

STOCK MARKET RESPONSE TO THE FINANCIAL REGULATIONS IN THE MORTGAGE-LENDING MARKET IN KOREA

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ABSTRACT

This paper investigates the economic impact of the financial regulations that aimed to control the housing market in Korea. We test for the validity of the general prediction that the financial regulations in the form of the Loan-to-Value (LTV) and Debt-to-Income (DTI) restrictions would have adverse impacts on the value of the firms operating in the mortgage-lending industry. Overall, the DTI restrictions adversely affect only those banks that possess relatively large amount of mortgage loans in their asset portfolio.

1. Introduction

The global financial turmoil of 2007 triggered by the sub-prime mortgage loan problem in the U.S. has profoundly influenced the financial markets around the world, and its negative impacts seem to linger on and shadow the global economy up until now. The financial crisis unveiled the weaknesses of the global financial system, and caused tremendous uncertainties in the market. This in turn brought about a widespread reduction in holdings of risky assets, leading to the global economic downturn. Despite the unprecedented world-wide financial crisis, the Korean financial market stayed fairly resilient, compared to the rest of the world. In particular, the Korean real-estate market remained relatively stable, although the global real-estate markets underwent severe price drops. Many scholars and practitioners attribute the resilience of the Korean market to the regulations on mortgage loans that were reinforced in 2006 by the Korean government. At the heart of the regulations were the loan-to-value (LTV) and debt-to-income (DTI) restrictions. An LTV ratio stipulates the maximum amount of loan home buyers can take out, relative to the total value of the collateral - the value of the house. The Financial Supervisory Service, the regulatory authority over the Korean financial institutions, lowered in 2006 the LTV ratio from 60% to 40% to restrain home mortgage lending of financial companies. A DTI ratio is the percentage of a borrower's annual income that is funneled into paying back the principle and interest. The DTI restrictions first came into effect in early 2006 with the ratio set at 40%. The DTI restrictions initially applied solely to the loans on those houses located in areas specifically designated as "so-called" speculation zones¹ in the city of Seoul, and were extended later in the same year to include the homes traded in most of the Metropolitan Seoul area. The LTV and DTI restrictions were mainly geared toward controlling the housing prices, and many experts anticipated that the regulations would effectively force the speculative bubbles to subside in the housing market. At the same time, it was widely believed that the financial regulations would negatively affect the firm value of the mortgage-lending firms because the operating scope of those firms would become substantially limited.

In this study, we empirically investigate if such beliefs are substantiated. Specifically, we examine

¹ A district, called Gu in Korean, is designated as a speculation zone if the housing price of the district has increased at a rate exceeding ① 1.3 times the increase of the consumer price index in the prior month, and ② 1.3 times the increase in the average nationwide housing price in the two previous months.

whether the anticipated negative effects of the financial regulations are impounded in the stock prices of the mortgage-lending firms.² We break down these firms into three sectors, banking, savings banking, and insurance, and test the market responses separately for each sector. This is because each financial sector has its own unique legal and institutional aspects, which would lead to differential market reactions to the regulations. While the mortgage-lending industry as a whole is expected to suffer from the regulations, individual firms would likely be affected discriminately, depending upon how many home mortgage loans they hold. It is likely that the larger the mortgage loans being held, the more damage would be inflicted on firm value. To test for this differential effect, the mortgage-lending firms in each sector are further divided into two groups: those holding relatively high levels of home mortgage loans and those with relatively lower levels. Each firm in the former (latter) group has a loan amount that is higher (lower) than the median loan amount of the sample firms. We examine market reactions for each group of firms in each sector.

In our study, we focus on the stock market responses in the neighborhood of two distinct event dates. The first event date is March 30, 2006 on which the DTI restrictions were imposed for the first time in the Korean mortgage lending market, and the other is November 15 of the same year when both LTV and DTI restrictions were reinforced by the government: The LTV ratio was lowered, and the coverage of the DTI restrictions was extended to virtually the whole Metropolitan Seoul area.

The reinforced mortgage-lending regulations just before the global financial crisis of 2007 are widely credited as having kept the Korean financial market resilient amidst the crisis, although not purposely intended to do so. To our knowledge, however, no studies have been conducted thus far to empirically document the effect of the highly praised governmental policy measures. Our study would thus contribute to the related literature by presenting some empirical evidence on the government policy. Further, we expect our study to provide a glimpse into understanding what it means to regulate the real estate market through mortgage-lending rules.

2. Literature Review

Our study is basically an empirical investigation into the impacts of major changes in governmental regulations. Specifically, our study tests for the impacts by measuring the stock market reactions employing a typical event-study methodology. There is a vast literature of that nature, which includes Carow and Larsen (1997), Elickson and Maydew (1998), Bittlingmayer and Hazlett (2000), Chen and Schoderbek (2000), Ali and Kallapur (2001), Edwards et al. (2004), Navissi et al. (2005), Lee and Park (2007), and Armstrong et al. (2010), just to name a few recent studies.

3. Institutional Background and Research Hypothesis

3.1 Loan-to-value and Debt-to-income ratios

The major financial regulations imposed by the Participatory Administration center around restrictions on home mortgage loans in the form of loan-to-value (LTV) and debt-to-income (DTI) ratios. An LTV ratio equals the loan amount relative to the value of its collateral (i.e., houses) that the borrower offers. To control the housing market, the Korean government sets the regulative LTV ratio to a certain level, which in turn determines the "maximum" amount of loan that can be raised at a financial institution to finance the purchase of homes. A DTI ratio indicates a percentage of a borrower's annual income³ funneled into the payment of the principal and interest on the total debt held by the borrower. It

² Alternatively, we could test for the impact of the financial regulations on the real-estate market. But, compared to the stock markets, the relevant return data in the real-estate market are limited and less reliable. For instance, daily housing price data are not available, and the data processing institution is a private company. So we confine our study to investigating the stock market reactions to the regulations.

³ The loan applicant must provide information on annual income by submitting reliable evidence such as his/her tax return. The applicant

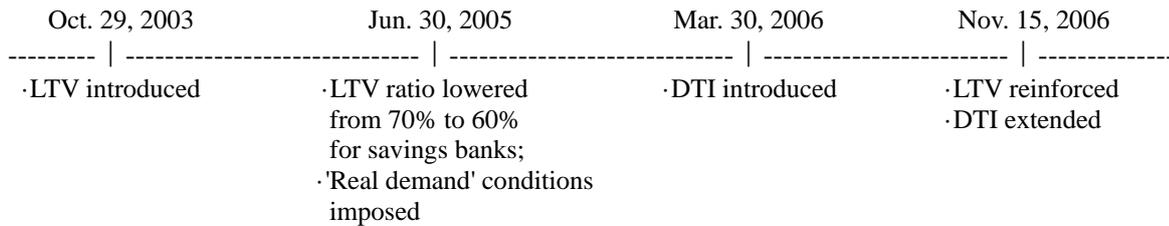
is computed as:

$$\text{DTI Ratio} = (\text{Annual principal and interest payment on home mortgage loan} + \text{Annual interest payment on other debts}) / \text{Annual income}$$

3.2 Historical perspectives of the financial regulations

The following timeline in Figure 1 summarizes the main events associated with the financial regulations discussed above.

<Figure 1> Important Dates Associated with Financial Regulations



3.3. Event Dates and Hypotheses

It has been widely thought that the financial regulations in the form of both LTV and DTI restrictions would have adversely affected the value of financial institutions operating in the mortgage lending market because they would largely limit the scope of their operations, thus eroding their profitability. To examine whether there was such an adverse effect of the financial regulations, we will investigate the stock price responses of those financial institutions on two critical event dates.

We now propose the hypotheses for our study in alternative forms:

Hypothesis 1: The stock prices of the financial institutions will react negatively to the announcements of the financial regulations in the mortgage lending market both on March 30, 2006, and on November 15, 2006.

While the mortgage-lending industry as a whole is expected to suffer from the regulations, it is also likely that individual financial firms will be affected differently, depending upon the extent of the operation in the market. So we set up the following hypothesis:

Hypothesis 2: The stock prices of the financial institutions holding larger mortgage loans will react more negatively to the announcements both on March 30, 2006, and on November 15, 2006.

4. Research Design

To test the hypotheses, we estimate daily abnormal stock returns for the dates included in the event window. Our window consists of the five days that include the event date and the two days before and after it. To measure the abnormal returns, we adopt the methodology of Ali and Kallapur (2001) as shown in equation (1) below:

$$R_t = \alpha_o + \alpha_1 R_{m,t} + \sum \alpha_{2i} D_i + \varepsilon_t \quad (1)$$

where:

R_t = daily return of the portfolio of financial firms

may include the annual income of the spouse if he/she carries no home mortgage loan.

$R_{m,i}$ = daily return of KOSPI (Korea Composite Stock Price Index)
 D_i = dummy variable, 1 for the five days included in the event window, and 0 otherwise.

We estimate equation (1) separately for each of the three financial sectors. Since both of the event dates belong to the 2006 calendar year equation (1) is estimated using 247 days of daily returns in 2006 (i.e., n=247). To test Hypothesis 2, we divide the sample firms into two groups on the basis of the median level of home mortgage loans: The high (low) group consists of the firms with mortgage loans above (below) the median level. We then run regressions of equation (1) for each group in each financial sector.

5. Empirical Results

Tables 1 through 2 report the regression results on the two event dates. Our main empirical findings are summarized as follows: The DTI restrictions seem to have negative effects mainly on the banks that hold relatively large amount of home mortgage loans in their asset portfolio. But such negative impacts appear moderate, compared to the strong concerns of the financial community. The savings banks with relatively large mortgage loans experience negative returns immediately before the event date (D-1 day), which are shortly reversed on D+1 day to slightly stronger positive returns. One possible explanation for such a reversal is that on D-1 day, the financial press reported news that the LTV cap on the savings bank loans was likely to be lowered to that of bank loans, but such unfavorable news was not substantiated in the official announcement made on D-day. In contrast, the banks with relatively small mortgage loans and all of the insurance companies seem to experience positive externality to a varying degree due to the DTI restrictions: The stock prices of these companies respond favorably.

The subsequent reinforcement of the LTV and DTI regulations negatively affect the banks with large mortgage loans, and this is to a much greater extent than in the case of the DTI restrictions. The reinforced regulations also adversely affect the savings banks with large mortgage loans, but to a lesser degree as compared to the adverse impacts on their counterparts in the bank sample. On the other hand, the same regulations have negligible impacts on all of the insurance companies, and the banks and savings banks holding relatively small amount of mortgage loans.

[Table 1] Regression results for Banks

$$R_t = \alpha_0 + \alpha_1 R_{m,t} + \sum \alpha_{2i} D_i + \varepsilon_t$$

Variables	Predicted sign	Banks		High		low	
		Coefficient	<i>t-value</i>	Coefficient	<i>t-value</i>	Coefficient	<i>t-value</i>
<i>Intercept</i>	?	0.000	0.44	0.000	0.61	0.000	-0.11
R_{mt}		1.147	24.07***	1.155	18.39***	1.287	16.42***
2006/3/28	-	-0.006	-0.76	-0.010	-0.91	-0.010	-0.73
2006/3/29	-	-0.007	-0.82	-0.020	-1.81*	0.000	0.02
2006/3/30	-	0.008	0.95	-0.001	-0.06	0.015	1.08
2006/3/31	-	0.017	2.02**	0.004	0.32	0.034	2.44***
2006/4/3	-	0.003	0.36	0.006	0.57	0.002	0.15
2006/11/13	-	0.008	0.97	0.012	1.08	0.000	-0.01
2006/11/14	-	-0.004	-0.48	-0.011	-0.95	0.000	-0.03
2006/11/15	-	-0.018	-2.09**	-0.021	-1.86*	-0.018	-1.25

2006/11/16	-	-0.014	-1.68*	-0.021	-1.86*	-0.007	-0.46
2006/11/17	-	-0.002	-0.20	-0.003	-0.27	-0.004	-0.32
Adj. R ²		0.71		0.54		0.53	
N		247		247		247	

Note 1) ***, **, *, indicates significance at the 1%, 5%, and 10% level, respectively (two-tailed).

[Table 2] Regression results for Savings Banks

Variables	Predicted sign	<i>Savings Banks</i>		High		low	
		Coefficient	<i>t-value</i>	Coefficient	<i>t-value</i>	Coefficient	<i>t-value</i>
<i>Intercept</i>	?	0.000	0.14	0.000	0.12	0.000	0.18
<i>R_{mt}</i>		0.955	9.51***	1.098	8.73***	0.800	6.92***
2006/3/28	-	-0.015	-0.84	-0.038	-1.70*	-0.001	-0.04
2006/3/29	-	-0.010	-0.55	-0.013	-0.58	-0.007	-0.33
2006/3/30	-	0.011	0.60	0.025	1.11	-0.004	-0.17
2006/3/31	-	0.024	1.31	0.043	1.90*	0.004	0.21
2006/4/3	-	-0.006	-0.35	-0.003	-0.14	-0.009	-0.44
2006/11/13	-	-0.006	-0.31	-0.003	-0.14	-0.008	-0.40
2006/11/14	-	-0.015	-0.83	-0.040	-1.76*	0.003	0.14
2006/11/15	-	-0.012	-0.65	-0.008	-0.37	-0.015	-0.73
2006/11/16	-	0.020	1.10	0.034	1.51	0.006	0.27
2006/11/17	-	0.001	0.04	0.002	0.10	-0.001	-0.05
Adj. R ²		0.26		0.25		0.14	
N		247		247		247	

6. Conclusion

This paper investigated the economic impact of the financial regulations that aimed to oversee the housing market in Korea. Specifically, we tested for the validity of the general prediction that the financial regulations in the form of the LTV and DTI restrictions would have direct and indirect negative impacts on firm value in the financial sectors. Overall, the DTI restrictions adversely affected only those banks that possessed relatively large amount of mortgage loans in their asset portfolio. In contrast, the banks holding a relatively small amount of mortgage loans and insurance companies appeared to entertain positive externality arising from the DTI restrictions. The subsequent reinforcement of the LTV and DTI rules negatively affected those banks with large mortgage loans, and this was to a much greater extent than in the case of the initial DTI restrictions. The reinforced regulations also unfavorably affected the savings banks with large mortgage loans, but to a lesser degree. However, the financial regulations had a negligible impact on all insurance companies and the banks (including savings banks) with a small amount of mortgage loans.

Of course, the financial regulations did not intend to create adversity in the mortgage-lending market of the economy: Rather, the regulations aimed at cooling down the inordinately speculative housing market. We could thus alternatively test for the direct impact of the financial regulations on the real-estate market. But, the relevant return data in the real-estate market are quite limited: For instance, daily

housing price data are not available because transactions do not take place on a daily basis in all districts. This prohibits us from studying the effects of the regulations on the housing market, at least in the short run. But we believe that our results should be supplemented by studies that investigate longer-run effects of the regulations on housing prices to gain a better understanding of the full impact of the regulations.

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