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Master of Science in Engineering

**System Dynamics Modeling
of Korean Lease Contract Chonse**

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Abstract

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Since the sub-prime mortgage crisis from the US, 2008, Korean housing market was plummeted, however, indigenous Korean lease contract 'Chonse' price have been increasing. This increase of Chonse price can be threat to the low-income people because most of them prefer to live at the house of Chonse contract. In order to solve this problem, Korean Government have implemented several 'Chonse' policies to secure low-income people's residence by decreasing price of Chonse, however, due to the lack of understanding on housing and Chonse market, Korean government policy seems to fail on getting effective results. In the housing and Chonse market, there are many stakeholders with own interest, so simple thought about housing and Chonse market such as more house supply will decrease house price would not work in a real complex housing market. This study suggested

system dynamics conceptual model which is consists of each part of causal-loop-diagrams for the Chonsej market as well as the housing market. In addition, this study try to explain why the policy did not work effectively using the examples of government past measures. . In conclusion, Chonsej price have its own homeostasis characteristic and different price movement with housing price at the short-term and long-term period. Unless government does not have structural causation mind in implementing policy in real estate market, the government may not have intended effects on the certain market.

Keywords: Chonsej, Jeonsej, System dynamics, Real estate

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Chapter 1. Introduction

This chapter presents the research background, problem statement, research method and scope in Chonsei housing market. At the end of this chapter, research process was described with process figure.

1.1 Research Background and Problem Statement

After the financial crisis originated in the United States in 2008, housing transaction volume was disappeared due to the expectation of housing market price decrease. In contrast, Chonsei price has been increased since 2008(KB bank 2012). It is highly probable that this phenomenon is from people who defer to buy a new house (Shin 2011).

Meanwhile, the domestic Chonsei contracts are mostly used for low-income people and social freshman, so the current high-rocketing increase of Chonsei would be the threat to ensure residence for the social weak. The government announced various policies to solve the Chonsei price. However, these previous Chosei policy did not fully considerate characteristic of housing market and their structural causes, the policy implementation have not been able to see proper effects.

Looking back to the housing policies of past years, the measures 8.31 had announced to increase tax of capital gains and real estate in order to control the price, however, the policy changed significantly from curb to boost real estate price because of the changed regime and financial crisis at 2008. The change had measures and tax reforms to encourage selling of unsold houses.

However, the two policy for the Chonseil and housing market was from different reasons but shared same demands, as if between activation plan for the unsold houses and building of public lease house are sharing residential demand. Therefore, the policy may collide the effects each-others. Likewise of former example, each different policy which did not consider complex causations in housing and lease market could not expect proper effectiveness. (Dispasquale 1999, Hwang 2011). Though these housing policies in housing market will affect to the Chonseil market, Korean government did not take fully account of price effects toward the Chonseil. For these reasons, Korean government policy for the Chonseil price decrease(stabilizing) have not been succeeded. Therefore, this study analyzes the Chonseil market consider with housing market, also suggests the result of Chonseil price by housing price change with separate time of short-term and long-term.

Previous research of housing and Chonseil market was about the simple co-relationship between small part of housing and Chonseil market during limited time. Moreover, those research theses have not included feedback relationship of whole market stakeholder. Every market including realestate, there are many stakeholders who share interests simultaneously, therefore, analyze feedback structure with certain variables which reflects market interests would be more effective rather than analyze simple co-relationship between two variables. This study try to design diagram of feedback structure of Chonseil market include housing market. Based on designed CLD(Causal-Loop-Diagram), this study also analyzes dynamical approach on the real estate market which could be used as policy estimate measures.

1.2 Research Objective and Process

The time range of this research is limited as after sub-prime mortgage crisis 2008. This study partially include domestic housing market and focused on the time of housing price down, Chonsei price up since 2010.

The process of this study is following.

1) Based on a literature review, find the features related to Chonsei and housing market with its current circumstances.

2) Derive most important variables and stakeholders at the both markets and CLD of system dynamics model.

- Develop each market of CLD qualitative model
- Compose each model as one chonsei system dynamics model

3) Validate developed System dynamics model by expert panels

- Suggest basis of CLD causation
- Face validity, Subsystem validity with experts panel
- Input-Output analysis

4) With system dynamics model, analyze recent government policies.

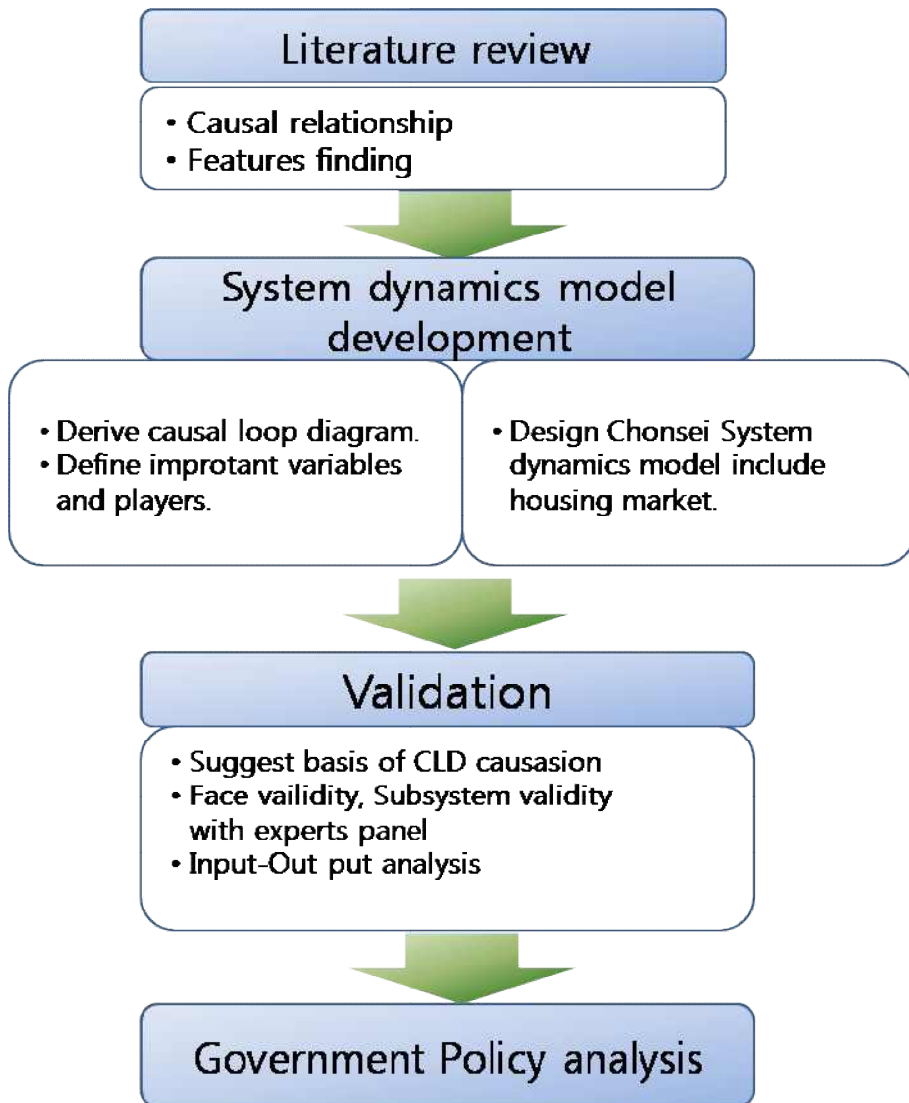


Figure 1-1. Research Process

Chapter 2. Literature Review

This chapter discusses the previous researched about Korean Chonseil contract. First of this chapter, history of Korean Chonseil was introduced as a lease contract. At the second chapter, this study presented other researches with literature review. Last, the main methodology of this study, system dynamics was introduced.

2.1 The Features and History of Korean Chonseil

Chonseil is a Korean indigenous lease contract. Finding at the record, Chonseil have been boosted as a common lease contract since 1940's. In that time, monthly rent house was only available in commercial house for the residential house, most people use Chonseil as a residential lease contract. Common land except house had not been use Chonseil contract. (Choi 2007). The feature of Chonseil contract was that landlord should preserve total principal of Chonseil deposit in order to refund deposit at the end of contract. It is key feature which is same from the past to the present. This lease contract has been existed only in Korea and this uniqueness may cause to study only by Korean researchers. But, particularly, foreign researcher have analyzed about the contract.

Another key feature of Chonseil is that this contract had been used as a private mortgage loan, when landlord has not sufficient financial aid in the past. That was estimated as an origin of Chonseil contract by previous researchers (Ambrose and Kim 2003). However, even though there are

various housing financial products since mid 1970s, Chonsei did not disappeared because the Chonsei lease contract provide some advantages to both landlord and tenant during the certain real-estate statement: continuous housing price booming. Earned deposit not from bank loan but from tenant was often used for buying a new house. This purpose of Chonsei from landlord have been defined as so-called “Leverage effect of Chonsei” (Lee 2002)

On the other hand, to the tenant, Chonsei contract has an advantage of saving monthly rent which will be useful to buy future house. Most people who wait to buy a first house prefer Chonsei contract due to the money saving. (Lee 2003, Cho 2003)

Because of stakeholders’ mutual benefits from Chonsei, we can state that Chonsei contract could be exist so far.¹ Recently, the number of Chonsei contracts is declining because of stagnation of housing market price which caused people expect lower benefits. In addition, low interest rate of bank deposit may make housholder hesitate to borrow chonsei house.

As this study suggested before, Chonsei have a profound relationship with housing market. Booming price of housing market was an important reason of chonsei which only can preserve it. To analyze current Chonsei prices increase, this study first suggests to start with analysis of housing market.

¹ From 63.7% at 1995 to 50.39% at 2005, conversely, the number of rent house is increasing from 22.04% to 33.92% (Statistics Korea, Census of Population ,housing, Lee 2010 re-quoted)

2.2 Literature Review

In a Korea real-estate market, research about house price was developed several method though, there is not sufficient dynamical researches on Chonsei but simple relationship between a dependent variable with Chonsei price. Shim (2010) proved housing price increase has a direct proportion with Chonsei transfer rate, Lee(2010) proved Chonsei deposit have a precede housing price. The Chonsei price index is preceding by housing price index was proved by Moon (2010).

The researches which have suggested dynamical structures among the variables in the Chonsei market include housing market is following. Brent W. (2010) suggested that Korean Bank policy changes regarding mortgage deregulation lead to decrease of Chonsei house demands. Also, continuous interest rate decrease of save deposit could reduce the intrinsic price of Chonsei deposit remarkably. Lee (2002) described capital gains and interest revenue of real estate market with illustrating concept of “The leverage effect of Chonsei”. Cho(2006) asserted that having a house means having a real asset, otherwise, Chonsei deposit means gaining a financial asset. So inflation and interest rate in terms of national economy could be the most important elements to analyze housing and Chonsei market. In the long term, Chonsei-House price ratio preceded by the lower interest rather than inflation increasing.

All these previous researches have a limitation of mathematical economics that it is ambiguous to definite stakeholders with each interest and hard to understand complex relationship among the stakeholders. Therefore, mathematical economic analysis at the real estate problem may be not appropriate to analyze how the prices will change when the market

environment changes including policy changes. As if analysis of housing market by Hwang (2011), system dynamics researches can suggest proper model through various causal relationship among the stakeholders.

Table 2-1 shows vary point of views with arguments above Chonsei problems. They suggested many solutions about Chonsei as well as housing market. Lee (2002) suggested Chonsei is a kind of monthly rate, thus, Chonsei can transfer to monthly rent by certain ratio. Lee (2010) and Kim (2009) focused on real estate policy not only national, but also other developed countries. Both Cho (2006) and Son (1996) focused on specific variable such as inflation and interest rate with government policies. Few variables from them were used as exterior variables in this research's model.

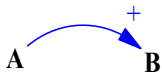

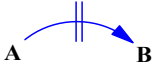
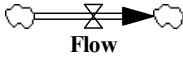
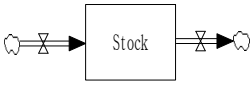
Table 2-1 Various point of views on Chonsei market

References	Main Point
Cho, D.H. "Dynamic Relationship between Housing Values and Interest rates in the Korean Housing Market", The Journal of Real Estate Finance and Economics 32, no. 2 (2006) : 169-184	Asserting long-term negative(-) relationship between interest and house value
Cho, D.C. "Interest Rate, Inflation, and Housing Price, , NBER East Asia Seminal on Economics, volume.15(2006):341-370	With concepts of inflation, he Suggesting basic equation with each variable
Lee, C.M. "An Analysis of Structure of the Monthly rent with Security Deposit Market", housing researches 37, no. 6 (2002): 87-97	Analyzed recent lease market trend that monthly rent with deposit (half Chonsei) prefer than Chonsei. The conversion rate (Chonsei to monthly) is higher than interest rate. Householder can make vary product by house in which he want to earn. and it would make more profit than normal interest
Ambrose, B. W., and S. Kim. "Modeling the Korean Chonse Lease Contract." Real estate economics 31, no. 1 (2003): 53-74.	Develop a contingent-claims model that recognizes the compound options embedded in the Chonse contract
J. son, "A review of the Korean housing market and related polices", Review of Urban & Regional Development Studies Volume 9, Issue 1,(1997)80-99.	Introducing Korean real-estate market trend emerging at 1970-1990's. Also, they emphasize that the government have to fewer regulations.
Lee. C.M. "Disputes on Multi-House Owners and Its solution." Housing researches 18, no. 1 (2010): 185-215.	He suggests harmful and favorable policies of muti-house owners in Korean housing market. also the author informs historical policies that was established at Rho's regime.
Kim, H.J. "A Comparative Study on the Real Estate Market and Policy Responses in England, Australia, the USA, Japan, China, and Korea" Seoul metropolitan researches. Volume. 10(1) (2009): 103-118	Asserting raise interest rate was effective only in the short term while tax policies were effective mid and long term

2.3 System dynamics methodology.

The Main method of this research is system dynamics methodology which is useful to describe nonlinear feedback systems included time dependent variables, stakeholders. System dynamics methodology was developed by Professor Forrester, MIT, has become one of the most widely used analytic methods for industrial, economic, social, and environmental systems. One of the strong characteristics of system dynamics is providing dynamic method to analyze on the complex nonlinear systems (Kwak 1995). System dynamics model could illustrate quantitative result of variables through structural feedback loops with time passage that can be useful to test the government policies. Table 2-1 shows legend of system dynamics.

Table 2-2 System dynamics diagram (Sterman 2000)

Diagram	Description	
	When all other conditions are identical	Variable A's increase (decrease) will increase (decrease) variable B.
		Variable A's increase (decrease) will increase (decrease) variable B.
	Critical time delay is to be included to satisfy the causal relationships between variable A and variable B.	
	Defined as rates or flow that change stock in system	
	Defined as stock or level as a variable saved as a system result	

2.4 Summary

In this chapter, Chonseï was introduced as a traditional lease contract. Beyond the meaning of the past, Chonseï nowadays obtains social meaning that it has a wide used for a low-income person who have not had own house.

At the part of preliminary study, many researches about Chonseï, real estate market was introduced. However, previous research was limited on simple relationship, so this study will suggest complex meanings among various stakeholders of Chonseï and housing market.

System dynamics methodology is providing separate reasoning process through designing researchers' mental model using feedback loops. It is useful to analyze Chonseï because it can show variables state along the time passage.

Chapter 3. Analysis of Chonseil Market

: Developing System Dynamics Model

In this chapter, Chonseil market include housing market will be analyzed by the role and interest of each stakeholders. Causal Loop diagram (CLD) is a structural diagram which describes cause and effect of every variable and stakeholders. Through CLD diagrams, every stakeholder and interest could be described as certain variable in a feedback loops. In addition, every part of CLD system dynamics model are able to integrate as one model, however, it is hard to understand and not proper to explain each meaning, the model was separated by the regional limitation regarding impact on the Chonseil price to ease the understand of whole model.

The limitation of each part of models is shown at table 3-1.

Table 3-2 Limitation of model

Model	Investment demand	First buyer demand	Limitation
① Demand model of housing market	Limited variation (Consider as absolute number)	Same with Chonseil demand	Limited area(Microscopic)
② Supply model of housing market	From Housing demand to Lease house supply (①Investment demand→ ①House demand→	Included house demand	National industry level (Macroscopic), Newly built only can supply in available land
③Supply-demand model of housing market.	②Expected price increase of house→ ②Newly house build→ ③Lease house supply) (Figure 3-1)	-	Limited area(Microscopic)

3.1 Demand model

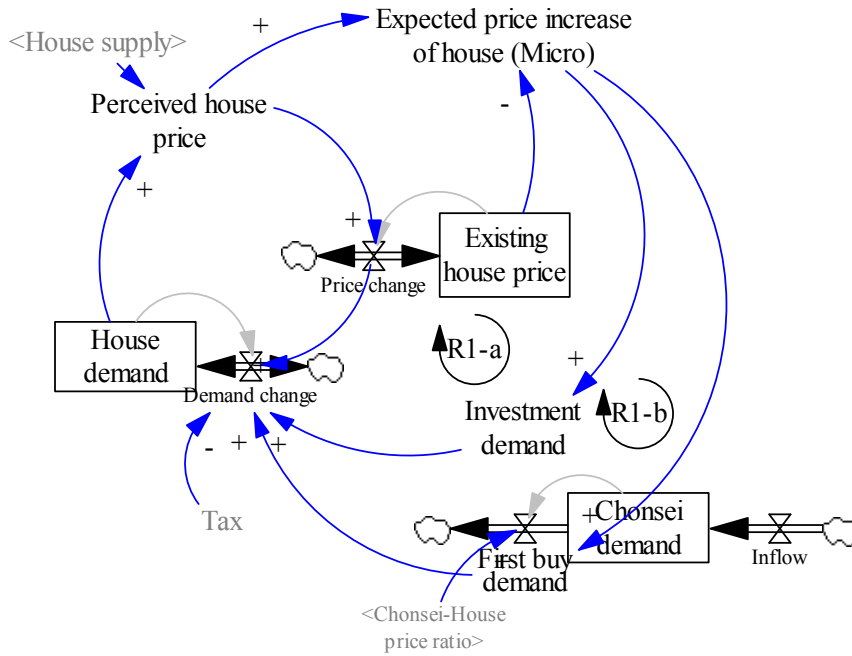


Figure 3-1 Demand model

Korean Chonsei market has a profound relationship with domestic housing market. To illustrate how the Chonsei price changes, this study considered housing supply partially. In the housing and Chonsei market, demand is the most effective element of changing both prices, however, it does not work on an entire national level, but only work on a limited area. This is a similarity with microscopic economical point that every individuals of the market are the important element of research. Therefore, demand model of housing market only takes into account the limited region as microscopic economics does. *Expected price increase of house* variable means investors expectation of future trade gains and house price expectation of first house buyer's(*First*

buy demand). In that case, investors' expectation and first house buyers' expectation for the future house price increase have similar roles in the housing market, so named as *Expected price increase of house*.

Model in Figure 3-1, it was limited as a restricted area since this model's main point is far from macroscopic economical effects. So, model on figure 1 does not represent the entire housing market. After this chapter, the research will suggest the entire housing supply market along with microscopic expectation of house price increasing. At the demand model of housing market in a limited area take into account relationship among the *Chonsei demand*, *House demand*, and *Existing house price*. To explain this, we have to state that most of first house buyer had lived in a Chonsei house to save money for buying another house. The advantage of Chonsei house which need not any monthly rent pay is the biggest advantage for the social freshman, the future first house buyer (Lee 2003, Cho 2010). From that reason, the out-flow of *Chonsei demand* can define as a *First buy demand* which can separate with *Investment demand*. Furthermore, *First buy demand* which was accumulated by *Chonsei demand* is affected by regional market environment: *Chonsei-House price ratio* and *Expected price increase of house(Micro)*. These variables determine whether investor and first buyer buy new house or not. (R1-b) This explains when Chonsei price is too high, first buyer can be promoted to buy new house, otherwise, when house price decreasing, both investors and first buyer defer to buy additional(new) house due to the low *Expected price increase of house(Micro)*.

Investor demand presents that a house demand which only think about future

house price increasing by homeowner. This demand only represents the people who already have one or more house, so their surplus house will be supply of lease house market.

Hwang (2010) suggested housing price model of Korean real estate market. According to his research, house price is determined by *Expected price increase of house* and *House demand*. He also asserted that the *Expected price increase of house* from *existing house price* is the most important reason of house trade. At the figure 1, R1-a loop describes feedback mechanism of housing price forming. In that loop, self continuous reinforcing feedback loop is existing (*Investment demand*↑ → *House demand*↑ → *Perceived house price*↑ → *Expected price increase of house(Micro)*↑ → *Investment demand*). As if this mechanism, each circulation make strengthen of variables in the loop. We call that “Self-reinforcing Loop” and named as “R”.

This study defined that national housing market could be activated by *Expected price increase of house(Micro)* which was using previous researches of housing price model at a references. From that point of view, every house buyer must expects house price increasing when they buy a new one, however, after 2008 by the mortgage crisis from the US, housing price tend to decreasing continuously. Thus, potential house buyer estimate the *Expected price increase of house(Micro)* is not sufficient or not exist to buy new house. This phenomenon is represented by R1 loop. Same with R1, Chonsei demand is not activated well due to the lack of *Expected price increase of house(Micro)*. Also, the lack of house purchase by the investor would cause the lack of lease supply so that causes decrease of Chonsei supply.

3.2 Supply model of housing market

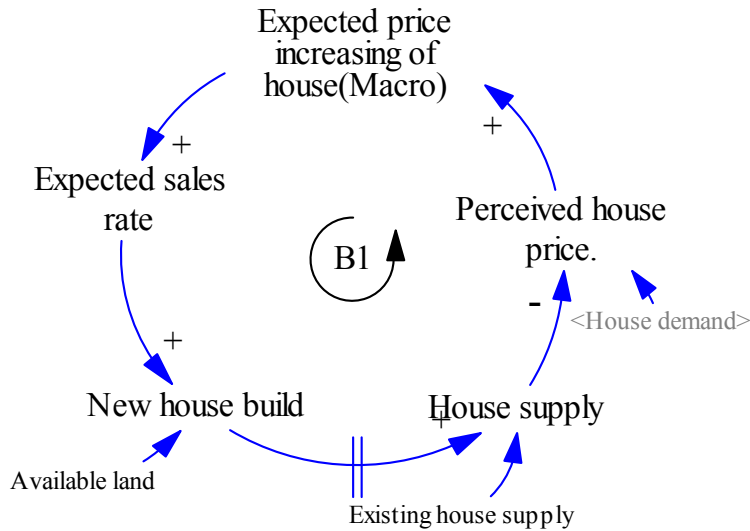


Figure 3-2 Supply model of housing market

The house supply model of housing market is different with the demand model of housing market regarding the limitation. The house supply model considers house supply of national industry level to explain new house build in the market. The house supply model of housing market explains an inverse proportion relationship of *perceived house price* with *house supply* by *newly house build* ($House\ supply \uparrow \rightarrow Perceived\ house\ price \downarrow$). This kind of feedback loop is called “Balancing loop”, named “B”, which define as every variable’s state is stable after a repetitive circulation. (Park, 2010).

Expected price increase of house(Macro) is a basis variable to determine *Expected sales rate* for the house supplier(private company). By this process, supply model of housing market describes the effect of *perceived house price* to the *New house bulid*. Since the house supply from the private company

appears 3-5 years later in the market due to the construction period, thus the interruption of house supply by the market expects can cause house and Chonse price increase.

In the past, for the industry level, Korean housing market has been defined as supply driven market (park 2010). The housing construction which was started 3-5 years ago, now appears in the market though, current housing market environment have plunged by the disappearing of price increase expectation, thus, *Perceived housing price* which is determined by “demand-supply of house” can be easily decrease. Furthermore, current insufficient housing supply from the low *perceived housing price* may cause future existing house price increase. As the supply model of housing market explained before, *Expected price increase of house* and delay of *newly build house* will affect to supply demand model of Chonse market and explain the Chonse price sudden increase regarding supply discontinuity.

3.3 Supply-Demand sequence model of housing market

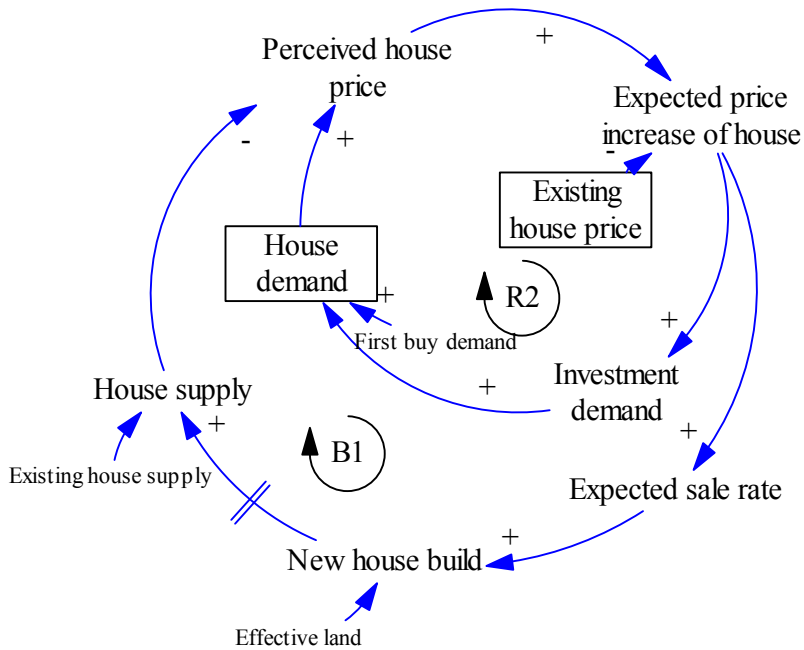


Figure 3-3. Supply-Demand sequence model of housing market

At the Figure 3-1 and figure 3-2, microscopic house demand model and macroscopic house supply model shares the *Expected price increase of house* variable. In each individual's house trade, microscopic *Expected price increase of house* (Micro) is prerequisite to the macroscopic new house supply. On the same perspectives, *perceived housing price* is the reason of macroscopic house supply and microscopic house demand is element of house price. Figure 3-3 illustrates a concept of house market autonomy which is about demand from micro scope to supply of macro scope. To be specific, housing market activating can be started from the first house buyer (individual), after then affect to macroscopic house supply from private

company. This model has been intended to obtain this meaning by integrating the variables of macro and micro *Expected price increase of house*.

When the housing market stagnated, private company cannot expect to earn profits by house sales, also common people cannot expect to earn profits by house trade. Hence, the first buy demand is the key variables to change the lease market as well as housing market. Except discuss this variable, it cannot be a remarkable effect on the above model which represent real market.

On the other hands, large amount of accumulated *Chonsei demand* due to the continuing housing market stagnation would be factor of significant market activation to both macro, micro markets including stabilization at the Chonsei market.

3.4 Supply-demand model of Chonsei market.

As mentioned before, the second, third house buyer(investor) have to supply their house to lease market. Meanwhile, the investor will find the most profitable house rent contract comparing monthly rent price and Chonsei deposit with bank interest rate. Like these days, interest rate of deposit is too low to get proper profit from Chonsei deposit, *Expected monthly rent profits revenue* may be higher than expected *Chosei revenue*, thus, current number of monthly lease contract is much greater than that of Chonsei. However, when the investor had used mortgage loan to buy additional house, Chonsei deposit from tenant can be exchangeable with the loan. Not only this case, Chonsei deposit could be used for other investment. This is the definition of “Leverage effect of Chonsei” (Lee 2002). Regarding leverage effects of Chonsei deposit, it would be bigger than monthly rent revenue when consider debt interest rate, and it would be more profitable when investor borrowed much money. In this case, investors additional house become *Chonsei supply* (B2). B2 loop is the self-balancing loop which controlled by *new house build*, *Investment demand*.

Requested Chonsei price by Landlord is determined by previous *Chonsei supply* and *Perceived Chonsei-House* price ratio based on local market condition. If the request of chonsei deposit is much bigger than local market's trend, contract will not succeed, so stakeholders' decisions in the Chonsei market based on the Chonsei-House price ratio is the most important element throughout the Chonsei market. Particularly, regional Chonsei price is differentiated by Chonsei-House price ratio, for instance, a small-middle city have a 70-80% of ratio. That is such a stark contrast compare to Seoul and big

metropolitan which is about 50% of proportion (KB bank 2012). As a Chonsei-House price ratio, *Perceived Chonsei-House price ratio* is represented as a regional price trend of Chonsei. Also, it has homeostasis characteristics in which people use this variable to estimate implicit price band. Because of this, *Perceived Chonsei-House price ratio* cannot be changed easily. Otherwise, variable Chonsei-House price ratio changes instantly because this variable only means previous Chonsei-House price ratio at the variable *Chonsei price* and existing housing price.

Mentioned Chonsei model can explain those price fluctuation by housing price. First, when the *Existing housing price* decreases, the *Chonsei-House price ratio* constantly decreases, because of low price of house, however, *Perceived Chonsei-House price ratio* will not change immediately, because of its homeostasis characteristic. Similarly, *Existing housing price* decreasing causes Chonsei-price decreasing in a short time, investment demand decreases *Requested Chonsei price by Landlord* due to the *Expected price increase of house* causes *Chonsei demand* increase and supply decrease in a long time. (R2↓, B2↓) Conversely, when *Existing housing price* increases, Chonsei price will increase in a short time, however, investment activation in a housing market can decrease *Requested Chonsei price by Landlord* (R2↑, B2↑). This described phenomenon is following next chapter.

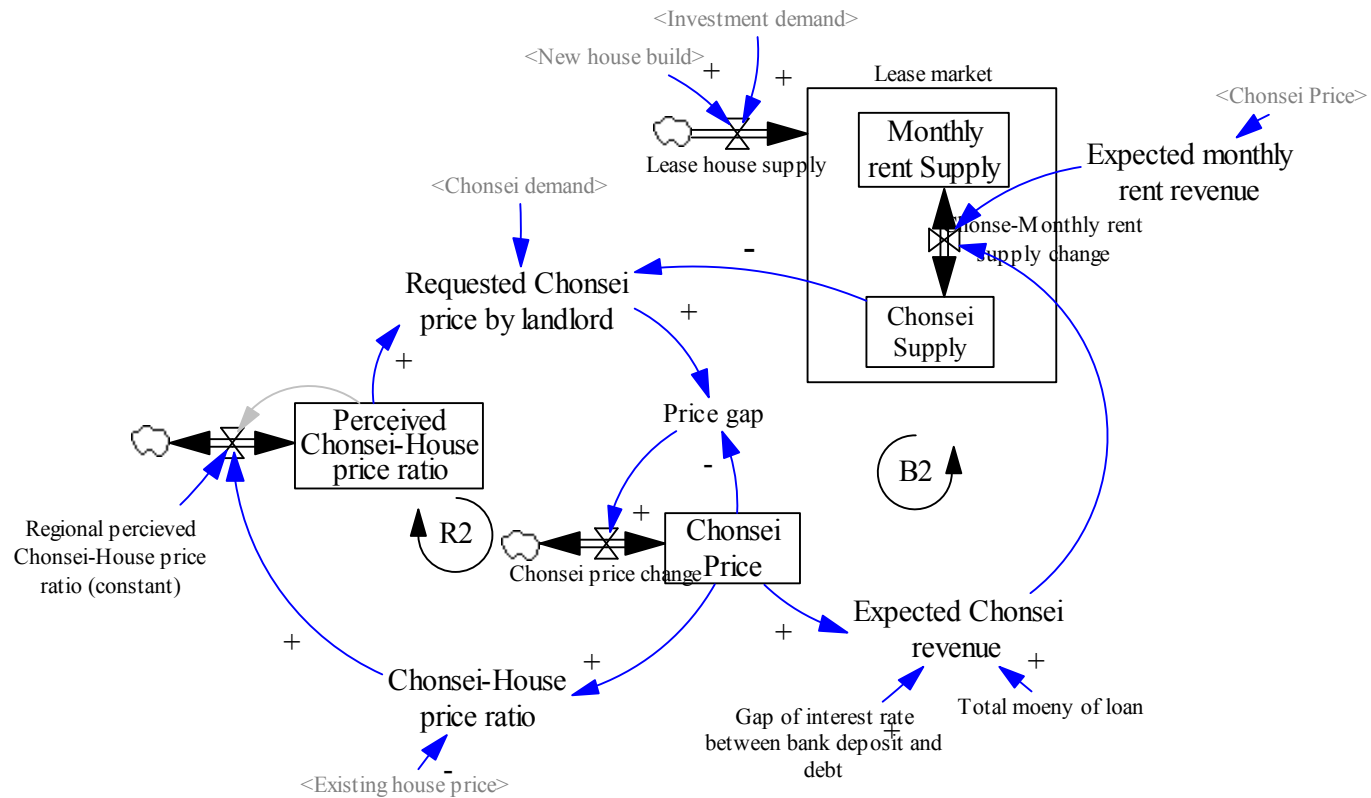


Figure 3-4 Supply-Demand model of chonse market

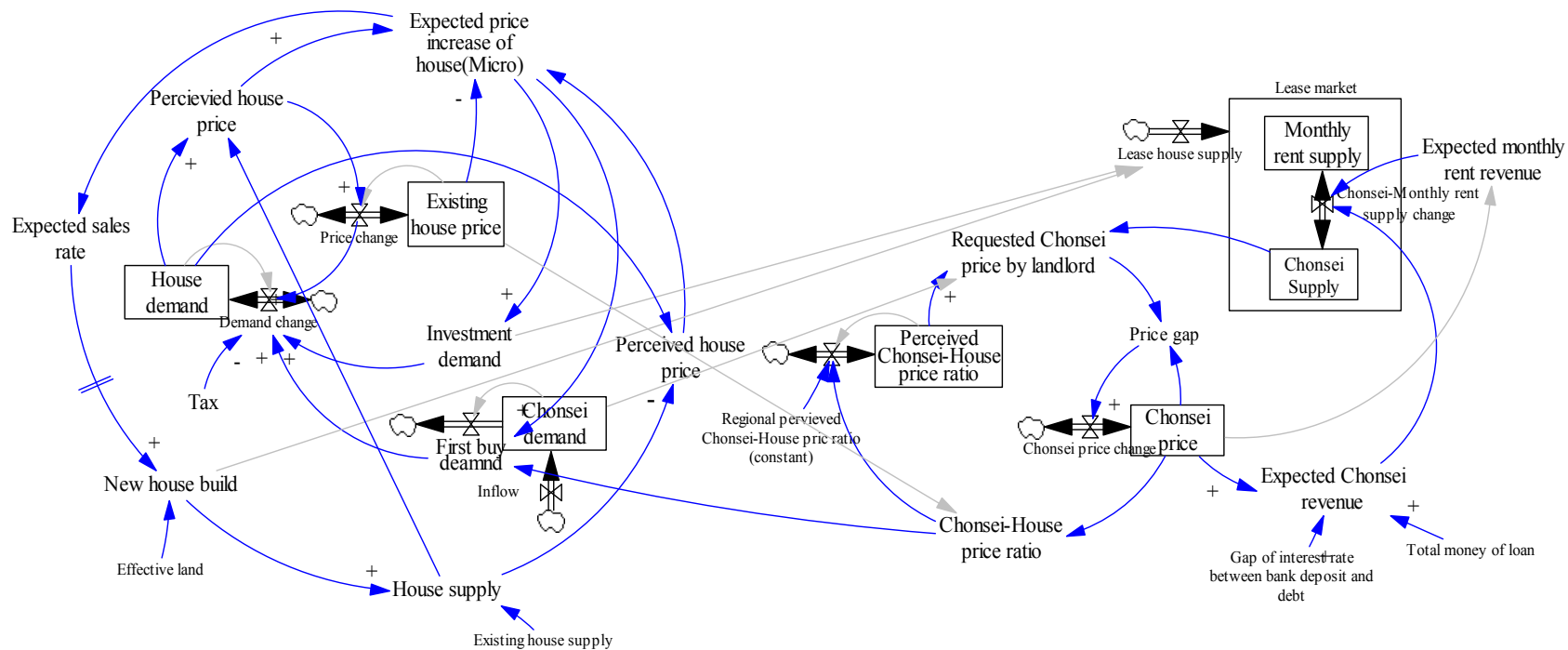


Figure 3-5 House-Chonseil entire model

3.5 Chonseï Price Behavior

In the previous chapter, Chonseï price has shown different price behavior at the two time perspectives: Short-term, Long term. In a short term, Chonseï price have shown immediate chase the housing price though, in a long term, the price was determined by whole supply from investors' house and accumulated demand, so the complex change would appear not like short-term behavior. To specify this through the developed model, Figure 6-1 describes state changes of the variables sequentially when the housing price decrease. Otherwise, Figure 6-2 describe state change of the variables when the housing price increase. Furthermore, Figure 6-3, 6-4 shows the approximate Chonseï price behavior with graph.

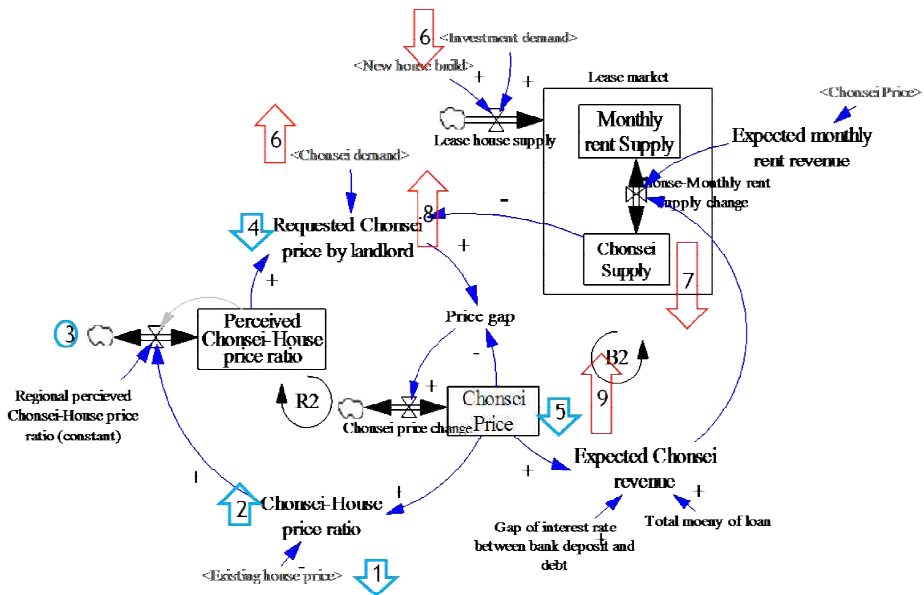


Figure 6-1 Chonseï price model variable changes when house price decrease

When house price decreased (Figure 6-1) number 1 to 5 variable will change in a short time. To be specific, Chonsei-house price ratio decrease immediately due to the *Existing house price* increase. However, *perceived Chonsei-House price ratio* does not change constantly, because it is implicit Chonsei price range in mind of those who involved in the market. Thus, *Requested Chonsei price* by landlord will decrease like house price did. Consequently, Chonsei price will decrease equally.

Otherwise, point of view in a long term, *Chonsei demand* will increase due to the high price of house. Also, *Chonsei supply* will decrease of lease house supply because of decrease of investment demand. Thus, Chonsei price will increase remarkably due to the high demand and low supply. Figure 6-2 will describe approximate illustration of price behavior

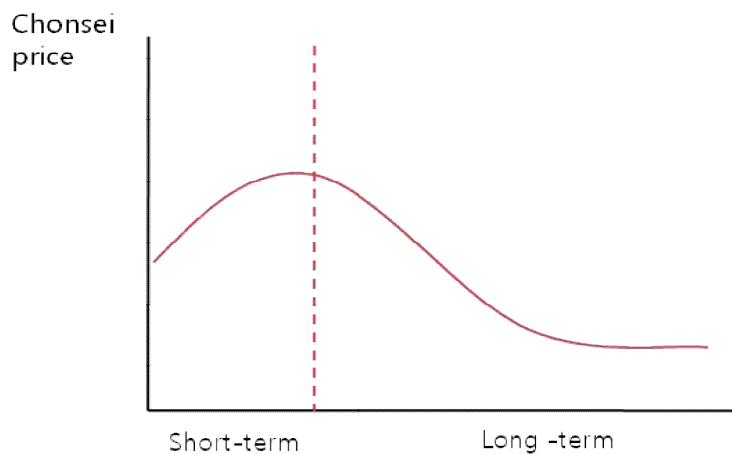


Figure 6-2 Chonsei price behavior when house price increase

Figure 6-3 shows Chonsei price model variable changes when house price increase.

Conversely, when *existing house price* ascend, Chonsei price will descend

by the reason mentioned before. However, in a long term, increasing Chonseil supply and decreasing Chonseil demand will increase Chonseil price sharply.

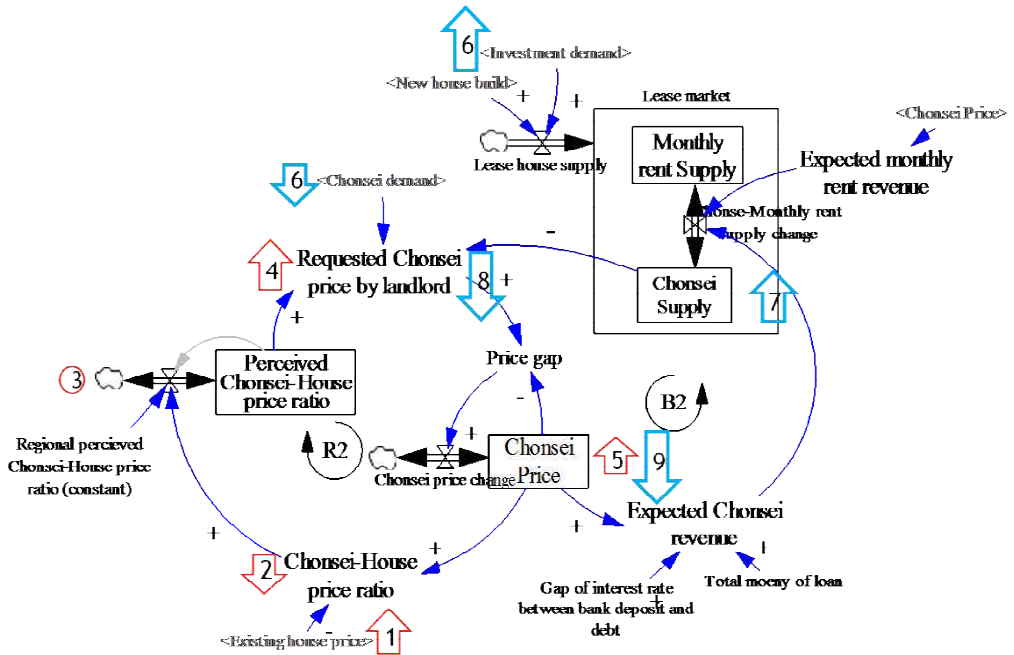


Figure 6-3 Chonseil price model variable changes when house price increase

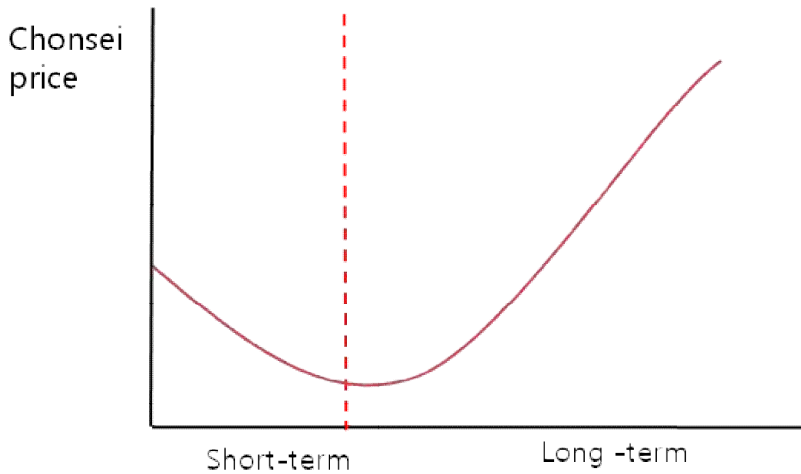


Figure 6-4 Chonseil price behavior when house price decrease

In the mean time of both chonsei price behaviors, *Perceived Chonsei-House price ratio* is the reason that makes conversed price behavior between time duration. That is from the people's accumulated contract experiences so that may not change easily.

Furthermore, the duration of Chonsei contract is usually 2 years in Korea, it means Chonsei price behavior may show price trend with 2 years term. Chonsei price decreasing change by house price is slower than price increase changes, because the price is based on *Requested Chonsei price by landlord*,

3.6 Summary

This chapter introduced developed system dynamics model with 3 separate modules. In a house demand model, this research defined first buy house demand as outflow of *Chonsei demand*. Also, *First buy demand* with investment demand are determined whether buy or not from the *Expected price increase of the house (Micro)*.

At the house supply model, the research defined house supply by private company due to the *Expected price increase of the house (Macro)* limited in an effective land.

With two former model, this study conceived Supply-Demand sequence model of housing market which can link with micro and macro scope perspectives.

At last, at the part of supply-demand model of Chonsei market, the study suggested reason of Chonsei price behavior by using two characteristics: homeostasis and time differentiated behavior.

Chapter 4. Validation

In this chapter, to validate previous developed model structure, this research has conducted 3 step validation processes which is from expert system validation and literature review. First, in a phase of face validity, expert panels evaluate the whole model with problem statement. Second, in sub-system validity, expert panel evaluate each developed sub-model. At last, in a phase of input-output process, set the input value as a house price and output value as a Chonse price. Comparing output with real price index from 2005 to 2011, real price index behavior has similar behavior with that of previous explained.

4.1 Causal Relationship from Previous Researches

All modules of system dynamics models in this research are based on the previous literature reviews which was proven already. Reference of each model was presented in table 4.

However, several previous researches only explained simple cause and result between variables, not explain implicit relationship among the variables sufficiently, it does not suitable to represent entire complex real-estate market situation.

Table 4-1 Main causation loop and references

Diagram	Description
	<p>Demand and house price have elastic relationship : Demand → House price (Jeong 2005)</p> <p>Expected price increase of house and demand have the direct proportion: Expected price increase of house → Demand (C. Kim and K. Kim 1999, Levin and Pryce 2005)</p>
	<p>Chonsei contract as a residential method before house buying : Chonsei demand → First buy demand (Lee 2003, Cho 2010)</p>
	<p>House construction and supply is activated by house sales rate of the market: Expected sales rate → House supply (Dipasquale 1999)</p>
	<p>Supply increase from leverage effect of Chonsei deposit : Chonsei price → Expected Chonsei revenue → Chonsei supply (Lee 2002)</p>

4.2 Expert model validation.

The developed model has been tried to validate by the expertise of panel. The panel was consisted of 5 researchers from Construction economy research institute of Korea's real estate and Korean local bank's real-estate researchers. Developed system dynamics model is a good Expert model because it is based on knowledge, reasoning and causation by the expert's research. The Expert model used to validate by 3 processes. (Timothy J. O'Leary 1990)

First, the model of this research had been validated by face validity process. The panels validated that the model fully adapted the real world and its analogy is proper. Second, at the phase of Subsystem validity process, the model had been validated from each part of the model which represents housing supply, demand, Chonseil in terms of variables' adequacy as well as limitation. At the first process, panels' opinion was corresponded with this research's problem statement as well as description of model, however, at the second phase, there was a few suggestions for the limitation. For instance, in a housing market, panel said there was no variable about taxes and interests. To solve that, add tax, interests variable as an exterior variable which could not affect to the main feedback loops.

Last, at the last phase, input-output process, feedbacks and reliability of model was discussed by using house and Chonseil price index from KB bank. Set house price index as a input value, the Chonseil price index having a proceeding behavior about 2 years delay as if this research suggested before (R2↓, B2↓), (R2↑, B2↑).

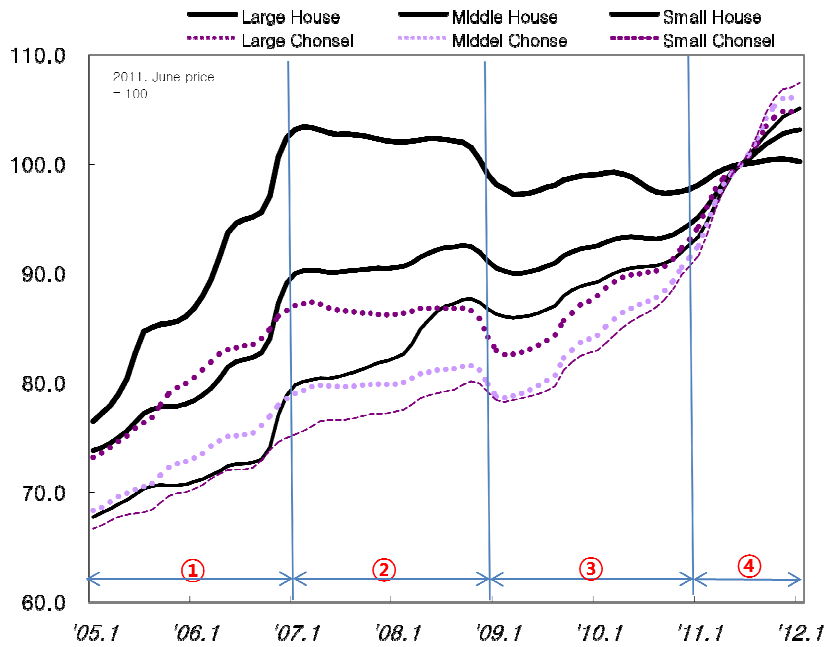


Figure 4-1 National apartment house and Chonseil price index

Figure 4-1 was provided by KB bank and presents national price of large, medium, small, apartment house price index. Set the price of Jun 2011 price as a 100, past price was represented to ratio. As shown in figure 4-1, from January 2007, house price increasing trend was observed(①). Also after October 2008, house price decreasing(stagnation) trend was observed(②). For the time at ① house price increase result in Chonseil price increase, however, regarding figure 4-2, the national Chonseil-house price ratio, substantial Chonseil price decrease was observed in the time of ②. Furthermore, house price stagnation shown at the time of ②, ③, casual house price decrease result in immediate Chonseil price decrease, however, after then, Chonseil price ratio increase continuously.

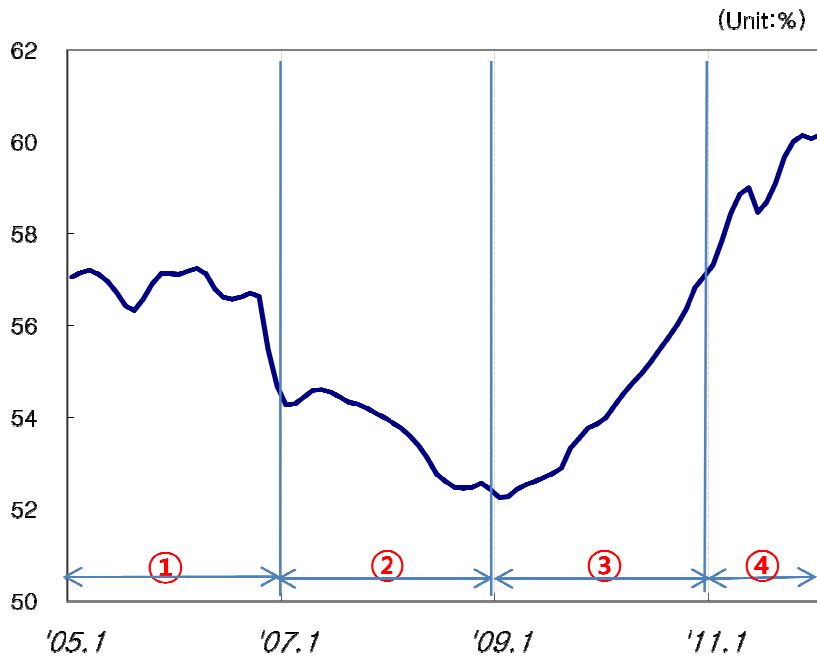


Figure 4-2 National Apartment house-Chonseil price ratio

In sum, house price increasing of time ① led to decrease Chonseil-house price ratio at time ②, and house price stagnation, decrease of time ②,③ led to increase of Chonseil-house price ratio of time ③. This is because of the homeostasis of Chonseil characteristics as well as existing of *Expected price increase of house*. From those elements, price decrease of Chonseil is more sensitive than price increase. This is from the characteristic of housing market. Even though house price is not decrease, just stagnate, the *Expected price increase of house* could not be observed by the first buy demander and investor. Therefore, the demand of Chonseil will increase and Supply of Chonseil will decrease due to the lack of both *new house build* and *Investor demand*.

The model presented in this research had been completed to verify in three steps. The price model of domestic housing market and Chonsei market that this research presented is verified by validation through experts panel and input-output analysis.

4.3 Summary

In this chapter, this research validated its developed model with two processes.

First, this study introduced casual relationship which was found from the various references in order to support its linkage of each variable.

Second, at experts validation process, developed model had been validated by five expert panels. The panels agree with problem statement of this study as well as include the each sub-model. Also they gave advice to improve previous model.

Chapter 5. Analysis of Past Government Measures

5.1 Analysis of Lease Market Stabilize Measures 2011

In 2011, Ministry of Land, Transport and Maritime Affairs announced the lease market stabilizing policies as the measures for the continuing Chonseil price rising phenomenon. Lease market stabilizing measures was announced 3 times sequentially in 2011. The 3rd measure of September 18th was the most specific and vast. The first and second solution can summarize as deregulations for the rent business individuals and Chonseil demander. At the first and second policy, the government state to support tax and loan interest to the lease house demander. However these supports is not proper solutions for shortage of Chonseil supply, because the supports may lead to increase monthly rent supply rather than Chonseil supply due to the low interest. To explain with illustrated model, government support would be the reason of decrease at *Gap of interest rate between bank deposit and debt* explained in figure 3-4.

Also by the loop of B2, expanded government's support in the low interest rate would be able to increase Chonseil demand. Even though this policy is for the lower income group to procure Chonseil deposit, it may increase Chonseil demand, *requested Chonseil price by landlord*, hence, this policy would increase Chonseil price itself (R2).

Table 5-1 Ministry of Land, Transport and Maritime Affairs 2011 lease market measures

Division		Jan. 13 th Lease market stabilization measures	Feb. 11 th Lease market stabilization complementary measures	Aug. 18 th Lease market stabilization measures
Tax & Funding	Requirement Mitigation	· Tax support for Private lease business	· Tax of Capital gains mitigation, decrease Tax of real estate.	· Tax support requirement which need more than 3 house, mitigate more than 1 house. · Private lease business owner's living house also tax-exempt studio apartment (Officetel) can resist as a lease house, also given equal level of tax advantage compare to other private lease house
	Construction support	· Loan for construction of middle small house with 2% interest	· When construct private rental housing, fund will provide with mitigation of regulations.	· Support to construct studio apartment from public housing fund. · Housing fund will support when university construct its dormitory. · Boarding house near the university can be supported by housing fund
Supply support		· Buy multi-family houses to supply for the public rent house · Public Chonseil lease house selection process shorten for the early occupation	· An early construction of public rent house proportion of public rent house increase when re-construction of metropolitan	· Public lease house will complete before autumn major move period. · LH buy multi-family house to use for the public lease house · 1000 Public Chonseil house for low-income university student
Chonseil deposit support		· Chonseil loan part of housing fund for the low-incomer abolishes condition of 6months houseless period. · Expanding Chonseil loan (5.7 →6.6 trillion won)	· houseless loan interest decrease (4.5%→4.0%) for the annual earning money is less than thirty million won)	· Income tax exemption for the Chonseil, monthly rent fee widen from less than 30 million won to 50 million won · Expanding recipients for loan from housing fund · Chonseil deposit loan of housing fund up from 50 to 60 million won, repayment period maximum 6 years
Trade activation		-	-	· First house buyer loan interest rate low to 4.7%, 0.5% decrease · Build express bus for the unsold house region

The third lease market stabilizing solution which is announced at September 18th, is quite different from 2 previous policies with regard to the size and concreteness. They all increase participation of rent business individuals in small house supply though, supply of Chonseis was not distinguished with monthly rent, so it may not be effective on the Chonseis supply. However, measures of dormitory construction fund for university students, remodeling of decrepit boarding houses, and supporting 1,000 Chonseis rent houses for university students are expected to be successful although the amount is relatively small. In addition, 0.5% reduction of loan interest rate for the first house buyers can decrease Chonseis demand by accelerating house purchasing. The government increases expected revenue of rent housing market by upsizing the range of tax refund for Chonseis, monthly rent. However the effect for the real Chonseis supply is slight because the recipient in the whole rent housing market is relatively small.

Government's measures for stabilizing rent housing market through three times announcement generally neglect autonomy of housing market, also they are not considering house supply feedback from the construction industry which can only begin from activating individuals' house transactions. Thus, it is hard to get effects on Chonseis supply from individuals' investment. Also, these 3 policies are not accelerating autonomy of the housing market, because measures are limited only for the lease market, so the effects on the market will be different from initial intent.

In addition, each political parties were discussing direct regulation to price of Chonseis deposit and monthly rent fee. However, many ministries are skeptical to such regulations. In the short term, the regulation would make sudden increase of rent price before the regulation is adopted, also in the long term, it would make abnormal price creation by interrupting autonomic supply-demand of the housing and lease market.

5.2 Policy Suggestion through Developed Model

In the chapter 5, this study discussed about government measures in 2011. To improve effectiveness in the policy, housing market perspective policy which can encourage transaction of house and its autonomy should be preceded.

First, measures have to consider the outflow of Chonsei demand which can be a first buy demand of house market. According to several news paper in Korea many expert argue that the loan for first buyer have to reinforce. Since 2005, this measure which promote first buy for the houseless person, have implemented, however fund is not sufficient and demand always bigger than government estimation. Not even think of interest aid from public fund, tax decrease for 1-2 years for the first buyer would be remarkable effect in the both housing and Chonsei market.

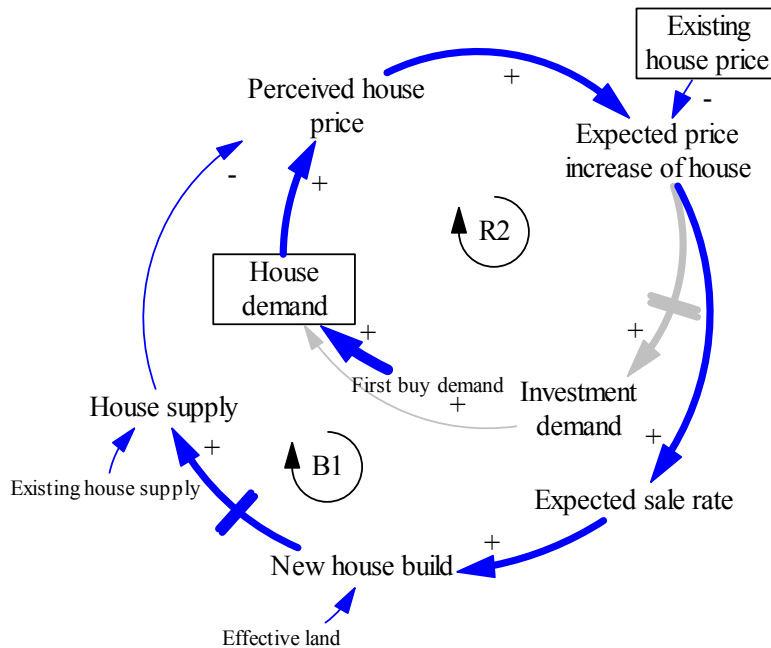


Figure 6-5 Initiating house demand(micro) and supply(macro) by *First buy demand*

As shown in figure 6-5 First but demand can initiate both house demand model and house supply model as well as micro/macro perspective transaction of house. Other measures and policy that government had implemented was not effective due to the shortage effects in both micro and macro perspectives market. Unfortunately, the fund for encouraging first buyer had been always scarce since 2006, but government did not increase its fund due to the financial reasons. Also, because of its insufficient fund, government has changed its criteria too frequently to reduce the recipients. To be more effectively, government have to widen its criteria and need more fund to give. Above all, this measure has to implement consistently.

5.3 Summary

In this chapter, we have discussed government specific measures by developed System dynamics model. Despite the seriousness of Chonseil phenomenon along the nation, 3 times measures of Korean government does not seem to be effective, because they consider monthly rent with Chonseil as well as only consider supply of Chonseil.

From developed model, this study suggests to encourage the purchase of new house from Chonseil tenant which would be the beginning of housing autonomy recovery.

Chapter 6. Conclusion

6.1 Conclusions

This research had analyzed Korean Chonseil market and housing market through system dynamics model regarding several interests of market stakeholder. This research had concentrated on feedback loops and casual loop diagrams of Chonseil to find effectiveness on the government policies.

In this research, Chonseil shows structural reasons which may hard to expect its future behavior: the homeostasis feature on perceived Chonseil-house price ratio, leverage effects of Chonseil deposit.

Also, using developed model, this study has evaluated government past measures for the Chonseil as well as suggested effective alternatives to boost both housing and Chonseil market. Through discussion with expert panels, model had been validated from variable inspection to the holistic context. In addition, price behavior had been validated from Chonseil and housing price index from 2005.

However, system dynamics analysis with certain feedback structure has a limitation compare to the real market behavior, thus, the model cannot be represent entire complexity of market. Limitation of each model has been described specifically before explain model.

In spite of the limitation, this research suggested to alleviate current Chonseil prices with reinforcing housing market autonomy.

References

KB bank(2012). "Housing, Chonsei price time series index" <<http://land.kbstar.com>>

The Ministry of Land, Transportation and Maritime Affairs(MLTM) (2011). "National housing supply trend analysis, November, 2011" <www.mltm.go.kr>

Kim, D. H. et al. (1999). System Dynamics, Daeyoung . pp.13 ~ 59

Shin, W. C. (2011). " A study of ripple effect of the rent (Chonsei) crisis on housing market." International Real Estate Policy Society 25(1): pp.149-157.

Shim, J. W. (2010). "A Time Series Analysis on Ratio of Chonsei to Monthly Rent with Variable Deposit Contracts of Apartments." Housing Studies Review 18(4): pp.163-182

Lee, W. J. et al. (2003). "The Characteristics of Consumer's Preference of house purchasing in the Capital Region of Korea" Journal of Korean Planners Association 38(3): pp.135-146

Lee, C. M. (2002). "The Characteristics of Consumer's Preference of house purchasing in the Capital Region of Korea." Journal of Korean Planners Association 27(6): PP.87-97

Lee, C. M. (2010). "Conversion Rate of Chonseil to Monthly Rent on Renter's Point of View." *Housing Study Review* 18(2): pp.163-182

Jung, I. H. (2011). "A study on the Causality of Housing Price and Chonseil Price in 8th School District – Focusing on Seoul Area" *Korea Real Estate Academy* 45: pp.5-17

Jung, E. C. (2005). "Housing supply forecast in a mid-term" Seminar of housing industry researchers: pp.1-38

Choi, C. G. (2007). "Modeling Chonseil and Monthly Rent Structure with Mortgage Lending and Tenant's Asset Constraint." *Journal of Korean Planners Association* 42(3): pp. 215-226.

Hwang, S. J. (2010). "A Dynamic Approach for Evaluating the Validity of Mortgage Lending Policies in Korean Housing Market." *Korea Institute of Construction Engineering and Management*, 11(5), pp.32~40

Hwang, S. J. (2011). "A System Dynamics Model for Analyzing the Effect of Housing Supply Policies." *Korea Institute of Construction Engineering and Management*, 12(5), pp.35~44

Ambrose, B. W. and S. Kim (2003). "Modeling the Korean Chonseil Lease Contract." *Real estate economics* 31(1): PP.53-74.

Cho, D. C.(2006). "Interest Rate, Inflation, and Housing Price - With an Emphasis on Chonseil Price in Korea." NBER SEMINAR ON ECONOMICS, NBER-EASE(15), PP.341-370

Cho, S. W.(2010). "Household Wealth Accumulation and Portfolio Choices in Korea" Journal of Housing Economics 19: PP.13-25

Dipasquale, D. (1999). "Why Don't We Know More About Housing Supply.", The Journal of Real Estate Finance and Economics, 18(1), pp.9~23.

Kim, C. and Kim, K. (1999). "Expectation and Housing price Dynamics Following Deregulation in Korea.", International Real Estate Review, 2(1), pp.126~142

Levin, E. J. and Pryce, G. B. (2009). "Why Determines the Price Elasticity of Housing Supply? Real Interest Rate Effects and Cyclical Asymmetries.", Housing Studies, 24(6), pp.713~736

O'Leary, T. J. (1990). "Validating Expert Systems", IEEE expert, 5(3), pp.51-58

Park, M. S. (2010). Boost, Control, or Both of Korean Housing Market : 831 counter measures, Journal of Construction Engineering and Management, 136(6), pp. 693-701

Sterman, J. D. (2000). Business Dynamics, Boston:Irwin McGraw-Hill, pp.191 ~ 232

국 문 초 록(In Korean)

2008년 세계 금융위기를 계기로 국내 주택시장의 가격정체와 전세가격의 상승이 오랫동안 지속되고 있다. 전세가격의 지속적인 가격 상승은 대부분 사회초년생 및 무주택자가 선호하는 거주지인 전세주택에 있어 가격 상승이 이들의 직접적인 거주 위협이 된다는 점에서 사회적 문제로 대두되고 있다. 정부는 다양한 정책을 통하여 이러한 전세가격의 안정과 무주택자의 거주지 안정을 위해 노력하고 있지만, 주택시장과 전세시장내의 구조적 이해 관계에 대한 인식 부족으로 정책의 효과를 제대로 보지 못하고 있다. 또한 선행연구에서는 다양한 주택시장, 전세시장의 독립변수에 의한 가격변화를 단선적으로 분석하고 있어, 다양한 변수와 이해관계자들이 존재하는 주택시장 및 전세시장 분석에 적합하지 않다. 이 때문에 본 연구는 주택시장을 포함한 전세시장의 작동원리를 시스템 다이내믹스 모델링 기법을 통하여 시각화·구조화 하고, 이를 바탕으로 정부의 전·월세 정책을 분석하였다.

분석결과 전세수요는 대부분의 무주택자가 주택구매이전에 선호하는 거주방법으로서 이후 실수요가 되며 투자수요와 본질적으로 다르다. 하지만, 이러한 실수요의 구매도 주택시장의 가격상승기대감이 존재하지 않으면, 투자수요와 함께 활성화 되기 쉽지 않다. 또한, 주택투자구매가 감소하게 되면 이로 인하여 투자거래에 의한 잉여주택이 생성되기 쉽지 않다. 이 때문에, 잉여주택의 임대시장공급 자체가 줄어들게 되고, 이것은 장기적으로

전세 공급의 감소로 이어져 주택가격하락이 전세가격 상승을 유발한다고 설명할 수 있다.

전세가격형성에 영향을 미치는 다른 요인으로 전세-매매비에 의한 가격향상성을 들 수 있는데, 이 때문에 정책 발표나 주택가격의 변화가 단기간과 장기간에 걸쳐 서로 다른 이유에서 비롯한 전세가격 변화를 유발 하는 것으로 분석되었다. 예를 들면 주택가격 상승에서 비롯된 단기적 전세가격 상승은 이후 투자주택공급에서 비롯되는 전세공급의 증가로 인하여 장기적 관점에서 가격 하락으로 이어질 수 있다.

2011년 정부는 3차례에 걸쳐 전, 월세 안정화 대책을 발표하는데 정부의 대책은 전세시장이 주택시장과 연결되어있다는 시각이 부족하고, 전세보증금의 지원이나, 임대인 세제지원 등의 단기적 정책 위주로서, 주택시장의 수요 공급 안정화를 전제로 하는 전세시장 공급 확대에 큰 영향을 미치지 못한다.

주요어: 전세, 시스템다이내믹스, 부동산, 주택시장

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