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Factors Affecting Housing Affordability in U.S. Local Government : Hierarchical Linear Modeling Regarding the Political Economy Perspective

미국 지방정부의 저소득층 주택공급정책 영향요인에 관한 연구 : 정치경제학 관점에서 계층선형모형 분석을 중심으로

박상철 미국 플로리다주립대학교 행정학 박사과정(제1저자)
Sang-Chul Park Ph.D. Course, Askew School of Public Administration & Policy, Research Assistant of Sustainable Energy & Governance Center, Florida State Univ.(Primary Author)
(sp06m@fsu.edu)

이세진 미국 플로리다주립대학교 행정학 박사과정수료
Se-Jin Lee Ph.D. Candidate, Askew School of Public Administration & Policy, Research and Teaching Assistant, Askew School of PA & PP, Florida State Univ.
(sl06r@fsu.edu)

김태진 국립 충주대학교 행정학과 교수(교신저자)
Tae-Jin Kim Professor, Dept. of Public Administration, Chungju National Univ.(Corresponding Author)
(tjkim@cjnu.ac.kr)

목 차

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I. Introduction

This paper introduces the presence of a nested structure[1] in the governmental dimension regarding the perspectives of political institutional economy(Tavares. et al. 2008) which explain the variation of housing affordability. The testing of hierarchical linear modeling for governmental nested structure can reduce the limitation of one-level analysis, and help to explain variations of the housing affordability driven by institutional analysis.

McCabe and Feiock(2005) argue that the one-level analysis has limitations for explaining the mechanisms or intergovernmental relations in terms of nested levels and "institutionalism". Furthermore, Feiock(2001) suggests that intergovernmental relations between high level(State Government) and low level(Local Government) provide the insights into complementary mechanisms affected by high level governmental and political circumstance in term of transaction costs. More specially, Ostrom(1990) has described the hierarchy structures(Nested Rules) in light of operational decision making and policy implementation. The low level institutions not only play a role by itself but also play a role of cooperation and integration between high and low level of government.

Previous housing affordability studies are conducted by the housing policy field in terms of housing price(Mathur. et al. 2004), local land use management(Burge and Ihlanfeldt. 2005), construction of affordable housing(Fischel. 2001), national or state level legislative process(Carr. 2007), housing subsidizing programs(Stone. 2006) and so on. However, Dixit(2009) indicates that the housing affordability crisis is required by political responsibility and accountability to increase housing units in which low and median income people in localities can be a homeowners or buy affordable housing in terms of local politics, and provided by different strategies and different priorities within community status such as level of income, poverty, black and population. Thus, variations among regional governmental dimensions have contributed to housing affordability issues, as predicted by the perspective of political incentive and priorities(Horn. 1995).

Regarding the primarily regional efforts in housing affordability and mechanism of governmental nested structure, this study tries to integrate and explain this phenomenon by utilizing the political economy perspective(Feiock. et al. 2008; Horn. 1995) and urban political economics(Helsley. 2003). Moreover, to overcome the limitation of single level analysis, the multi-level analysis(Raudenbush and Bruk. 2002) is employed for providing intergovernmental

1) Tavares. et al.(2008) introduce the hierarchical(Multi-level) structure to measure the factors influencing delay for land use decision-making in terms of city and counties choices with the perspectives of political institutions and land use management.

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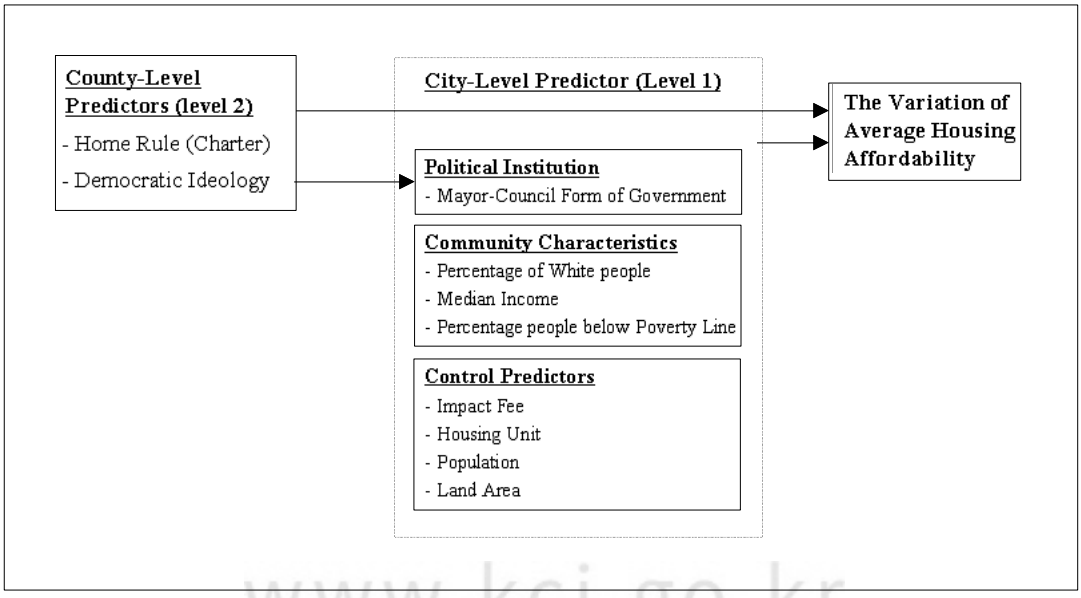
relations and explaining governmental hierarchical structure. Thus, the factors within each category of the political institutions and constituency demands determine regional and geographical differences of housing affordability. The following ideas are advanced: i) governmental hierarchy can represent the variations of housing affordability between local governments, ii) determination of housing affordability can be explained by the political economy perspective, and iii) potential factors(Institutions) in high level government can strongly influence the political pinstitutions at low level government.

II. Literature Review and Theoretical Framework

1. Housing Affordability and the Politics

During the last several decades, citizens and local governments have tried to develop city infrastructures and improve communities' wealth. The efforts of local developments have been matched with local economic development and increased the price of housing value. However, even though the impact of economic development has promoted residential area and positively influenced the local community, at the some critical point, local policies and approaches of local economic development concentration negatively impacted growth across cities' boundaries and aroused citizen

Figure 1 _ Theoretical Framework



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dissatisfaction. In terms of urban problems, and particularly urban sprawl[2], local governments have experienced problems such as loss of population, high price of housing, and accelerating out of reach of low income and working family, and large social gaps between citizens in terms of Not In My Back Yard(NIMBISM) and externalities of neighborhood property value(Galster. et al. 2004). The issue of housing supply and policies related with housing affordability, thus, becomes an important matter in community development.

Local governments have responded in various ways through governmental provisions with municipal decisions corresponding with the local comprehensive planning and housing regulation in terms of long term investment and policies reducing the urban sprawl(Alchian and Demsetx. 1973). Local governments point out that the reduction of housing affordability may be driven by market mechanism as developers focus on more expensive apartments and construction to increase housing costs for their benefits(Been. 2005). Further, the stream of NIMBYISM by pro-environmental groups, residential community associations(RCAs) and homeowner associations(HOAs) also causes the reduction of affordable housing(Helsley. 2003: p37). Therefore, local governments have been trying to reduce social injustice and discrimination bringing the isolation of low income people in terms of property rights(Pendall. 1999).

Regarding the social contextual problem (Fiscelli. 2005) related with housing affordability, local political institutions may determine the governmental housing supply and policies, and is related with institutional design and interacting with citizen in terms of political incentive and constraints. In the same sense, it is related with Clingermayer and Feiock(2001) argument that the constraints and incentives of political institutions affect the policy performance and municipal choices at local government in terms of community priorities under the concept of institution which can employ the meaning of “limited sets of possible results of social choice process”(North. 1990). Moreover, the community's interest puts pressure on political actor supplying the preferred policies of community interests group that have capability for political support or incentive. Housing affordability, therefore, has to consider the mechanism of political incentive constrained by community needs and voices in terms of political market perspective(Lubell. et al. 2005; Horn 1995), and be studied by regional or geographical different preference.

2) Department of Housing & Urban Development(2000) addresses that approximately 5.4 million households in the United States have kept the position with inadequately housing or cost burden more than half of their income for housing, and National Neighborhood Coalition(2001) indicates that the low-income family has a net of shortage for taking rental housing and most of affordable housing are already occupied by the higher income people.

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2. Hierarchical Modeling and Political Market

1) Governmental Hierarchy

Benton(2003) argued that the evolution of county government has been followed by the county wide authority at the aspects of historical administrative or political institutions and needs of research agenda about county government. The county government research is defined as "the nested hierarchies which indicate that political institutions, high level of autonomy, local social and spatial contexts providing that higher government should be more likely to intervene, local actor who presents that contingent top down actions by intergovernmental relation, intersectional cooperation and administrative conjunctions on local coalition building"(Sellers. et al. 2007). Regarding the discretionary authority in high level government, the public policy choice and implementation influence on policy decision making in low level of government and determine the community wealth and citizen satisfaction(Martin and Nyban. 1994). With above perspectives, the local government brings the integration of multiple strategies and tools devised by "win-win" approaches between cities, unincorporated areas and county government(ICMA. 2007).

2) Political Economy Perspective

A previous study by Tiebout(1956) addresses that the public have the main actors for choosing or moving to the local government to get better public service or their economic satisfaction in terms of the aspect of "foot voting". Tiebout focuses on the positions of demanders who determine where they will be the place being much better off. However, the political economic perspectives try to contribute to verify the collective choice problem caused by the Tiebout model which is driven by demanders oriented model, but also the political equilibrium models within a community(Helsley. 2003). This suggests that political institutions can amplify the majority rule and better respond majority preferences. The perspective of political economy integrates local politics and emphasizes the political incentive and preference controlled by constituencies' demand for making policy choices and providing public goods from collective action(Ramirez. 2008; Lubell. et al. 2005). Community interest groups take part in the policy process and affect the political action arena to get preferred policy outcomes(Eggertsson. 1990). Political institutions, that is, determine the policy directions, procedures and policy tools, and the responds the community priority in terms of progressive and institutional reform. Helsley(2003) indicates that "political economics is a useful tool which verifies the fundamental optional policy choices by political and

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institutional constraints". Thus, local political institutions generate jurisdictional interests or benefits through policy change and political power to affect residential development for political incentive from constituencies' voting power(Denzau and Weingast. 1982). After reviewing previous research, we group them into two equally intriguing sub-field of study. This research is based on County Level predictors(Home Rule Charter[3], Democratic Ideology[4]), and City Level Predictor(Political Institution: Mayor-Council Form of Government[5], Community Characteristics: Percentage of White people, Median Income, Percentage people below Poverty Line, Control Predictors: Impact Fee, Housing Unit, Population, Land Area). Based on it, we develop our theoretical framework for this study<see Figure 1>.

III. Research Design

1. Data Construction

This study is based on cross-sectional analysis, and the unit of analysis is Florida 67 counties, 404 cities and 66 unincorporated areas[6]. Most of data are constructed by the previous research which is "Politics, Institutions and Local Government Provision of Environmental Public Goods".(Feiock. et al. 2008) and involves five published data as: U. S Census Bureau(1999), ICMA's survey(2000) and Directories of the Florida League of Cities(1999; 2000). Other data set are employed by the Florida Housing Data Clearinghouse(FHDC) and Florida Legislature Committee on Intergovernmental Relations(FLCIL).

2. Analytical Method and Measurement Instrument

Hierarchical linear modeling(HLM) is a useful tool for measuring the natural nested structure because it takes into accounts the relationships and verifications between different groups, and within groups' structure(Raudenbush and Bryk. 2002). The HLM reduces the problems of aggregation data at one unit level analysis combining with high level of structure. It means that the HLM prevents the coefficient, effect of residual and pure effect of predictors from

3) Home-Rule Charter; Charter increases county governmental authority and discretion. Counties having their home-rule charter can provide discretionary policies without state government interferences.

4) Democratic Ideology is regarded as liberalism.

5) Usually, United States cities are categorized by mayor-council form, council-manager form and mixed-form of government.

6) Duval, unincorporated area is consolidated into the cities' area.

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Table 1 _ Descriptive of Variables Used in HLM Analysis

Cities' and Unincorporated areas-level Dependent Variable	
• AFFORDINDX	Affordability Index in 2000 calculated by following formula as $\frac{\text{Median\_Family\_Income}}{\text{Qualifying\_Income}}$
City and unincorporated area-level Predictors	
• MCF	The effects-coded dichotomous variable: 1 for mayor-council form of government, 0 for other form of government in 1999
• POVERTY(P)	The effects-coded continuous variable: the percentage of people who are under poverty level in 1999
• WHITE(W)	The effects-coded continuous variable: the proportion of white people in 1999
• LAND AREA(LA)	The effects-coded continuous variable: the area in square miles in 2000
• HOUSING UNIT(HU)	The effects-coded continuous variable: total number of housing units in 1999
• IMPACT FEE(IF)	The effects-coded dummy variable: 1 for implementation of impact fee, 0 for not implementation of impact fee in 2000
• POPULATION(PL)	The effects-coded continuous variable: the number of population in 2000
• MEDIAN INCOME(MI)	The effects-coded continuous variable: the average of median income with log natural in 1999
County-level Predictors	
• CHARTER(C)	The effects-coded dichotomous variables: 1 for county having charter, 0 for county not having charter
• IDEOLOGY(I)	The effects-coded dichotomous variables: 1 for county being dominance of democrat ideology, 0 for county being not dominance of democrat ideology

misinterpretation and misleading at measurement. Thus, HLM is more applicable to analyze the governmental nested structure(Thum. 1997).

1) Housing Affordability

Housing affordability is usually measured by the median housing price comparing with median housing income, and predicts the supplied or satisfied housing units or stability in localities(Kutty. 2005). To more specifically measure about capacity of buying a house, it is necessary to include the qualifying income(Anthony. 2003). Thus, for defining of housing affordability, the following formula constructs housing affordability index[7]:

7) Housing affordability index(Shimberg center. 2005: pp48-50) is driven by the Florida Housing Data Clearinghouse(FHDC) at the 2004 annual report, "The State of Florida's Housing 2004".

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○ $AffordabilityIndex = \frac{Median\ Family\ Income}{Qualifying\ Income}$

- Qualifying Income: mortgage constant*median housing sale price
- Mortgage constant formula[8] = $interest\_rate/[1-[1/(1+interest\_rate)^{n}$

Following the affordability index, when the city and unincorporated areas present the bigger ratio of affordability index, the median or low income households can afford to buy the median houses, or occupied median house rate is high in local community.

2) Methodological Identification

The variables are separated by two categories which consists of county variables and city and unincorporated areas variables. The specific measurement is the same as above<Table 1>.

(1) One Way ANOVA Model(Unconditonal Model)

The one way ANOVA model is primarily first step for measuring about confirming hierarchical structure and the variations between county governments. The governmental-nested structure emphasizes the contributions and effects of higher level of government meaning that each county government enforce the different policy priorities and description which in turn influences policy decision making and implementation of cities and unincorporated areas. Especially, McCabe and Feiock(2005) have indicated the variation of intergovernmental policy preference, and Benton(2002) denotes that the county governments having the difference of social ecological environment affect the various policy responsibilities and shape the variations of governmental policy implementation. Thus, in order to investigate the housing affordability within the governmental-nested structure, the ANOVA model should be applied. This governmental hierarchy is followed by the equations:

$Level\ 1\ (Cities\ \text{and}\ uinicoperated\ Areas)\ :\ Housing\ Affordability\ = \beta_{0j} + r_{ij}$

$Level\ 2\ (Counties'\ Governments)\ :\ \beta_{0j}\ = r_{00} + u_{0j}$

$Mixed\ Model\ (One\ Way\ ANOVA\ Model)\ :\ Housing\ Affordability\ = r_{00} + u_{0j} + r_{ij}$

8) The mortgage constant formula driven by the "Property-Investing.Org"(2008) and 30 year mortgage interest rate is 7.8%.

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(2) Random Coefficient Model

To measure of housing affordability, the political economy perspective is categorized by the political institution(Policy Supply Side) and constituencies' demands(Policy Demands Side), and emphasizes the political incentive and benefits maximization of demanders(Ramirez. 2008; Lubell. et al. 2005; Horn. 1995). Feiock and Kim(2000) test the predictors including form of government and community demands for applying to political economy(Helsley. 2003). They argue that the mayor-council form of government purses short term political benefits and implements new development policies based on political incentives such as reputation or reelection. However, the development policies depend on the community preferences. The political officials(Strong Mayor) cannot provide or accelerate the developmental policies such as economy development or residential development without community agreement or supports. The mayor-council form of government, furthermore, has the characteristics of geographical politics. It comes from the shared interest policies and reduces the political costs and risks for representatives and supports the regional preferences (Clingermayer and Feiock. 2001). In the mayor-council form of government, the housing policies and supply tools are enforced by the municipal interest with lower coordinating cost among the diverse benefits and interests and residential development(Lang. et al. 2008). Thus, mayor-council form of government is positively related with housing affordability.

Regarding the expectation of political activity by constituencies' preference, Persson and Tabillni(2000) argue that the constituencies in political arena participate in the policy choices with "voting, lobbying or other behaviors influencing political institution". In terms of consumer perspective in political market, the constituencies' demands are regarded as player of benefits maximization(Edlin and Shannon. 1998). Thus, socioeconomic status is related to policy choice and implementation. High income and white population attempt to pursue the pro-environmental policy or policy related with increasing property value and negatively related with housing affordability. The population in minority status or high poverty level is related positively with increasing housing constructions and needs (Clark. 2005; Ihlanfeldt. 2004).

The total housing units and square miles of land area is positively related with residential development capacity and community wealth(Kelly. 2003). Those factors not only constrain housing supply and affect on residents' mobility from construction of housing but also influence on housing affordability through politics of land set in circumvent regulations. Regarding to land use management techniques, the impact fee, usually, determines the housing price with elastic characteristics in terms of increasing housing quality and well arranging infrastructures(Mathur. et al. 2004). Increased housing price through impact fee constrains the range of affordable housing, and finally determines the community housing affordability in terms of median housing

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Table 2_Random Coefficient Model

Mixed Random-Coefficients Model Housing Affordability =

$$r_{00} + r_{10}(MCF) + r_{20}(P) + r_{30}(W) + r_{40}(LA) + r_{50}(HU) + r_{60}(IF) + r_{70}(PL) + r_{80}(MI) + u_0 + u_1(MCF) + u_2(P) + u_3(W) + u_6(IF) + r$$

* Level 1(Cities and Uncopprated Area): Housing Affordability$_{ij}$=

$$\beta_{0j} + \beta_{1j}(MCF_{1j}) + \beta_{2j}(P_{2j}) + \beta_{3j}(W_{3j}) + \beta_{4j}(LA_{4j}) + \beta_{5j}(HU_{5j}) + \beta_{6j}(IF_{6j}) + \beta_{7j}(PL_{7j}) + \beta_{8j}(MI_{8j}) + r_{ij}$$

* Level 2(County Government) :

$$\beta_{0j} = r_{00} + u_{0j},\ \beta_{1j} = r_{10} + u_{1j},\ \beta_{2j} = r_{20} + u_{2j},\ \beta_{3j} = r_{30} + u_{3j},\ \beta_{4j} = r_{40},\ \beta_{5j} = r_{50},\ \beta_{6j} = r_{60} + u_{6j}$$
$$\beta_{7j} = r_{70},\ \beta_{8j} = r_{80}$$

value comparing with median income(Been. 2005). That is, the increased housing value prevents the low or median income family from buying houses or being the homeowner.

To test the relationships between predictors and housing affordability, the random-coefficients model explains what the average of the 395 regression equations(i.e. what the average intercept and slope are), how much the regression equations vary from county to county, and what the correlation between intercepts and slopes is(Raudenbush and Bryk. 2002). Thus, through random-coefficient analysis, it is possible to verify the average differences among counties governments and different average effects of cities and unincorporated areas factors to influence on determination of housing affordability.

(3) Intercepts and Slopes as Outcome Model

The intercepts and slopes as outcome model allows to estimate the variability in the regression coefficients across the county governments in terms of what characteristics of county governments predict why some county governments have higher means than others and which factors of some county governments have greater effect of cities' and unincorporated areas' factors. With regard to intercepts and slopes as outcome model, the home-rule(Charter) and Democratic ideology are employed as potential predictors influencing cities' and unincorporated areas' factors. Tavares. et al.(2008) employ the potential factors including home-rule charter and democratic ideology. Reformed county governments through home-rule charter significantly increase their policy discretions and autonomy, and they have high commitments in regional development and attempt to reduce the regional conflicts(Benton. 2002). Also, the Democratic ideology in county governments supports that the liberal chiefs and administrators involved in welfare politics, and they have priorities of redistributive policies. Thus, home-rule charter and democratic ideology in county governments positively influence on political institutions and

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Table 3 _ Intercept and Slopes as Outcome Model

Mixed Intercept and Slope as Outcome Model Housing Affordability =

$$r_{00} + r(C) + r(I) + r_{10}(MCF) + r(MCF \times C) + r(MCF \times I) + r_{20}(P) + r_{30}(W) + r_{40}(LA) + r_{50}(HU) + r_{60}(IF) + r_{70}(PL) + r_{80}(MI) + u_0 + u_1(MCF) + u_2(P) + u_3(W) + u_6(IF) + r$$

*** Level 1(Cities and Unincorporated): Housing Affordability$_{ij}$=**

$$\beta_{0j} + \beta_{1j}(MCF_{1j}) + \beta_{2j}(P_{2j}) + \beta_{3j}(W_{3j}) + \beta_{4j}(LA_{4j}) + \beta_{5j}(HU_{5j}) + \beta_{6j}(IF_{6j}) + \beta_{7j}(PL_{7j}) + \beta_{8j}(MI_{8j}) + r_{ij}$$

*** Level 2(County Government) :**

$$\beta_{0j} = r_{00} + r_{01}(C) + r_{02}(I) + u_{0j},\ \beta_{1j} = r_{10} + r_{11}(C) + r_{12}(I)u_{1j},\ \beta_{2j} = r_{20} + u_{2j},\ \beta_{3j} = r_{30} + u_{3j},$$
$$\beta_{4j} = r_{40},\ \beta_{5j} = r_{50},\ \beta_{6j} = r_{60} + u_{6j},\ \beta_{7j} = r_{70},\ \beta_{8j} = r_{80}$$

average housing affordability in cities and unincorporated areas.

3) Data Analysis

A multicollinearity problem is when two independent variables are highly correlated and the resulting statistical model cannot accurately estimate their independent variables effects on the dependent variable(Afifi, Clark and May. 2004). Thus, the independent variables are investigated by a VIF(Variance Inflation Factor) test, and correlation matrix before testing the interaction effect. After this investigation, the VIF is below five indicating that the multicollinearity problem is not an issued for this model.

A residual analysis(Raudenbush and Bryk. 2002) suggests that the data set has the problem as a violation of assumptions denoting that the two groups are equal as homogeneity and data have to present the normal distribution with expected mean zero and equal variance, not issued by the outliers. To investigate the residual analysis, first of all, the 'l1resid' which indicates the difference between the fitted and observed value for each city and unincorporated area and 'fitval' which presents fitted value for each city and unincorporated area. In terms of two tests, the 'l1resid' and 'fitval' present normal distribution. Furthermore, the variables in cities and unincorporated areas have normal distribution. Finally, through all testing of residuals, it is possible to decide that the predictors in hierarchical linear modeling of housing affordability explain well at level across counties.

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IV. Empirical Findings

1. Descriptive Analysis and One Way ANOVA

After hierarchical linear analysis investigating the factors influencing on housing affordability, the model verifies the governmental hierarchy, political economy perspectives, and are justified with the statistical significance. In the table 4, the descriptive analysis is presented for housing affordability; the 395 observations for cities and unincorporated areas, and 65 observations of counties level of government, including the mean, standard deviation, minimum and maximum value at all predictors.

For investigating the variation of the outcome within and between counties, and reliability of each county's sample mean as an estimate of its true population mean, the One Way

Table 4_Descriptive Statistics

	Variable	Observation	Mean	SD
Level 1 (City and Unincorporated areas)	HOUSING AFFORDABILITY	395	1.10	0.40
	MCF	395	0.27	0.44
	WHITE	395	74.54	22.17
	POVERTY	395	14.00	8.22
	MEDIAN INCOME	395	2.79	4.62
	IMPACT FEE	395	0.34	0.47
	POPULATION	395	35072.16	98762.81
	HOUSING UNIT	395	21514.43	67403.64
	LAND AREA	395	117.00	450.47
Level 2 (County)	CHARTER(HOME RULE)	65	0.28	0.45
	DEMOCRATIC IDEOLOGY	65	0.46	0.5

Table 5_Results from the One-Way ANOVA Model

Fixed Effect	Coefficient	Se	T-statistic	p-value
- Average Housing Affordability, r_{00}	1.163	0.035	33.255	0.000
Random Effect	**Variance Component**	**df**	χ^2	**p-value**
- County mean, u_{0j}	0.234	64	309.177	0.000
- Level 1 effect, r_{ij}	0.321			

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ANOVA(Raudenbush and Bryk. 2002) with random effects is run as following results in <table 5>. The One Way ANOVA model provides the primary test of nested structure in terms of governmental hierarchy. The data set of housing affordability has the 67.8% reliability estimated, and is verified by governmental hierarchy with statistical significance of variance component(P<0.01). The average housing affordability across counties is about 1.163. This has a standard error of 0.035 and present within 95% confidence interval[9] as 1.163±(1.96×0.035) = (1.094, 1.232). Under the normality assumption, to indicate a substantial range in average housing affordability among counties, the plausible values {A 95% plausible value: $1.163 \pm 1.96(\sqrt{0.054}) = (0.708, 1.617)$} is calculated as following equation; $\hat{r}_{q0} \pm t_{.025}(\widehat{\tau_{qq}})^{1/2}$. Finally, the estimation of intra class correlation(ICC)[10] showing the proportion of variation between counties is about 42.2% for housing affordability(Raudenbush and Bryk. 2002).

2. Random Coefficients and Intercepts & Slopes as Outcome Model

To test of relation between housing affordability and predictors(mayor-council form of government, white, poverty, median income, impact fee, total housing unit, land area, and population) the random coefficient model is run and measured at statistical significant level in <table 6>.

As I expected, the county level variation is statistically significant(p<0.01) and average difference(Intercept) of housing affordability across the number of cities and unincorporated areas across counties is still statistically significant(p<0.01) when controlling for other effects of predictors. In fixed effect, mayor-council form of government is positively significant effect(p<0.05), white is negatively significant effect(p<0.05), land area is negatively significant effect(p<0.1), median income is negatively significant effect(p<0.05), and impact fee implementation is negatively significant effect(p<0.05). Moreover, in random effects between counties, the predictors of mayor-council form of government(p<0.1), white(p<0.05) and poverty(p<0.05) are statistically significant.

For investigating the "proportion of reduction in variance[11]", the changed variance calculated at level of city and unincorporated area is reduced about 14.5% taking accounted for by white, mayor-council form of government, poverty and impact fee. Furthermore, ICC is presented by

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9) A 95% confidence intervals is calculated by as following equation; 95% CI $(\widehat{r_{01}}) = \widehat{r_{01}} \pm t_{.025}(\widehat{V_{r01}})^{1/2}$

10) The intra-class correlation is presented by following equation; $\hat{\rho} = \widehat{\tau_{00}} / (\widehat{\tau_{00}} + \widehat{\sigma^2})$

11) Proportion variance is calculated by following equation; $\hat{\sigma}^2$(random_ANOVA)− $\hat{\sigma}^2$(with_predictors)/ $\hat{\sigma}^2$(random_ANOVA)

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Table 6 _ Results from Random-Coefficient and Intercepts and Slopes as Outcome Model

	Random-Coefficients Model			Intercepts and Slopes as Outcome Model		
Fixed Effect	Coefficient	T	p-value	Coefficient	T	p-value
Overall Housing Affordability, r_{00}	**3.399**	5.136	**0.000**	**3.181**	4.452	**0.000**
- CHARTER, r_{01}	-	-	-	-0.066	-0.887	0.379
- DEMOCRAT IDEOLOGY, r_{02}	-	-	-	**0.137**	1.942	**0.056**
MCF slope, r_{10}	**0.094**	2.692	**0.009**	**0.122**	2.012	**0.048**
- CHARTER, r_{11}	-	-	-	**-0.116**	-1.679	**0.098**
- DEMOCRAT IDEOLOGY, r_{12}	-	-	-	0.038	0.397	0.692
POVERTY slope, r_{20}	-0.003	-0.736	0.465	-0.006	-1.384	0.171
WHITE slope, r_{30}	**-0.003**	-2.111	**0.038**	**-0.004**	-2.303	**0.025**
LAND AREA slope, r_{40}	**-0.00004**	-1.897	**0.058**	-0.00003	-1.631	0.103
HOUSING UNIT slope, r_{50}	-0.000001	-0.758	0.449	-0.000001	-0.811	0.418
IMPACT FEE slope, r_{60}	**-0.082**	-2.641	**0.011**	**-0.062**	-1.817	**0.074**
POPULATION slope, r_{70}	0.000001	0.714	0.475	0.000001	0.856	0.093
MEDIAN INCOME slope, r_{80}	**-0.189**	-3.232	**0.002**	**-0.163**	-2.516	**0.013**
Random Effect	Variance Component	χ^2	p-value	Variance Component	χ^2	p-value
County mean, u_0	0.297	12.321	**0.015**	0.294	12.908	**0.002**
MCF slope, u_1	0.008	9.198	**0.055**	0.01	8.154	**0.017**
POVERTY Slope, u_2	0.0002	17.334	**0.002**	0.0002	13.567	**0.009**
WHITE Slope, u_3	0.00003	21.186	**0.001**	0.00003	20.902	**0.001**
IMPACT FEE, u_6	0.002	4.147	0.387	0.002	4.442	0.349
Level-1 effect, r	0.085			0.084		
Reliability						
INTERCEPT, β_0	**0.527**			**0.528**		
MCF, β_1	**0.242**			**0.275**		
POVERTY, β_2	**0.501**			**0.507**		
WHITE, β_3	**0.499**			**0.510**		
IMPACT FEE, β_6	**0.066**			**0.080**		

the 77.7% of explanation in random-coefficients model which is slightly increased by the county-level variation comparing with One Way ANOVA model. The reliabilities of intercept(52.7%), white(49.9%), poverty(50.1%), mayor-council form of government(24.2%) and impact fee(6.6%) in random level 1(City and Unincorporated Area) coefficients have estimated the reliability for testing the extent of data explanation.

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After investigating the random coefficient model, the final model of intercepts and slopes as outcome is estimated. In the table 6, the model provides that the potential factors from county government influence on factors of city and unincorporated areas for determination of housing affordability. The unique effects of charter and ideology have statistical significance to average housing affordability and mayor-council form of government. The Democratic ideology, that is, positively influences on average housing affordability($p<0.1$), and charter(home rule) negatively affects to mayor-council form of government which increases the housing affordability ($p<0.1$).

Overall, the cities' and counties' predictors are the same effects with statistical significance at random coefficients model. But, in terms of adding the county governmental predictors, the variance components of average housing affordability($p<0.05$) and mayor-council form of government($p<0.05$) are more statistical significant caused by reducing the county government variance. As reducing the county level variance, the proportion variance is reduced by 1% after adding the charter and democrat ideology at intercept of housing affordability and mayor-council form of government. Even though it reduced small proportion, the charter and democrat ideology predictors are related with variability of cities' and unincorporated areas' housing affordability. Moreover, the reliabilities of intercept of average housing affordability(52.8%), mayor-council form of government(27.5%), white(51%), poverty(50.7%) and impact fee(8%) are increased by effects of adding the charter and democrat ideology.

V. Conclusion and Discussions

Through the study of hierarchical linear modeling of housing affordability, the authors offer the following two contributions: i) governmental hierarchy in terms of variation of cities and unincorporated areas across counties with factors which are political institutions, socio-economic status, community or physical characteristics and impact fee(Land Use Policy Tool), ii) political economy perspective in public policy can explain the determination of housing supply, and the constraint in terms of interaction between political dimension and constituencies' demand(Community Demand). Furthermore, previous theories and research provide the construction of available or applicable factors in both governmental levels, and regarding hierarchical linear modeling, the factors can be influential dimensions for explaining the local housing affordability.

The nested governmental structure is well presented by One Way ANOVA model. The county government has a positively or negatively effect on cities' and unincorporated areas' policy decision making and outcome(Feiock. et al. 2008; Sellers. et al. 2007; ICMA. 2007; Ostrom. 1990), and

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has the difference of average housing affordability across counties. It may come from the not only difference of ecological environment but also difference of priorities for community development or legislative politics. The mayor-council form of government across counties has a preference to increase the housing affordability in terms of geographical or regional pragmatic policies based on high performance-oriented short term policy directly promoting and subsidizing the housing construction(Feiock and Kim. 2000; Gerber and Philips. 2003; Clingermayer and Feiock. 2001). It is likely to be interested in reducing the social gap between high income and low income through the housing policies, and perhaps does not try to implement the short term policy if the policy brings the negative externality and political risks(Clingermayer and Feiock. 2001).

In terms of political economy perspective, the mayor-council form of government might try to reflect the regional or geographical priorities to take benefits of political incentive as reelection or political careers(Feiock and Kim. 2000; Gerber and Philips. 2003; Clingermayer and Feiock. 2001), and the constituencies' demands which is related to income level and housing value in terms of property right and priorities of homeowners(Lubell. et al. 2005). One might interpret that white residents have a preference for pro-environmental policy and strong private government which is explained by the "residential community association(RCAs) and homeowner associations(HOAs)"(Helsley. 2003). This demonstrates that they have the characteristics of discriminatory and undemocratic for the policy decision making of public services and regulation within "shadow government perspectives" in constitutional restriction. In land use, the homeowner association is hugely linked with their property value and holds the collective choice to make pro-environmental interests in land use. Otherwise, the low and median income people have the priorities of increased housing affordability.

Furthermore, home rule charter and Democratic ideology are tested as important predictors influencing housing affordability(Benton. 2003; Martin and Nyhan. 1994). Democratic ideology influences positively on the average housing affordability across counties. It shows that county wide liberalism and redistributive politics strongly affects to supply housing affordability to low or median income people. The results of charter have a negative effect mayor-council form of government based on geographical needs or policy. It might be related with mechanism of reducing the self autonomy of the mayor-council form of government(Benton. 2002; Jeong and Feiock. 2006) in terms of characteristics of governmental hierarchy.

The impact fee is one of the land use policy tools, and directly or indirectly influences the housing affordability. Most of study is related with negative effect from impact fee in terms of increased housing value. As houses increase in value, the low or median income group cannot afford buy a house. The impact fee, thus, has a negative effect on housing affordability(Been.

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2005; Mullen. 2003), which suggests that the land use management techniques can determine the housing supply and affordability.

However, this paper has a limitation about data set for using the hierarchical linear modeling. Usually, hierarchial linear modeling is more applicable with large data set at level-one data regarded as cities and unincorporated areas level (Raudenbush and Bryk. 2002). But this paper has constructed by counties, cities and unincorporated areas in Florida state. Thus, for complementing this paper's limitation, it is necessary to investigate about housing affordability using hierarchical linear modeling through national level data set for more applicable validity and reliability.

Lastly, this paper has implications to apply the governmental hierarchy and political market about housing supply and residential development in Korea. Regarding as intergovernmental relations and policy integration between high level and low level of government, local governmental authorities and discretions are emphasized by responding with local community needy and preference. Still, the political actors in Korea not only are constrained by voters' preferences and regional or geographical climate of election but also are strongly involved by partisan. It may be linked with mechanism of political incentive and political ideology. Additionally, the Korea government shapes the top-down hierarchy as strong central government, whereas local municipalities try to promote their administrative capacities and institutionalize the structure of self-governing. In terms of above governmental structure and mechanism similar with U.S. local governmental structure, this paper might be applicable to address the Korean politics to promote residential development or housing supply for increasing housing affordability. Further, if an empirical study applies to affordabitlity housing policy in Korea, it will provide diverse and variable policy recommendations for increasing affordability housing.

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ABSTRACT

Factors Affecting Housing Affordability in U.S. Local Government; Hierarchical Linear Modeling Regarding the Political Economy Perspective

Keywords: Governmental Hierarchy, Political Economy, Political Institution, Housing Affordability, Hierarchical Linear Modeling

Affordable housing has been an important concern for local governments in the recent and has become a more pressing issue. Efforts to understand and explain how local governments influence housing affordability have been less than successful because they ignore the fact that cities and unincorporated areas are nested within county government. Empirical models, thus far have not been able to capture this nested structure. This paper extends the political economy of local policy-making to investigate how the configurations of county and sub-county governments shape local housing affordability. Multi-level analysis is applied by estimating a hierarchical linear model. The empirical findings generally confirm the predictors of the political market explanation and reveal county level decisions influence affordability at the local level and that the hierarchical structure is responsive to constituency demands. As predicted, political institution plays a mediating role with relations to constituencies'demand.

미국 지방정부의 저소득층 주택공급정책 영향요인에 관한 연구: 정치경제학 관점에서 계층선형모형 분석을 중심으로

주제어: 정부 간 계층, 정치경제학, 정치적 제도, 저소득층 주택공급, 계층선형모형

지난 수십 년 동안 미국 지방정부에서 저소득층에 대한 주택공급정책은 중요한 관심대상이 되고 있다. 그동안 저소득층 주택공급정책에 미치는 지방정부의 영향력이 어느 정도인지를 설명하려는 연구들은 다소 미흡하였다. 그 이유는 첫째, 시 혹은 Unincorporated Area가 카운티 정부 내에 포함되어 있으며 이들의 영향력하에 있다는 사실을 무시하였다는 것이고, 둘째, 정부 간 계층구조가 주택공급정책에 미치는 영향력을 분석하기 위한 정교한 경험적 모형이 없었다는 점이다. 이러한 관점에서 본 연구는 정치경제학 관점에서 지방정부의 정책결정과정을 탐색하는 데 있다. 특히 저소득층 주택공급정책을 추진하는 과정에서 카운티 정부와 하위 계층 정부들 간에 어떠한 영향관계에 있는지를 분석하는 데 목적이 있다. 이러한 목적을 달성하기 위해 본 연구방법은 계층선형모형(HLM)을 사용하였다. 분석결과 기존 선행연구에서 제시한 정치시장 모형의 이론적 변수들이 주택공급정책에서 영향을 미친다는 것을 경험적으로 검증하였으며, 지방정부의 수준에서 카운티 정부의 영향변수가 카운티 내의 시정부 혹은 Unincorporated 정부의 저소득층 주택공급정책에 영향을 미치고 있음을 밝혀내었다. 또한 정치적 제도는 유권자의 수요와 관련된 중재자 역할을 하고 있음을 검증하였다.

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