

A Study on the Effects of Loan-to-Value ratio on the Financial Soundness of Commercial Banks

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Abstract

The purpose of this study is to investigate the effect of housing finance regulation on the banking management performance by analyzing the changes in the financial soundness of banks and changes in housing finance regulation. For this purpose, the independent variables such as changes in the amount of housing market, mortgage lending rate, housing transaction volume, house price, housing supply, and household nominal income are set. The dependent variables are BIS(Bank for International Settlement) capital adequacy ratio, classified loan ratio, and respectively. The rate of mortgage recognition was selected as a control variable. The results of the study are as follows. The increase in housing transactions has reduced the ratio of equity capital and classified loans. This implies that the increase in lending due to housing transactions has led to a decline in equity compared to loans, and that the loan generated at this time is a stable loan with a stable repayment potential. This means that the increase in loans caused by housing transactions has affected the decline in equity capital compared to loans, and that the loan generated at this time is a stable loan with a stable repayment potential. Furthermore, the bank's own loan review suggests that it has not already made risky loans enough and that excessive government regulations are infringing on the bank's autonomy. In other words, it can be seen that housing financial regulations are adversely affecting the reduction of banks' capital adequacy ratios due to interest rate hikes. This study presents research on real estate market stabilization policies such as housing supply expansion policies other than housing financial regulations that adversely affect the bank's financial health, while proposing ways to mitigate bank management shocks if housing financial regulations are inevitable.

Key word: Housing Finance Regulation, Commercial Banks, Financial Soundness, Mortgage Loan, Housing Transaction Volume

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I . Introduction

Housing finance served as a link to the demand for housing purchases by relieving the financial burden on housing prices. However, the housing financial regulations have emerged to normalize overheated markets and correct speculation through proper level of regulations, as excessive funds have been concentrated in the housing market, resulting in rising housing prices and side effects of curbing real demand. Housing finance regulations, meanwhile, have a function to strengthen the financial soundness of banks that lend housing and financial products. This is a policy that can be used as a means to prevent bonds that can lead to insolvency throughout the financial industry to secure financial stability. However, there is also a view that regulations on housing finance can undermine banks' competitiveness by infringing on their management autonomy. According to these opinions, housing financial regulations constrain the bank's major operations and cause the bank's management performance to deteriorate.

As such, the effectiveness of housing financial regulations has a wide impact on the performance of households, housing markets and banks, and there is room for controversy over their appropriateness. Most of the research so far has focused on the effect of housing financial regulations on stabilizing the housing market, but in this study, we want to analyze how they affect bank management performance through changes in the financial soundness.

If housing financial regulations negatively affect the financial health of commercial banks, they can be based on the grounds that housing financial regulations violate the bank's management autonomy. This means that housing financing through the bank's own review rather than regulation of housing financing by the government can block unhealthy loans, and excessive regulation violates the bank's autonomy. On the other hand, if housing financing regulations have a positive impact on the financial health of commercial banks, it can be judged that they contribute to the resolution of bad debts and make stable and sustainable management possible. This means that the stability of loans generated by the value of collateral determined by the bank itself is poor, so regulating them will help the bank's financial health and serve as a basis for financial regulations of commercial banks.

II. Theoretical background

Housing finance regulations have had a huge impact on the housing market and household debt, so there have been many prior studies related to them. However, different researchers have different views on its effectiveness, especially on the impact of housing financial regulations on banks' financial health.

First of all, as a study of positive aspects of housing financial regulations, Lim(2013) conducted a study¹⁾ focusing on the effects of improving household debt in housing financial regulations and argued that it is desirable to seek to address the increased likelihood of default. On the other hand, Heo(2012) argued that policymakers would prefer to regulate loans through LTV and DTI adjustments rather than interest rate adjustments to avoid the burden of debt repayment for the entire lender.²⁾

According to Kim(2017) as a study that raised questions about the effectiveness of housing financial regulations, excessive housing financial regulations could add to the repayment of the principal and interest burden on the vulnerable class, which could be a burden on the household economy.³⁾ Furthermore, he stressed that it is unlikely that the repayment of principal will occur, citing cases where housing prices did not fall below 70% even during the 2008 financial crisis. Meanwhile, Ko(2017) argued that although the overall household debt is increasing, mortgage loans are less than 50 percent of the total loans, so it is impossible to conclude that the increase in household debt is the cause of mortgage loans.⁴⁾ Rather, excessive regulations on housing finance will shift loan demand to non-banking sectors, adding to the burden on low-income earners and dampening consumer sentiment, slowing the economic recovery.

As such, existing studies focused on the effect of housing financial regulations on the household economy and the housing market. However, existing research has the following limitations.

1) Lim Dae-bong, Regulation on Loan in Housing Market, Housing Price, and Household Debt, 48 No.3 (2013):361-381

2) The Effect of DTI, LTV and Loan Repayment Conditions on Mortgage Mortgage Average Rate, Regulatory Study 21 no.2 (2012):39-77

3) Kim Deok-rye, "Appropriation Plan for Housing Finance Regulation" (Seoul: Housing Industry Research Institute, 2017)

4) Goh Sung-soo, The Effect of Household Debt Regulations on Housing Market, Daegu: Korea Appraisal Board, 2017)

Firstly, events such as new housing supply that occurred at the same time were overlooked, focusing only on trends before and after home finance regulations took effect. Secondly, pointing to an increase in the total household debt, overlooking the ability to repay and the soundness of the debt, only pointing to the amount of the liability. Thirdly, it was pointed out that funds were simply concentrated in the housing market, overlooking the effect of interest rate fluctuations.

The differentiation from the existing research in this study is as follows. First of all, we want to identify the combined impact of housing financial regulations by utilizing various variables such as total loan volume and housing transaction volume as well as housing supply. Secondly, the comparative analysis of real estate market indicators and bank financial soundness indicators can evaluate the qualitative dimensions of mortgage loans. Thirdly, it also focused on the effects of interest rates. The low interest rate trend after the financial crisis has caused excessive capital to flock to the housing market as it is now. As a result, we want to find out how interest rate fluctuations affect financial stability in the housing market.

III. Research Method

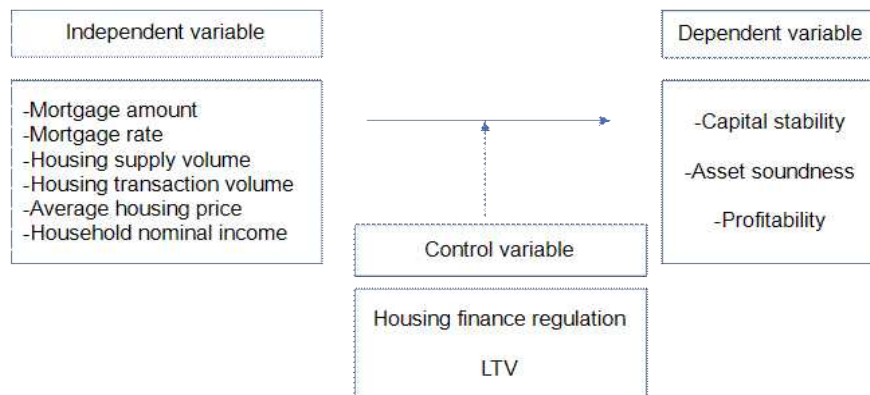
1. Research Design

This study seeks to find out how loan regulations arising from the mortgage rate affect the financial soundness of banks. However, there is a limit to viewing mortgage rates as a direct factor affecting the financial health of banks in the real estate market. Therefore, the government intends to analyze the effect of regulating the correlation between the housing market and the bank's financial soundness by injecting the housing financial regulation as a control variable.

The flow of the study is as follows. The independent variables include six variables: mortgage rate, mortgage rate, new housing supply, home transaction volume, housing price and housing supply, and the correlation between these variables is verified by structural equation modeling to derive more significant variables. The subsidiary variable established the financial health of the bank. Capital adequacy, asset soundness and profitability were selected as indicators for measuring the financial health of banks. LTV, a representative housing financing regulation, was selected as the control variable. We analyze the changes

in LTV regulation to generate variables that can be used for regression analysis. After analyzing each variable, the moderating regression identifies which factors and influences housing financial regulations affect the bank's financial health, and identifies how they affect the bank's financial health in this process through moderating effects.

[Figure 1] Research Model



2. Variable Settings

(1) Independent Variable

Since the above six independent variables have interrelationship, applying them directly to the regression model is a concern for the problem of multicollinearity. Therefore, the correlation of six independent variable factors is investigated through the structural equation model. In the model between independent variables, variables that are not affected by other variables are used for the regression analysis model with the bank's financial soundness.

(2) Dependent Variable

The scope of this study was the financial soundness of commercial banks for 16 years from 2002 to 2017. The criteria for measuring financial soundness were 'capital adequacy', 'asset soundness', and 'profitability'. The detailed indicators were 'BIS capital adequacy ratio', 'classified loan interest ratio' and 'net interest margin'. The above three indicators measure the stability of bank capital, the repayment possibility of loans, and the profitability of loans.

(3) Control Variable

The control variable was the quarterly LTV index. LTV regulation has the characteristic that it is limited to conclude as a single number because it has the characteristic that it applies differently according to the price of the target area and the house. To solve this problem, the weighted figure was used considering the area range, the price of the house, and household income.

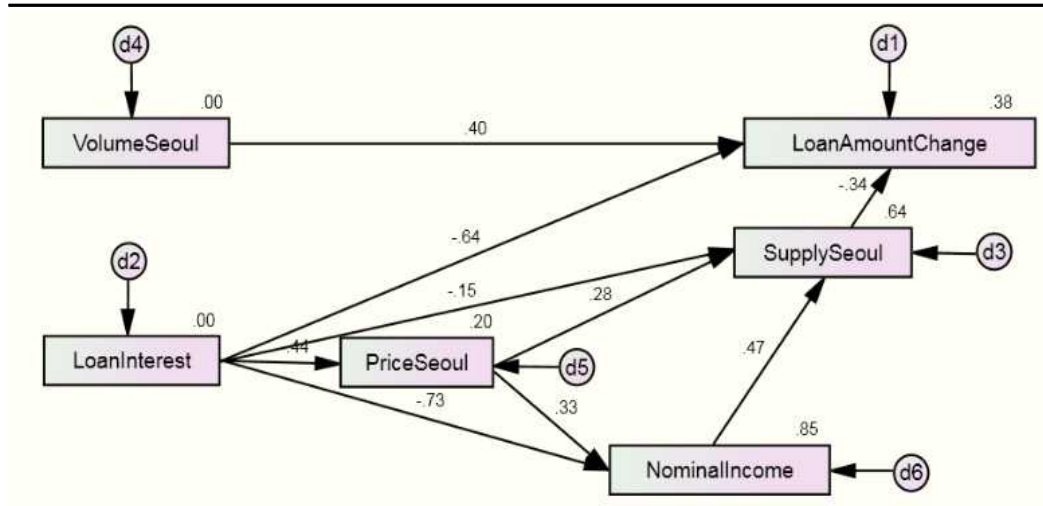
Considering the effects of loan regulations for the purpose of the study, the Seoul Metropolitan Area was limited to the region where the effects of housing financial regulations were most clearly expected. Currently, the areas of housing financial regulations are divided into speculative areas, overheated speculation zones, and areas subject to adjustment, including 19 districts in Seoul and Sejong City, and areas with significantly higher housing prices were selected. It was determined that Seoul is representative in analyzing the effectiveness of housing financial regulations as it is the region subject to the strongest loan regulations.

3. Methodology

SPSS and SPSS AMOS were used for the analysis, and the sources of the data were as follows: The 'new mortgage loans amount,' 'loan interest rates on mortgage loans,' 'housing supply volume,' 'housing transactions volume,' and 'housing prices' selected as independent variables were collected through the National Statistical Portal KOSIS, the Bank of Korea's Economic Statistics System and the Korea Deposit Insurance Corporation's General Information. The figures and local scope of DTI and LTVs selected as adjustment variables were referenced by the Ministry of Land, Infrastructure and Transport's public data and media reports, and the weights according to the number of houses were collected through data from Statistics Korea. The financial soundness data of commercial banks selected as a dependent variable were referenced in the disclosure data of the Financial Supervisory Service's Financial Statistical Information System. For definitions of terms, the Financial Services Commission's Financial Terminology Dictionary and the Ministry of Land, Infrastructure and Transport's disclosure data were referenced.

IV. Housing Market Index Analysis

[Figure 2] Independent Variable Structural Equation Modeling



Note) CMIN : 9.153, GFI : 0.944, NFI : 0.950, PNFI : 0.380

Figure 2 is a structural equation model based on the correlation of housing market indicators. The independent variable group used new mortgage loan amount, mortgage loan interest rate, housing supply amount, housing transaction amount, average housing price, and household nominal income in urban area, and listed as "Loan Amount", "Loan Interest", "Supply Seoul", "Volume Seoul", and "Normal Income". Mortgage volume increases when housing transactions increase, housing supply decreases and mortgage lending rates fall. The negative relationship between housing supply and mortgage loan seems to be due to the interest rate. The correlation analysis of the housing supply and mortgage loan amount did not show a significant correlation, but showed a positive relationship. However, the negative correlation in the structural equation model is not directly influenced by the direct effect, but the variable of the mortgage loan interest rate is strongly influenced. On the other hand, the housing supply increased as interest rates fell, housing prices rose, and household nominal income increased. This seems to be due to the decline in interest rates accelerating the inflow of funds into the housing market, raising housing prices and increasing household incomes driving such demand to supply. In addition, housing prices rose as interest rates fell, which was linked to the increase in housing supply and household nominal income. The mortgage loan rate affected all variables except the amount of housing transaction, and

the amount of housing transaction had a significant effect only on the variable of mortgage loan amount.

As a result of structural equation analysis, it is difficult to draw correlation with financial soundness of banks through the amount of housing supply, mortgage loan amount, household nominal income, and housing price, which were dependent variables. For example, mortgage loans are directly or indirectly affected by the remaining five variables. If the change in mortgage loan amount affected the financial soundness of commercial banks, it is difficult to analyze what variables caused such results. This is because mortgage loans can change only by increasing the amount of housing transactions even if the remaining variables are fixed. Therefore, in order to select variables that are not affected by dependent variables by other independent variables, mortgage loan interest rates and housing transactions were selected as independent variables of the study for financial soundness of commercial banks. This is because mortgage loan interest rates and housing transaction volume are the most independent variables and are representative variables that explain the housing market. Therefore, in the regression analysis model, the mortgage loan loan rate and the amount of housing transaction are set as the representative variables of the entire housing market, and the correlation between these variables and the capital adequacy, asset soundness and profitability of commercial banks is derived.

[Table 1] Housing Market Indicators Descriptive Statistics

	N	Minimum value	Maximum value	Average	Standard deviation
Loan Amount	48	-3.04	18.05	5.32	4.55
Loan Interest	48	2.72	7.27	4.63	1.31
Supply Seoul	48	9023.00	28283.00	17966.66	5681.86
Volume Seoul	48	13308.00	115994.00	39103.25	18602.82
Price Seoul	48	35175.00	56155.00	46204.56	4167.37
Nominal Income	48	3031383.00	4665034.00	3913956.33	482814.21
Number of effective numbers (by list)	48				

[Table 2] Housing Market Indicators Correlation Coefficients

		Amount	Interest	Supply	Volume	Price	Income
(Amount) Housing transaction volume	Pearson correlation coefficient	1	-.445**	.065	.492**	.020	.242
	Significant probability (both sides)		.002	.662	.000	.893	.098
(Interest) Loan interest rate	Pearson correlation coefficient	-.445**	1	-.678**	-.158	-.444**	-.873**
	Significant probability (both sides)	.002		.000	.282	.002	.000
(Supply) Housing supply volume	Pearson correlation coefficient	.065	-.678**	1	-.049	.648**	.777**
	Significant probability (both sides)	.662	.000		.742	.000	.000
(Volume) Housing transaction volume	Pearson correlation coefficient	.492**	-.158	-.049	1	-.178	-.043
	Significant probability (both sides)	.000	.282	.742		.225	.772
(Price) Average housing price	Pearson correlation coefficient	.020	-.444**	.648**	-.178	1	.653**
	Significant probability (both sides)	.893	.002	.000	.225		.000
(Income) Nominal income	Pearson correlation coefficient	.242	-.873**	.777**	-.043	.653**	1
	Significant probability (both sides)	.098	.000	.000	.772	.000	

Note) **. Significant at the Correlation Coefficient of 0.01 (both sides), N = 48

V. LTV(Loan to Value) Ratio Analysis

1. Method of Housing Finance Regulations Measurement

The strength of housing financial regulations is controlled by the regulation of the amount of loans for individual loans and the adjustment of the scope of areas subject to the amount of loans. Adjustment of the amount of loans for individual loans is implemented by

adjusting the ratio of LTVs. LTV is a mortgage maintenance rate, and strengthening it reduces the amount of loans compared to the value of collateral, resulting in a decrease in the total amount of loans. Regulated zoning is carried out through real estate regulatory zoning. As such, housing financial regulations regulate the scope of loans for a single loan, and at the same time, the enforcement of regulations is determined through the regional scope that applies. Consequently, the effectiveness of the regulation cannot be measured simply by considering the monetary scope of the regulation or, on the contrary, the regional scope.

[Table 3] LTV Indicator

$$LTV_i = \frac{\frac{(Unrealized\ collateral\ value\ with\ LTV)_n}{(Total\ security\ value\ of\ the\ house)_n}}{\frac{(Unrealized\ collateral\ value\ with\ LTV)_0}{(Total\ security\ value\ of\ the\ house)_0}} \cdot 100$$

$$= \frac{\frac{V_n - R_n \cdot LTV_n}{V_n}}{\frac{V_0 - R_0 \cdot LTV_0}{V_0}} \cdot 100$$

$$\begin{aligned} V_n &= (Total\ security\ value\ of\ the\ house)_n \\ &= (Housing\ transaction\ volume)_n \cdot (Average\ housing\ price)_n \\ R_n &= (Unrealized\ collateral\ value\ with\ LTV)_n \\ &= (Housing\ transaction\ volume\ in\ LTV-applied\ areas)_n \\ &\cdot (Average\ housing\ price\ for\ LTV-applied\ areas)_n \end{aligned}$$

The concept of LTV indicators was introduced to reflect this monetary and regional scope simultaneously. For the convenience of the study, this ratio was later labeled as LTV_i. First of all, we assume the maximum possible amount of loans contained within the local scope of the housing financing regulation. In this study, the total collateral value of houses in Seoul is defined as the limited area of Seoul. The index of n units is expressed as ‘Total Valuen’. Total Value is the total value of houses in the study area. Considering that the LTV regulation is a regulation based on the value of collateral, it was calculated based on the number of houses and the average price, while the value of collateral that was not realized in the current period due to the housing financial regulation is ‘Regulated Valuen’.

At this time, the ratio of the total loanable amount to the amount not realized due to housing financial regulations shall be 'Regulated Raten'. LTVi is an indicator that reflects both the expansion and reduction of the LTV regulation region and the increase and decrease in loanable amount, and it is possible to effectively measure the strength of the regulation. This indicator assumes the collateral value of individual houses as market price and does not reflect the LTV ratio applied differently to each house. Therefore, it is difficult to see accurate figures reflecting exact regulatory changes, but it means that they show strong changes in macro-regulation.

2. Analysis of the Effect of Housing Finance Regulation

Table 4 shows the effectiveness of each quarterly housing financing regulation. The LTVi value was set at 100 for the first quarter of 2006, and the figures for each quarter represent the effectiveness of housing financial regulations compared to the base year. This generally increased with higher home transactions and increased with stronger LTV regulations.

LTVi, which stood at 100 in the first quarter of 2006, has increased since the entire Seoul metropolitan area became a speculative area. This seems to reflect the strong real estate regulations of the participatory government, and then the strong loan regulations continued in 2007 and 2008. But in 2008, a financial crisis and the inauguration of the Lee Myung-bak administration changed this aspect. The Lee Myung-bak administration tried to solve the problem by easing regulations on the housing market because the housing market was stagnated due to the financial crisis. LTVi, which achieved its peak in 2008, has been steadily decreasing since then, indicating this deregulation trend. This trend continued after the launch of the Park Geun-hye government, and LTVi continued to decrease during the Park Geun-hye regime. However, since the launch of the Moon Jae-in government, the real estate price increase trend has been strengthened and the flow has been expanded to speculative aspects. As a result, the figure of LTVi in 2017 has been strengthened to the level of the participating government.

[Table 4] LTV Indicator

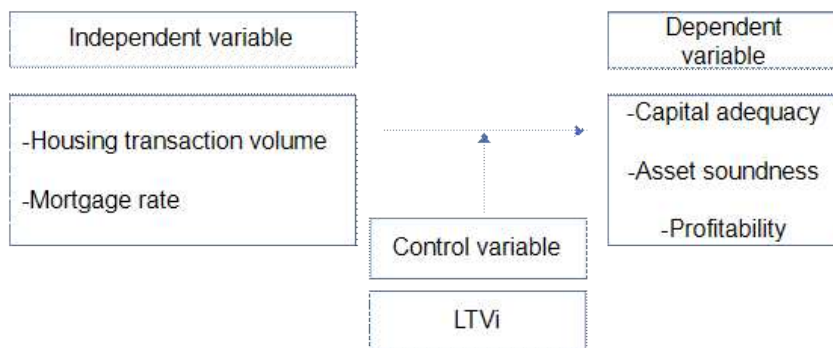
Period	Unrealized collateral value / Total collateral value	LTVi	Period	Unrealized collateral value / Total collateral value	LTVi
06.1Q	0.552	100.000	12.1Q	0.430	77.796
06.2Q	0.563	102.042	12.2Q	0.415	75.232
06.3Q	0.562	101.853	12.3Q	0.414	74.990
06.4Q	0.600	108.671	12.4Q	0.418	75.677
07.1Q	0.600	108.671	13.1Q	0.415	75.230
07.2Q	0.600	108.671	13.2Q	0.418	75.743
07.3Q	0.600	108.671	13.3Q	0.421	76.249
07.4Q	0.600	108.671	13.4Q	0.415	75.101
08.1Q	0.600	108.671	14.1Q	0.418	75.765
08.2Q	0.600	108.671	14.2Q	0.414	75.017
08.3Q	0.600	108.671	14.3Q	0.300	54.336
08.4Q	0.444	80.434	14.4Q	0.300	54.336
09.1Q	0.449	81.372	15.1Q	0.300	54.336
09.2Q	0.445	80.640	15.2Q	0.300	54.336
09.3Q	0.437	79.141	15.3Q	0.300	54.336
09.4Q	0.427	77.335	15.4Q	0.300	54.336
10.1Q	0.431	78.114	16.1Q	0.300	54.336
10.2Q	0.425	76.936	16.2Q	0.300	54.336
10.3Q	0.427	77.416	16.3Q	0.300	54.336
10.4Q	0.437	79.141	16.4Q	0.300	54.336
11.1Q	0.432	78.329	17.1Q	0.300	54.336
11.2Q	0.433	78.353	17.2Q	0.300	54.336
11.3Q	0.430	77.927	17.3Q	0.500	90.559
11.4Q	0.429	77.740	17.4Q	0.600	108.671

VI. Research Results

1. Moderating Regression Study Model

Based on the results of the structural equation model analysis, in this study, 'Housing Transaction Volume' and 'Housing Mortgage Loan Interest Rate' were selected as independent variables representing the housing market. The moderating regression model identified the correlation between home transactions and mortgage rates on the financial health of commercial banks and the adjustment effect of housing financial regulations, while identifying how home transactions and mortgage rates affect capital adequacy, asset soundness and profitability, respectively. This not only has the nature of pre-validation to verify the adjustment effect, but also allows us to identify how key variables in the housing market affect bank management. Next, the adjustment effect of the adjustment variable, LTVi, was identified to see if housing financial regulations had this effect in relation to the major variables in the housing market affecting the financial soundness of banks. To verify this, we also performed three multi-independent variable-moderating regression analyses.

[Figure 3] Moderating Regression Model



2. Moderating Regression Analysis Results

(1) Impact on Capital Adequacy

[Table 5] BIS Capital Adequacy Ratio Moderating Regression Analysis

Independent variable	Model 1			Model 2			Model 3		
	β	t	p	β	t	p	β	t	p
Housing transaction volume	-0.234	-3.488	0.001	-0.212	-3.024	0.004	0.048	0.690	0.494
Loan interest rate	-0.903	-13.472	0.000	-0.802	-7.008	0.000	-0.554	-6.219	0.000
LTV _i	-	-	-	-0.123	-1.1083	0.285	-0.272	-3.299	0.002
Housing transaction volume X LTV _i	-	-	-	-	-	-	-0.077	-1.206	0.235
Loan interest rate X LTV _i	-	-	-	-	-	-	-0.413	-6.785	0.000
R ²	0.803			0.808			0.912		
R increasing amount	-			0.005			0.104		
F-value	91.694			61.756			86.963		
F increasing amount	-			1.173			24.754		
p	0.000			0.000			0.000		

Note) Dependent variable : BIS Capital Adequacy Ratio

As shown in Table 5, the variable of housing transaction volume was derived from Model 1, but there was no significant p value in Model 3. This means that the increase in housing transaction volume has a significant impact on the decrease in capital adequacy, but the moderating effect of housing finance regulation is not significant.

The decline in BIS capital adequacy ratio means that equity capital has decreased or risk-weighted assets have increased. Among the two factors, it is the increase of risk-weighted assets that are judged to be affected by the increase in housing transaction volume. This is because new loans are generated due to new transactions, which can affect the increase in risk-weighted assets. If real estate transactions regulated by housing finance regulation are calculated as a high risk credit in the calculation of risk-weighted assets, it is judged that the regulation of this will weaken the correlation between the increase in transaction volume and the decrease in capital health. However, there was no significant

result, which means that real estate transactions restricted by regulations were not such dangerous assets.

The mortgage rate variable was derived with significant p values in Model 1 and Model 3. This means that the increase in housing transactions has a significant impact on the reduction of capital adequacy and that the moderating effect of housing financial regulations has been significant in the process. The rise in loan interest rates will be a burden on repayment. This repayment burden is believed to have affected the increase in the risk of loans, which led to an increase in risk weight and an impact on the fall in BIS. Housing finance regulations further strengthened the correlation between these declines. This reinforced the adverse effects of bank capital adequacy on rising interest rates due to housing financial regulations.

(2) Impact on Asset Soundness

[Table 6] Moderating Regression Analysis of Classified Loan Ratio

Independent variable	Model 1			Model 2			Model 3		
	β	t	p	β	t	p	β	t	p
Housing transaction volume	-0.531	-4.177	0.000	-0.473	-3.610	0.001	-0.371	-2.272	0.028
Loan interest rate	-0.212	-1.672	0.102	0.048	0.225	0.823	0.208	0.992	0.327
LTV _i	-	-	-	-0.318	-1.497	0.141	-0.555	-2.852	0.007
Housing transaction volume X LTV _i	-	-	-	-	-	-	0.258	1.723	0.092
Loan interest rate X LTV _i	-	-	-	-	-	-	-0.360	-2.510	0.016
R ²	0.291			0.326			0.510		
R increasing amount	-			0.034			0.185		
F-value	9.245			7.081			8.747		
F increasing amount	-			2.242			7.910		
p	0.000			0.141			0.001		

Note) Dependent Variables : Classified Loans

The variable of housing transaction volume was found to be significant p value in Model 1, but no significant p value was found in Model 3. This means that the increase in housing transaction volume has a significant effect on the decrease in the ratio of classified loans, but the moderating effect of housing finance regulation is not significant. As the amount of housing transactions increased, the ratio of classified loans decreased, which can be understood that the increase in real estate transactions reduced the ratio of classified loans by eliminating bad debts. However, since the moderating effect has not been verified, it seems to be a general phenomenon independent of housing finance regulation.

(3) Impact on Profitability

[Table 7] Net Profit Margin Moderating Regression Analysis

Independent variable	Model 1			Model 2			Model 3		
	β	t	p	β	t	p	β	t	p
Housing transaction volume	0.018	0.264	0.793	-0.029	-0.432	0.668	-0.125	-1.319	0.194
Loan interest rate	0.985	13.103	0.000	0.680	6.112	0.000	0.621	5.095	0.000
LTV _i	-	-	-	0.262	2.378	0.022	0.225	1.994	0.053
Housing transaction volume X LTV _i	-	-	-	-	-	-	0.177	2.040	0.048
Loan interest rate X LTV _i	-	-	-	-	-	-	0.050	0.604	0.549
R ²	0.796			0.819			0.835		
R increasing amount	-			0.023			0.017		
F-value	87.528			66.276			42.647		
F increasing amount	-			5.656			2.124		
p	0.000			0.000			0.000		

Note) Dependent Variables : Net Interest Margin

The housing transaction volume variable was not verified in Model 1. On the other hand, the loan rate variable was significant p value in Model 1, but no significant p value was found in Model 3. This means that the increase in housing transaction volume has a significant impact on the decrease in profitability, but the moderating effect of housing finance regulation is not significant. These results show that the volume of housing

transactions and the profitability of banks are not significantly related, but interest rates are correlated with the profitability of banks. This seems to be the result of the small profit that can be obtained from the margin due to the drop in interest rates.

3. Research Result Summary

[Table 8] Moderating Regression Analysis Test Result

Sortation	Verification	Results
1-1	The Effect of Housing Transactions on Capital Adequacy	-
1-2	The Effect of Housing Finance Regulations on the Capital Adequacy of Housing Transactions	X
1-3	Effects of Mortgage Rate on Capital Adequacy	-
1-4	The Effects of Housing Finance Regulations on the Capital Adequacy of Mortgage Rates	-
2-1	Effects of Housing Transaction Volume on Asset Soundness	-
2-2	The Effect of Housing Finance Regulations on the Property Soundness of Housing Transactions	X
2-3	The Effect of Mortgage Rates on Asset Soundness	X
2-4	The Effect of Housing Finance Regulations on the Property Soundness of Mortgage Rates	X
3-1	Effects of Housing Transaction Volume on Profitability	X
3-2	The Effect of Housing Finance Regulations on the Profitability of Housing Transactions	X
3-3	Impact on the Profitability of Mortgage Rates	+
3-4	The Effect of Housing Finance Regulations on the Profitability of Mortgage Rates	X

Note) + : Positive Relation, - : Negative Relation, X : Unrelated

The increase in housing transaction volume, which is a major variable in the housing market, reduced the ratio of capital adequacy and the ratio of classified loans. This means that the increase in loans due to housing transactions has caused the decline in capital adequacy compared to the loan, and the repayment possibility is stable. Mortgage rates were negative for capital adequacy and were strengthened by housing finance regulations. This means that the increase in the lending rate has a negative effect on the bank's management stability, but it has a positive effect on profitability. In this process, housing finance regulation strengthens the negative effect of management stability.

Ⅶ. Conclusion

1. Summary and Limitations

This study conducted an assessment of the quality aspects of loans generated through the increase in housing transactions and an assessment of the increase in the risk of banks for raising loan rates, with the following implications.

First, loans generated by increased housing transactions are not at high risk for repayment. The decrease in the capital adequacy ratio and the decrease in NPL ratio due to the increase in housing transactions means that the absolute amount of loans increases, but the risk has not increased compared to the increased amount of loans. This means that the bank's own loan review does not already provide risky loans enough, suggesting that excessive government regulations violate the bank's management autonomy.

Second, housing financial regulations have an additional adverse effect on banks' worsening capital adequacy ratios due to interest rate hikes. A hike in the benchmark interest rate leads to a hike in the lending rate, which causes the weight of risk-weighted assets reflected in the valuation of the capital adequacy ratio. The current situation in Korea is simultaneously raising interest rates and tightening housing financial regulations. Due to this situation, the recent tightening of housing financial regulations has raised additional management risks for banks, which has added to the management burden. Therefore, it would be necessary to study real estate market control through complementary methods to improve it.

Despite the efforts of researchers to objectively analyze market phenomena, this study did not reflect many individual factors affecting the housing market. It also has limitations that have been difficult to consider the impact of real estate regulatory announcements and the effect of new regulations. Therefore, subsequent research is expected to be more empirical and valuable if we conduct micro-change studies on the charter market, which has a significant impact on home sales transactions, and event analysis of impact effects before and after the government's regulatory announcement.

2. Implications for Future Society

In this study, as a policy measure for the deterioration of the financial soundness of

commercial banks due to the housing finance regulation policy, we would suggest as follows: Firstly, real estate policies that do not strengthen the bank's management burden should be studied. The study found that tightening housing financial regulations adversely affected the bank's management performance, meaning that the less government interference in the bank's management and the higher the bank's autonomy, the higher the bank's management performance. Furthermore, it can be derived that the bank's credit screening process is sufficient to control unhealthy loans. In this regard, if there is a real estate policy that does not adversely affect the bank's management performance, it is clear that choosing such a regulation will have a positive effect on both the bank and the real estate market. Therefore, it is time to consider a more fundamental solution rather than an indirect approach to the real estate market through fund market regulation. However, it is undeniable that the trend of real estate speculation and the rise in real estate prices have been steep for a while, so measures to manage it at an appropriate level should be studied.

Secondly, we would like to emphasize the need to improve the structure that is insensitive to real estate regulation by deregulating the banking industry and creating new profit models. Currently, the nation's commercial banks have the character of commercial banks and thus have a profit structure that relies on loan margins. Therefore, it has a sensitive nature to changes in the housing market, and the impact of housing financial regulations on banks' financial health has been significantly revealed in this study. In response, the relevant laws were revised to suggest that commercial banks grow into investment banks based on commercial banks. Currently, Korea's investment banking industry is based on large securities firms. However, fostering investment banks based on large securities firms suffers from limitations in capital. As a result, the government will be able to establish a sound investment bank based on commercial banks from the government's perspective, while the bank will be more insensitive to the government's regulation of the loan market.

As a way to stabilize the real estate market in Korea, the Housing Finance Regulation Policy has revealed its limitations in worsening financial competitiveness. In response, the government should study real estate market stabilization policies other than housing financial regulations, and if housing financial regulations are inevitable, it should revise bank regulations to provide measures to ease bank management shocks.

Banks' management risks and market volatility have been increasing due to a series of tightening housing finance regulations. Therefore, we sincerely hope that multilateral supplements to these regulatory policies will be studied together to contribute to stabilizing the real estate market.

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주택 담보 인정 비율이 시중 은행의 재무건전성에 미치는 영향에 대한 연구

최동하* · 강원석**

요약

본 연구에서는 주택시장의 변화에 따른 은행 재무 건전성의 변화와 그에 대한 주택금융규제의 조절효과 분석을 통하여 주택금융규제가 은행 경영성과에 가지는 의미를 도출하고자 한다. 이를 위하여 주택 시장의 대출량변화, 담보대출금리, 주택거래량, 주택가격, 주택공급량, 가계명목소득을 독립변수로 설정하였으며 종속변수로는 은행의 BIS자기자본비율, 고정이하여신비율, 순이자마진을 선정하였다. 그리고 대표적인 주택금융규제인 주택담보인정비율을 조절변수로 선정하여 그 효과를 분석하였다. 연구의 결과는 다음과 같다. 주택거래량 증가는 자기자본비율과 고정이하여신비율을 감소시켰다. 이는 주택거래로 인한 대출증가로 대여금 대비 자기자본하락 효과가 작용하였고 이때 발생한 대출이 상환가능성이 안정적인 여신임을 의미한다. 또한, 은행 자체적인 여신심사로 이미 충분히 위험한 대출을 실시하지 않았으며 정부의 과도한 규제가 은행의 경영 자율성을 침해하고 있음을 시사한다. 즉, 주택금융규제가 금리인상으로 인한 은행의 자기자본비율 감소에 악영향을 주고 있음을 알 수 있다. 본 연구는 은행의 재무건전성에 악영향을 주는 주택 금융 규제이외의 주택공급 확대 정책과 같은 부동산 시장 안정화 정책 연구를 제시하는 한편, 주택 금융 규제가 불가피할 경우 은행 규제를 개정하여 은행의 경영 충격을 완화할 수 있는 방안을 제안한다.

핵심 주제어: 주택금융규제, 시중은행, 재무건전성, 담보대출금리, 주택거래량

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