is the rental option. It is a call option in the sense that a tenant who owns this option has the right, but not the obligation, to reside in the current apartment after the next rent review, paying a rent that is the lower of the market rent and the strike price (or strike rent). In other words, a tenant who owns this option will only exercise it if the market rent exceeds the strike price at the time of the rent review (the maturity date). On the other hand, the tenant will not exercise this option if the market rent ends up below the strike price, since he or she can pay the lower market rent for the following rental period. While a tenant who owns an option has a right to exercise it, the landlord is always obliged to fulfil his part of the option agreement as soon as a tenant chooses to exercise the option.

Paper 3: The valuation of residential rental options

While the first two papers aim at a broad audience interested in housing policy for increasing home ownership among low income households in general, and in risk mitigating devices for home owners and tenants in particular, this third paper only studies one insurance instrument; the proposed rental option. Furthermore, this paper discusses how such insurance could be valued. Because of the option-like features of the proposed insurance policy, this paper studies the valuation problem using option-pricing theories.

One of the most interesting and important questions to study when discussing a new rent insurance instrument like the rent option studied here, is whether the insurance can be sold to tenants at a reasonable price. Indeed, the rental insurance policy not only presupposes that a landlord should be obliged to offer his tenants rental insurance, it also presupposes that there should be a price ceiling associated with the insurance. Such a rule could e.g. fix that the maximum insurance premium should not exceed 5 percent of the current rent a tenant pays. I show that such a level might be reasonable also from the perspective of what is a "correct" price of the option. Interestingly, numerical examples show that it is possible to obtain "correct" insurance premiums that in fact also seem to be reasonable, thus increasing the possibility of successful marketing of the proposed insurance policy.

This paper also develops a formula for pricing a residential option with respect to a tenant's so called outside option in which two new parameters are introduced; the tenant's transaction cost of moving and moving threshold. This formula provides a potentially useful way of conceptualizing the way households actually might think at the time of deciding to buy an option. Numerical results show, as could be expected, that the value of an option increases with higher transaction cost of moving, and decreases with higher moving threshold.

Paper 4: Pooling of resources in housing development through strategic alliances: Theoretical framework and options for the Swedish market

As with many other industries worldwide, the Swedish housing construction industry evolves as it adapts to external and internal forces that affect economic, social, political and institutional dimensions of the environment that the actors in the housing construction industry live in. The point of departure of this article is the abolition of large public housing construction subsidies in Sweden that has taken place since 1992/93. Today, in order to produce enough dwellings to meet demand, the developers must be able to secure access to necessary resources without public housing construction support.

The intention of this article is to contribute to an increased awareness of potential benefits of different types of strategic alliance activities among the many actors in the housing construction market, above all as vehicles to pool resources. Based on the large general literature on strategic alliances and interfirm collaboration, we create a frame of references for establishing strategic alliances in the residential development industry.

Alliances may be structured in an infinite number of ways allowing any combination of sharing the risks and rewards through different contractual and company arrangements (cf. Wilkinsson and Reed, 2008). We present a number of interesting non-financial and financial alliances that may be of interest to developers as well as local governments to pool necessary resources to complete successful development projects, and increasing their competitive advantages.

The financial alliances are to solve developer's needs to solve the problem of financing a project, and sharing risks. The non-financial alliances aim at increasing competitive advantage, learning, and pooling knowledge: what to build, when to build, and where to build in order to increase competitive advantage and attractiveness, to produce a good quality building on time and within budget, focusing on the production process, but alliances can also involve the design process (cf. Wilkinsson and Reed, 2008, pp. 242-243).

Paper 5: Improved price index for condominiums

Academicians have developed and discussed many different methodologies to construct home price indexes in order to track home price movements as accurately as possible. Although average (arithmetic mean or median) price indexes are simple to compute, they cannot take into account that homes are heterogeneous goods. Since the composition of homes sold may vary from one period to another period, it is necessary to construct quality-adjusted home price. Having access to the most recent sales information is yet another challenge that producers of home price indexes face. Many times index producers only have access to data that pairs sales prices with moving-in or deed dates. However, in order to avoid problems with time lags, index producers should use data that pairs sales prices with contract dates.

The objective of this article is to contribute to the literature on the production of reliable apartment price indexes. We develop a number of alternative monthly quality-adjusted price indexes for condominiums (housing cooperative apartments) based on a unique dataset covering sales in the whole of Stockholm municipality from January 2005 to June 2009. This data set contains both information about a number of important characteristics of the sold dwellings, geographical and locational attributes, as well as the dates when sales contract were signed, and not the transaction dates.

First, we estimate an aggregated hedonic equation with monthly time dummy variables, and compare this index with arithmetic mean and median price indexes. Although the three indexes basically show similar price trends, the monthly index figures differ in a significant way. The hedonic index is smoothed compared to the average price indexes, and therefore has a lower standard deviation of monthly price changes. This finding may be important, since the standard deviation of price returns is a key parameter in the valuation of different financial and insurance products.

Although an aggregated hedonic model has attractive features as compared to simple mean and median price indexes, the assumption that the implicit prices do not change over time may not be valid. Therefore, we estimate hedonic moving window regression indexes, in order to test whether the assumption of constant implicit prices over time is reasonable or not. Our results show that the difference between the aggregated hedonic equation index and the moving windows regression index models is very small. This result may be explained by the short time period (4.5 years) we consider in this paper. This fact might also explain why the moving windows regression versions of Laspeyres and Paasche indexes, in which we use the initial and final 12-month period quantities as weights (i.e. initial and final year “standard home”), yield indexes that are similar to the aggregated hedonic index. However, as times goes by, implicit prices as well as the characteristics of the “standard home” might change significantly, and therefore it may be important to further develop methods that consider these factors.

Paper 6: Valuing the cooperative association conversion option

Since the 1990s, both private and municipal owners of multifamily rental properties in Sweden have sold a large number of their properties to housing cooperatives established by the property's tenants. One motivation for the large increase in so called housing cooperative conversions is that the practice of rent regulation causes actual rents to be lower than market-clearing rent levels, especially in attractive areas in larger cities. By selling the property to a housing cooperative, the property owner can take advantage of the positive price difference between the price of housing co-operative dwellings, which are determined by demand and supply, and the value of the property based on the assumption that the rents will continue to be lower than market rents.

In this paper we use a real options approach to derive a closed-form valuation formula for the option an owner of an income producing multi-family property has to sell it to a housing cooperative. In traditional option valuation models, the date when the option matures is known in advance. However, it is common that the property owner does not know in advance when the tenants (through the housing cooperative) will buy the property. In this paper we let the expected time to maturity, which is the day when the tenants purchases the property from their landlord, to be a random variable. The numerical examples suggest that the value of the conversion option increases as expected time to conversion increases, as well as when the volatility of the price of housing cooperative properties increase. The real options approach suggested in this paper may be especially useful to explicitly conceptualize the problem of valuing a rental property with embedded options to switch it to another type of property.

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