A Study on Improvement Measures for Vacant Houses in South Korea Based on the Analysis of Their Causes A Comparison and Analysis Between the Seoul Metropolitan Region and the Local Regions

[1]Jaehwan Kim and [2]Heecheol Shim
[1]Faculty of Regional Development, Kongju Nat'l University, 54 Daehakro, Yesangun,
Chungnam, Korea
[2]Fishing Village, Specialized Support Center, Chungnam Institute, 900 Singyeongri,
Hongseong, Chungnam, Korea

Abstract: Vacant houses which cause damage to urban aesthetics and are a waste of resources are emerging as a new social issue. This study set out to compare and analyze the factors of vacant housing between the Seoul metropolitan region and five major metropolitan cities and the local regions with the data of "other" vacant houses and "deserted" ones (including the ones to be demolished)"of the population and housing census by the National Statistical Office. Multiple regression analysis was conducted with two main factor categories of vacant housing, the social and economic factors and the housing market environment factors. The analysis results were as follows, first there were significant negative (-) relations between the percentage of vacant houses and the percentage of the elderly population both in the Seoul metropolitan region and the five major metropolitan cities and the local regions, secondly, the percentage of deteriorated houses had negative (-) relations with the dependent variables in the local regions. These analysis results have implications for the importance of the influx of population into cities and a need for the central government and the local governments to take thorough management measures.

Key words: Vacant house, regression analysis, deteriorated house, stock housing, the Seoul metropolitan region, local region

INTRODUCTION

According to the population and housing census data published by the National Statistical Office, the number of vacant houses was approximately 510,000 in 2000, 790,000 in 2010 and over one million in 2015. The ongoing increase and negligence of vacant houses has caused physical and economic problems throughout society including the deterioration of the residential environment, hollowing out bad public order, poor aesthetics and an increasing burden of administrative costs. In cities that have recently been stagnant or declining, the number of vacant houses is rising even faster which led the local governments to recognize it as a new urban phenomenon and put more effort into finding solutions for it Kim and Lee (2015). The housing distribution rate recorded 100% already in 2008 which means that the increasing number of vacant houses and the deterioration of old houses have become inevitable social issues (Jeon and Kim, 2016). It is important to identify the causes of vacant housing in order to figure out the vacant housing issue that is emerging as a social issue. This study set out to examine the vacant houses in each city, gun and gu based on the population and housing census data of the National Statistical Office and search for solutions to prevent them. The National Statistical Office categorizes vacant houses as follows, the ones for sales, rent or moving, the ones not sold or with no resident, the ones under repair, the ones for temporary (occasional) use, the ones for business the deserted ones (including the ones to be demolished) and others (which include the ones not belonging to the first six categories). This study set three goal to figure out the characteristics of vacant houses to compare and analyze the differences in the factors influencing vacant houses according to different population distribution and residential environments between the Seoul metropolitan area and local areas and to provide policy implications for the future utilization plans and alternatives of vacant houses.

Corresponding Author: Heecheol Shim, Fishing Village, Specialized Support Center, Chungnam Institute, 900 Singyeongri,
Hongseong, Chungnam, Korea

MATERIALS AND METHODS

The present study decided to distinguish and analyze the factors influencing vacant housing by region and conducted multiple regression analysis with the dependent variable of the ratio of vacant houses for total houses including the categories of others and the deserted ones (including the ones to be demolished). South Korea was thus divided in 260 cities, guns, gus. The two middle categories of social and economic factors and housing market environment factors were set as variables based on previous studies. The regions with a relatively lower distribution of vacant houses including Seoul metropolitan region and five major metropolitan cities were compared with those with a relatively lower distribution of vacant houses including the other regions. The Seoul metropolitan region covers Seoul city and its neighboring Gyeonggi Province and Incheon Metropolitan city. The five major metropolitan cities include Daejeon, Daegu, Ulsan, Busan and Gwangju with the biggest population size across the nation. Local areas include all the cities around the nation except for the Seoul metropolitan region and five major metropolitan cities. The study compared 122 areas in the Seoul metropolitan region and five major metropolitan cities with 138 areas in the rest of the nation.

As seen in Table 1, there were more vacant houses in the local areas than in the Seoul metropolitan region and the metropolitan cities which was why the study distinguished the two regional categories to figure out factors influencing vacant housing. This will provide efficient policy implications for each with different characteristics.

Concept and categorization of vacant houses: The definition of vacant houses vary a little according to the characteristics, type and population of the concerned area. The recently revised ordinances of Seoul city and Gwangju Metropolitan city define vacant houses as houses or buildings that no one lives in or uses for a year or longer from the day when their residence or usage is checked. Offering total numbers and survey results with respect to vacant housing, the population and housing census divided vacant houses into five categories the ones for sales, rent, or moving, the ones not sold or with no resident, the ones under repair, the ones for temporary occasional use, the ones for business and others until 2010 and added another category of "the deserted ones (including the ones to be demolished" in 2015 to make them total six categories.

Review of previous studies: Studies on vacant houses usually cover one of five topics which include the analysis of factors related to vacant housing the current state and characteristics of vacant houses, analysis of vacant houses influence, analysis of cases in developed nations and management and utilization plans for vacant houses (Jeon and Kim, 2016; Hwang *et al.*, 2012). A study on the factors of vacant housing by Bassett *et al.* (2006) reported that, vacant houses lowered and reduced the real estate value based on literature study and resident interviews and that vacant housing was affected by various complex elements including debt race politics and economic situations. Mallach (2010) pointed out that vacant houses kept appearing and being neglected ultimately due to aging and shrinking populations. As for studies on the current state and characteristics of

Table 1: Current state of vacant houses by the administrative districts (2015)

Administrative district	Total vacant houses	"Deserted" vacant houses	"Other" vacant houses
Nationwide	1,068,919	79,425	10,856
Seoul city	79,049	7,384	1,380
Busan Metropolitan city	86,626	5,170	316
Daegu Metropolitan city	29,610	1,835	595
Incheon Metropolitan city	47,402	2,841	251
Gwangju Metropolitan city	26,705	1,203	74
Daejeon Metropolitan city	26,419	2,037	669
Ulsan Metropolitan city	21,423	1,152	49
Sejong Metropolitan autonormous city	16,458	81	95
Gyeonggi Province	144,893	6,060	3,369
Gangwon Province	59,260	3,548	609
Chungcheongbuk Province	54,884	3,334	416
Chungcheongnam Province	73,719	4,755	448
Jeollnbuk Province	73,869	7,177	424
Jeollanam Province	103,333	10,915	625
Gyeongsangbuk Province	108,114	13,262	790
Gyeongsangnam Province	98,680	8,142	717
Jeju special self-governing province	18,475	529	29

vacant houses (Silverman *et al.*, 2013) examined the current state and location characteristics of vacant houses in Buffalo, New York and reported that the percentage of vacant houses rose farther away from educational and medical facilities. The percentage of vacant houses increased in the surrounding areas of the one with a high percentage of vacant houses in a positive (+) relation and the percentage decreased in the surrounding areas of the one with a low percentage of vacant houses also in a positive (+) relation. As for studies on the influence of vacant houses (Han, 2014) found that in Baltimore, the longer a vacant house was neglected, the more influence it would have on the lower value of nearby real estate and reported an analysis result that a vacant house neglected for a long time would have negative (-) effects on the value of nearby buildings. Accordino and Johnson (2000) reported that vacant houses had negative (-) impacts on the local vitality and development as well as nearby buildings. Mikelbank (2008) reported that vacant houses had influences on the lower prices of nearby real estate and the most impact on the real state within the radius of 250-500 ft from them. As for studies that analyzed cases in developed nations (Yuni, 2011) introduced the bank of Vacant Houses in Japan and reported that, the bank built a database of vacant housing information introduced a vacant house to a new migrant in the area and provided additional services accordingly. Lee Jae-Woo examined the plans for vacant housing management in the UK and reported that, it was important to secure affordable houses by enforcing a mandatory measure making a mid and long-term arrangement system and making use of various subsidy programs at the local government level. Enumerated the policies and utilization plans for vacant housing management in Japan and raised a need for an outside business operator to form an organic network with the community and establish a harmonious relationship with the inner community in order to manage vacant houses in the area. Lastly for studies on the management and utilization plans for vacant houses, Oh

Seung-ha and Jo Won-seop examined the remodeling and characteristics of vacant houses in Yeongwon-gun and proposed that social issues related to vacant housing could be solved by using vacant houses as various facilities including cafes, resting places, cultural experience halls and Hwangtobangs to generate revenue and active promotion and intercession work at the local government level.

Organization and definition of variables: By revising and supplementing variables used in previous studies this study used the ratio of vacant houses which include the deserted ones (including the ones to be demolished) and others for the total houses as a dependent variable. The two major middle categories of factors influencing vacant housing were social and economic factors and housing environment market factors. The former includes the increase rate of households (%) the increase rate of the elderly population (%) and the percentage of the working population (%) whereas the latter included the current state of house transaction the percentage of deteriorated houses (%) and the ratio of houses for households (%).

Table 2 presents the revised and supplemented version of the variable organization by Noh and Yu.

This study used the data of a total of 260 cities, guns and gus (as of 2017) provided by the population and housing census (2015) and the Korea Appraisal Board. Of the independent variables, the social and economic factors included the increase rate of households for 5 years from 200-2010 and it was deemed to be an important indicator for the social conditions of the concerned area. The increase rate of the elderly population was also based on the increase rate variables of the population and housing census for the period between 2010-2015. The percentage of the working population was based on the percentage of the working population age 15 or older for the entire population of each area. As for the current state of housing transactions under the category of housing market environment factors, the number of housing transactions was added as

Table 2: Organization of variables

--Variables--		Definition	Source
Dependent variable	Percentage of vacant houses including "deserted vacant houses" and "other vacant houses"	Percentage of "deserted" and "other" vacant houses in total houses	Population and Housing Census
Independent variables	**Social and economic factors**		
	Increase rate of households (%)	Increase rate of households for five years (2010-2015)	Population and Housing Census
	Increase rate of the elderly population (%)	Increase rate of the population aged 65 or older for 5 years (2010-2015)	Population and Housing Census
	Percentage of the working population (%)	Percentage of the working population aged 15 or older for the entire population (2010)	Population and Housing Census
	Housing market environment factors		
	Current stage of housing transaction (number)	Current stage of housing transaction (2015)	Korea Appraisal Board
	Percentage of deteriorated house (%)	Percentage of buildings constructed in 1979 or before in total houses (2015)	Population and Housing Census
	Ratio of houses for households (%)	Ratio of houses for households (2015)	Population and Housing Census

Table 3: Basic statistics

Variables	Average	Minimum	Maximum	SD
Percentage of vacant houses (%)	0.97	0.0041	4.57	1.03
Increase rate of households (%)	8.53	-9.35	129.79	15.09
Increase rate of the elderly population (%)	18.22	-26.93	61.97	13.70
Increase rate of the working population (%)	63.53	38.53	66.70	198.12
Current state of housing transactions (number)	6042.71	59.00	35.043	6569.87
Percentage of deteriorated houses (%)	6.70	00.03	63.12	2.66
Ratio of houses for households (%)	113.07	69.09	219.45	20.86

a variable to figure out the flow of housing transactions in the concerned area. The percentage of deteriorated houses was calculated based on the percentage of deteriorated houses built in 1979 or before (Lim and Lim, 2012) in total houses. Lastly, the ratio of houses for households was calculated as of 2015.

Descriptive statistics: Table 3 shows the basic statistics of 260 cities, guns, gus across the nation. The percentage of vacant houses including other vacant houses and deserted ones in total houses was an average of 0.97%. It was the lowest in Bundang-gu of Seoul city (0.41%) and the highest in Uiseong-gun of Gyeongsangbuk Province (4.57%).

The increase rate of households was an average of 8.53% with Integrated Cheongju city which was the merger of Cheongju city and Cheongwon-gun on July 1, 2014, recording the highest increase rate of households for its Seowon-gu and Cheongwon-gu. The increase rate of the elderly population was the lowest in the new Cheongwon-gu and Heungdeok-gu after the merger of Cheongju city and Cheongwon-gun and the highest at 61.97% in Cheongju city after the merger.

The average number of housing transactions was 6042 with Suwon city recording the highest number at 35, 043 and Ulreung-gun recording the lowest number. The percentage of deteriorated houses was an average of 6.7% with Yeongtong-gu of Suwon city recording the lowest percentage at 0.03% and Shinan-gun of Gyeongsangnam Province recording the highest percentage at 63.12%.

The ratio of houses for households was an average of 113.07% with most of the areas recording the ratio over 100%. Gimpo city was the lowest at 69.09% and Heungdeok-gu of Chungcheongbuk Province was the highest at 219.45%.

RESULTS AND DISCUSSION

With the percentage of vacant houses as a dependent variable, analysis was conducted of their causes across the nation, the Seoul metropolitan region and the five major metropolitan cities and the local areas to find policy implications according to regional characteristics (Table 4 and 5).

The F value of the Seoul metropolitan region and the five major metropolitan cities was significant at the significance level of 1% which represents the explanatory power of the model was 11.9%. All of the VIF values were under 5 which caused no issue of multicollinearity. These findings indicate that the fitness of the model was at the significance level. The increase rate of the elderly population was the variable with a significant value and negative (-) relation. That is when all the other conditions are the same an increase to the increase rate of the elderly population by a unit will result in a decrease to the percentage of vacant houses by 3% which is in line with the effects of fewer vacant houses according to the rising increase rate of the population in previous studies. The present study also found that a higher increase rate of the elderly population led to a lower percentage of vacant houses which is a little bit different from the findings of previous studies and seems attributable to the influx of population following rapid urbanization. That is an increase of the urban population, regardless of the age of the population will lower the percentage of vacant houses.

In the local regions, the F value was significant at the significance level of 1% which represents the explanatory power of the model was 41.7%. All of the VIF values were under 5 which caused no issue of multicollinearity. These findings indicate that the fitness of the model was at the significance level. Variables with a significant value were the increase rate of the elderly population and the percentage of deteriorated houses, both of which were in negative (-) relations. When the other conditions are the same, an increase to the increase rate of the elderly population by a unit will result in a decrease to the percentage of vacant houses by 0.34%. The rising increase rate of the elderly population led to the decreasing percentage of vacant houses in the local regions as well. As the population decreases both in cities and local regions today, the percentage of vacant houses will drop with the influx of population that return to farming or home village. That is any demand for houses will results in the lower percentage of vacant houses in the local regions like the case of the Seoul metropolitan region and the 5 major metropolitan cities. An increase to

Table 4: Regression analysis results (122 areas in the Seoul metropolitan region and the five major metropolitan cities)

Dependent variable: percentage of vacant houses ("other" vacant houses +"deserted" vacant houses/total houses)	Nationwide		
	B	t-values	VIF
Social and economic factors			
Increase rate of households	-0.001	-0.195	1.692
Increase rate of the elderly population	-0.018***	-3.676	1.280
Percentage of the working population	0.000	-.008	2.051
Housing market environment factors			
Current state of housing transaction	0.000	0.027	1.005
Percentage of deteriorated houses	-0.033	-1.242	1.087
Ratio of houses for households	-.003	-1.322	1.674

Constant term = 1.509, 2.688; Adj. R^2 = 0.119; F = 2.937***; N = 122

Table 5: Regression analysis results (138 areas in the local regions)

Dependent variable: percentage of vacant houses (other vacant houses+deserted vacant houses/total houses0)	Nationwide		
	B	t-values	VIF
Social and economic			
Increase rate of households	-0.007	-1.116	1.487
Increase rate of the elderly population	-0.034***	-3.671	1.635
Percentage of the working population	0.0001	0.178	1.198
Housing market environment factors			
Current state of housing transaction	0.000	-0.004	1.184
Percentage of deteriorated houses	-0.166***	-4.388	1.534
Ratio of houses for households	-0.003	-0.600	1.237

Constant term = 3.023, 5.650; Adj. R^2 = 0.417, F = 15.377***; N = 138

the percentage of deteriorated houses by a unit led to a decrease to the percentage of vacant houses by 16.6% which means that both the central government and the local governments are taking thorough measures to manage deteriorated houses by proposing various policies and projects related to vacant houses. They run an array of centers including an information center for vacant houses in agricultural and fishing villages and a total center for those who return to farming and home village, trying to make use of vacant houses as new residence. In addition, they remodel and repair deteriorated houses and use them as produce stores, coffee shops and resting places as part of their various attempts. It is also the result of active movements such as the movement of finding owners for vacant houses in agricultural and fishing villages in conjunction with social enterprises.

CONCLUSION

Using the data of 260 cities, guns and gus across the nation this study analyzed the factors influencing vacant houses neglected in the Seoul metropolitan region and the 5 major metropolitan cities and also in the local regions. A regression model was set with the dependent variable of the percentage of other vacant houses and deserted ones (including the ones to be demolished) based on the data of the population and housing census by the National Statistical Office. Analysis was conducted with a total 6 variables including social and economic factors and housing market environment factors based on previous studies. The findings were as follows first an increase to the increase rate of the elderly population resulted in a decrease to the percentage of vacant houses both in the Seoul metropolitan region and the 5 major metropolitan cities and in the local regions with some differences in significance between them which indicates that there is a demand for houses in cities with an influx of population in both cases. These findings raise a need for efforts to prevent neglected houses in the current situation of South Korea in which the elderly population, aged 65 or older is growing. Second an increase to the percentage of deteriorated houses resulted in a decrease to the percentage of vacant houses in the local regions which is likely due to the effects of vacant housing policies in various aspects at the local level and the efforts to utilize deteriorated houses anew in various aspects. Vacant housing is an increasingly emerging social issue. The central government, local governments and also social groups need to make diverse efforts and work together to solve the concerned issues including the inadequate systems and laws. It is also required to manage and analyze vacant houses on an ongoing basis and propose plans for vacant housing management that is efficiently fit for each area.

REFERENCES

Accordino, J. and G.T. Johnson, 2000. Addressing the vacant and abandoned property problem. J. Urban Affairs, 22: 301-315.

Bassett, E.M., J. Schweitzer and S. Panken, 2006. Understanding housing abandonment and owner decision-making in flint, Michigan: An exploratory analysis. Master Thesis, Lincoln Institute of Land Policy, Massachusetts, USA.

Han, H.S., 2014. The impact of abandoned properties on nearby property values. Hous. Policy Debate, 24: 311-334.

Hwang, J.I., Y.I. Choi and H.I. Kim, 2012. Analysis of current situation and perception of empty homes owners managing and using rural empty houses: Focused on Jeonbuk Wanju county. J. Agric. Extension Community Dev., 19: 989-1020.

Jeon, Y. and S. Kim, 2016. The causes and characteristics of housing abandonment in an inner-city neighborhood-Focused on the Sungui-dong area, Nam-gu, Incheon. J. Urban Des. Inst. Korea Urban Des., 17: 83-100.

Kim, J.Y. and Y.J. Lee, 2015. [Developing local cultural resources in Gwanin-Myeon, Pocheon city utilizing the concept of slow city (In Korean)]. Asia Pac. J. Multimedia Serv. Convergent Art Humanities Sociology, 5: 409-417.

Lim, Y. and H. Lim, 2012. Neighborhood regeneration policy proposal on the revitalization and reclamation of vacant urban spaces. Archit. Urban Res. Inst., 10: 27-37.

Mallach, A., 2010. Facing the urban challenge: The federal government and america's older distressed cities. Master Thesis, Brookings Institution, Washington DC., USA.

Mikelbank, B.A., 2008. Spatial analysis of the impact of vacant, abandoned and foreclosed properties. Master Thesis, Federal Reserve Bank of Cleveland, Cleveland, Ohio, USA.

Silverman, R.M., L. Yin and K.L. Patterson, 2013. Dawn of the dead city: An exploratory analysis of vacant addresses in Buffalo, NY 2008-2010. J. Urban Affairs, 35: 131-152.

Yuni, K., 2011. Japan's immigration assistance projects and poor housing choices. Urbanity Poverty, 92: 70-99.