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Abstract: Existing papers analyzing the link between deposit insurance and bank market values have usually been confined to investigating incremental regulatory shifts in the banking sector. The latest case on the introduction of deposit insurance occurred in China, and therefore it gives us a chance to explore the stock market reaction to the major regulatory policy change in banking. Although the introduction of deposit insurance is usually expected to be favorable news for banks, our results show that the average abnormal returns of all listed banks in China are statistically significantly negative on the announcement day. They indicate that investors believe the introduction of deposit insurance has an adverse effect on the banking industry in China. We also find that among bank characteristics such as asset size, z-score, and ROE, only size has a statistically significant positive impact on the abnormal returns of the Chinese listed banks on the announcement day. These results mean that although compulsory deposit insurance certainly enhances small banks' credibility, China's capital markets think that the adverse influence is lower for big banks than for small banks. Our results, which are not fully consistent with those previously found in the United States and Denmark, indicates that the difference in the financial regulatory environment prior to the introduction of deposit insurance leads to differential wealth transfer.

Key words: deposit insurance, announcement, wealth effect, event study, China

JEL codes: G18, G21, G28, G38

1. Introduction

Whether deposit insurance has wealth implications for bank shareholders is a fundamental question for academics in banking. The extant literature on the issue (for example, O'Hara and Shaw, 1990; Maduraa and Bartuneka, 1995; Biswas et al., 2000) is based primarily on the United States banking sector and finds that stockholders of large or risky banks obtain a benefit and that negative effects accrue to those with holding stakes in smaller banks or more conservatively operating financial institutions. The United States was the first country to introduce a national deposit insurance system in 1933 in the midst of a banking crisis, and the above conclusion is drawn from observing incremental changes in the deposit insurance system of the United States; therefore, its generality is questionable for banks in other countries (Bartholdy et al., 2004).

The latest case of introducing a deposit insurance scheme occurred in China, and it permits us to investigate the potential wealth effects of a major policy shift in deposit insurance. On November 30, 2014, the China's central bank—the People's Bank of China—posted the draft bill of China's deposit insurance, and it was deemed the first official signal suggesting the coming adoption of a new and explicit deposit insurance. Prior to that date, China's central government had implemented a highly predictable implicit government guarantee against bank failure.

Therefore, this research has the policy implication for countries that will establish a deposit insurance scheme. Out of 189 countries covered by the World Bank, 113 countries had explicit deposit insurance by the end of 2015, and the remaining 76 countries (40.22% of the 189 countries) did not have explicit insurance. An overwhelming majority of those 76 countries are developing countries. Policymakers in these countries can learn from the experience of China, as

the largest developing country in the world, about how the stock market responds to the announcement of deposit insurance in order to assess the impact of the introduction of deposit insurance.

The theoretical and empirical literature on deposit insurance is extensive and has been summarized by scholars. Kane (1995, 2000) summarizes the extensive theoretical literature on deposit insurance, points out the drawbacks of casualty-insurance and option-writing models, argues that risk endogeneity and incentive conflict should be acknowledged, and explains how to design optimal financial safety nets to fit a country's circumstances. Demirgüç-Kunt and Kane (2002) not only give a portrait of deposit insurance around the world but also classify the empirical papers based on the topics in terms of bank stability, market discipline, financial development, and crisis management. Allen et al. (2011) review the theory of deposit insurance and point out several underlying assumptions that were not satisfied during the financial crisis starting in 2007. Then they call for new research on the relationship between bank failures, deposit insurance schemes, sovereign default, and currency depreciation, as well as on deposit insurance scheme reforms.

To the best of our knowledge, the sole paper examining the link between the announcement of the introduction of deposit insurance and stock markets is Bartholdy et al. (2004). They examined the effects of the 1987 initiation of deposit insurance on the stock market in Denmark and found that the market values of large Danish banks exhibited a modest positive reaction to the announcement of insurance but that small risky banks responded negatively. Although our paper is similar to theirs in terms of topic, it is significantly different at least in two respects. First, prior to the introduction of deposit insurance, interest rates were highly regulated in China but

were allowed to change freely in Denmark. The Danish government adopted a highly predictable merge-and-close policy with respect to troubled banks before the introduction, but in China, the government fully protected depositors against bank failure. These significant differences in the financial institution environment possibly may have led to different assessments of the same major policy change. Second, as shown later, our results are not consistent with Bartholdy et al. (2004). Their results indicate that the introduction of deposit insurance did not affect banks as a whole. However, the average abnormal returns of all listed banks in China are statistically significantly negative on the announcement day, and size has a statistically significant positive impact on the banks' abnormal returns on the announcement day.

In this paper, we explore China's stock market reaction to the announcement of deposit insurance by using an event-study method. The method rests on the assumption that stock markets are efficient in China. Fortunately, the latest literature (Lin et al., 2011; Chong et al., 2012; Mobarek and Fiorante, 2014) shows that the Chinese markets are fairly efficient in a weak form and that the market efficiency has been greatly improved. Carpenter et al. (2015) find that since the reforms in the last decade, China's stock market has become as informationally efficient about future corporate profits as the U.S. market.

Our main findings are as follows. We find that the average cumulative abnormal returns of the banking sector are negative and statistically significant. This reflects the fact that China's stock markets negatively assessed the major adjustments in overall regulatory policy. The negative response to the announcement of deposit insurance indicates that shareholders in banking as a whole suffer a reduction in wealth. Only asset size has a statistically significant positive impact on the banks' abnormal returns on the announcement day, and this indicates that

China's investors believe the adverse influence is more serious for small banks than for big ones. Our results are not consistent with those previously found for the United States and for Denmark. This suggests that the financial regulatory environment prior to the introduction of deposit insurance did matter.

The rest of the paper is organized as follows. In the next section, we present background information on China's banking industry and deposit insurance. Announcement day determination, sample selection, and methodology design are outlined in section 3. We give empirical findings and further discussion in section 4. Section 5 concludes the paper.

2. Background on China's Banking Industry and Deposit Insurance

2.1. Background on China's Banking Industry

We first give an overview of China's banking system in brief. The system has undergone—and continues to undergo—a series of major changes due to policy shifts.

Between 1949 and the late 1970s, the People's Bank of China (PBOC) functioned as both the central bank and a commercial bank, taking deposits and extending loans. Reforms began in 1978, and the banking industry was expanded by creating four large state-owned commercial banks with policy-lending mandates, while the PBOC remained the central bank and supervisor of the financial system.[1]

Since the mid-1990s, the central government has introduced a series of institutional and

[1] The four banks include the Bank of China (BOC), the China Construction Bank (CCB), the Agricultural Bank of China (ABC), and the Industrial and Commercial Bank of China (ICBC). The four banks' missions differed according to the sectors in which they were directed to specialize. In 1985, they were allowed to deal with all sectors. A fifth, much smaller but rapidly growing bank, the Bank of Communications (BoCom), is now included in the group, which is then referred to as the Big Five.

regulatory reforms. These reforms primarily followed two paths. On one hand, the government strongly directed the state-owned banks to conduct commercial business based on market principles instead of policy lending. On the other hand, the Chinese government allowed the new banks to enter the market. The China Minsheng Banking Corporation, the first Chinese bank almost solely owned by private institutional shareholders, was founded in 1996. In the mid-1990s, local governments were allowed to establish local banks (i.e., city commercial banks) by consolidating local rural and urban cooperatives. In April 2007, four foreign banks (Citigroup Inc., HSBC Holdings PLC, Standard Charted PLS, and Bank of East Asia Ltd.) were first licensed to accept deposits in RMB (Chinese Yuan Renminbi) from the country's citizens.

In order to improve the management of existing banks and new entrants, two major strategies were introduced. One is to attract strategic foreign investors.[2] The earliest case of introducing a strategic investor in China is Citigroup's purchase of about 5% of Shanghai Pudong Development (SPD) Bank in January 2003. Another strategy of the regulators is to encourage the banks to list on stock exchanges for additional external monitoring. The Bank of Communications (BoCom) was the first to take this route in June 2005, when it raised more than $2 billion in an IPO on the Hong Kong stock exchange. It is worth mentioning that although China's government has implemented a series of reforms in the banking industry, these reforms did not fully liberalize the interest rates of deposits and loans, and the Chinese people believed that banks were highly

[2] Strategic investors are defined as those investors who would contribute not only capital but also independent foreign directors to bank governance and bring in foreign management skills and new products, resulting in the improvement of efficiency and returns on investment. However, there are still various restrictions on them, such as ownership proportion and holding period. Sun et al.(2013) analyze the effect of the strategic investors on Chinese bank efficiencies.

protected and regulated.[3]

As of the end of 2013, the number of banking financial institutions was 3,949 (Almanac of China's Finance and Banking, 2014), all of which are largely controlled by various levels of government. Besides the Big Five controlled by the central government, joint stock commercial banks, urban commercial banks, rural commercial banks, rural credit cooperatives, and foreign-owned banks account for 12, 145, 468, 122, and 42 institutions, respectively.[4] Only 16 of 3,949 banks are publicly traded firms. Among the 16 banks, 9 banks are cross-listed on the Shanghai and Hong Kong stock exchanges. The other 7 are listed only on the Shanghai Stock Exchange.

2.2. Background on Deposit Insurance

Before May 1, 2015, there was no explicit deposit insurance in China. Although no financial crisis has broken out in China, large-scale depositor runs have occurred in some small- to medium-sized financial institutions. The Hainan Development Bank, which had assets with a face value of about $2 billion, was the first case of a run on a commercial bank in China in 1998 (Yan and Huang, 2008). The central government took on the responsibility of its outstanding debts. The bankruptcy of the Hainan Development Bank in 1998 stimulated a great deal of interest, leading to discussion and research on the introduction of deposit insurance to the Chinese financial system among the public, officials, and researchers. At last, the People's Bank of China posted a deposit insurance draft bill and solicited opinions on its website on November 30, 2014.

[3] Currently, the People's Bank of China continues to set the range (upper and lower bounds, or base rate and floating range) within which interest rates can be set.

[4] Other institutions include policy banks, the postal savings, finance companies, trust and investment companies, financial leasing companies, and so on.

This was the first official announcement that China would soon launch an insurance system for bank deposits. On March 31, 2015, the State Counsel of China declared China's Deposit Insurance Act.

According to the Act, the public deposit insurance scheme is not operated as a state unit of the government administration but is run under the control of China's central bank. The scheme in force makes membership compulsory. The deposits at foreign branches of the domestic bank and domestic branches of the foreign bank are not protected. The deposit insurance covers all domestic and foreign currency deposits. Deposits of as much as 500,000 RMB yuan, including the principal and accrued interest per saver at each covered bank, are insured. The central government does not inject initial funds in the funding of the deposit insurance scheme. A flat premium is used currently, and future funding of the deposit insurance scheme will use a combination of a benchmark premium rate and a risk-based one. Insured banks pay premiums once every 6 months. The Act of March 31, 2015, stipulated that it would take effect on May 1, 2015.

3. Announcement Day, Sample Selection, and Methodology Design

3.1 Announcement Day Determination

It is crucial to determine the announcement day in the study on the market response of the introduction of deposit insurance in China. Before the Deposit Insurance Act officially came into operation on May 1, 2015, there were four other important event dates. On October 29, 2014, the deposit insurance draft drawn up by the People's Bank of China was approved by the 67th standing committee of China's State Council. On November 30, 2014, the People's Bank of China

posted the approved deposit insurance draft on its website to solicit opinions on the draft from the public. On February 17, 2015, China's Prime Minister, Li Keqiang, signed the draft into administrative law. On March 31, 2015, the State Council posted the Deposit Insurance Act on its website.

Among those dates, we define the date of November 30, 2014, as the announcement day for the following reasons. First, news of the deposit insurance draft posted on the PBOC website on November 30, 2014, was the first to be pervasively reported by many media at home and abroad.[5]

Second, according to China's government regulation, disclosure of the fact that the deposit insurance draft was approved by the committee and signed by the prime minister was prohibited. Moreover, regarding the approval by the committee of China's State Council on October 29, 2014, we searched the economic and financial news released via television, radio, the Internet, and newspapers from October 29, 2014, to November 2, 2014. In contrast to the news record for November 30, we failed to find any hint of the deposit insurance draft approved by the 67th meeting of the Standing Committee of China's State Council. This suggests that the committee's

[5] For example, reports were published by the Xinhua News Agency (the official press agency of the People's Republic of China, the biggest and most influential media organization in China), http://news.xinhuanet.com/fortune/2014-11/30/c_127263576.htm; Sina Net (one of the biggest portal websites in China), http://finance.sina.com.cn/money/bank/insurance/; the Wall Street Journal, http://cn.wsj.com/gb/20141201/fin071637.asp; Bloomberg, http://www.bloomberg.com/news/articles/2014-11-30/china-drafts-deposit-insurance-in-move-to-free-interest-rates; and the Economist, http://www.economist.com/news/finance-and-economics/21635512-scheme-protect-savers-exposes-chinese-banks-useful-uncertainty-premium.

approval was not regarded as important information by the public or that the news was simply not available to the public. Similarly, regarding the prime minister's signature on February 17, 2015, we searched the economic and financial news released via television, radio, the Internet, and newspapers from February 17, 2015, to February 24, 2015. We failed to find any report on the draft signed by Prime Minister Li Keqiang. Third, a comparison between the posted draft and the official Act shows that there is no substantial change in content.[6] In other words, no new major information related to the deposit insurance was reported between March 31, 2015, and May 1, 2015.

Furthermore, to confirm the robustness of our results, we investigated the announcement effects using the same event-study approach for all five event dates, and we only found significant responses on November 30, 2014. Therefore, in this paper, we focus on November 30, 2014.

3.2. Sample Selection

The announcement day, November 30, 2014, was Sunday, and the stock markets were closed in China on that day. Hence, we chose the next day, December 1, 2014, as the event day. This also gives the markets ample opportunity to reflect the news of the deposit insurance draft posted on the PBOC website and the news reported by many media outlets. As of November 30, 2014, 16 banks were listed on the Shanghai Stock Exchange and the Shenzhen Stock Exchange.[7] Among the 16 banks, 14 were traded on the Shanghai Exchange, and 9 were cross-listed on the

[6] See the draft http://www.pbc.gov.cn/rmyh/105253/2809462/index.html and the Act http://www.gov.cn/zhengce/content/2015-03/31/content_9562.htm for the changes.

[7] As of November 30, 2014, the IPO process in China was essentially based on an approval system, which is different from the registration system that characterizes the IPO process in most developed countries.

Hong Kong Stock Exchange and the Shanghai Stock Exchange.

Insert Table 1 here

As is evident from Table 1, the total assets, the total loans, and the total deposits of the listed banks vary from a high of 20,609,953 million RMB yuan of ICBC to a low of 554,113 million RMB yuan of NINGBO, from 11,026,331 million RMB yuan of ICBC to 174,685 million RMB yuan of NANJING, and from 15,556,601 million RMB yuan of ICBC to 306,532 million RMB yuan of NINGBO, respectively. The highs are 37.1945, 63.1212, and 50.7507 times the lows, respectively. The corresponding coefficients of variation in total assets, total loans, and total deposits reach 0.9916, 1.0547, and 1.0747, respectively. They indicate that these listed banks differ substantially in size. Moreover, the traditional state-controlled banks, the Big Five, make up 70.77% of the total assets, 73.70% of the total loans, and 73.85% of the total deposits of the sample 16 listed banks. In contrast to the 11 other listed banks, earnings per share of the Big Five are low and vary from a high of 0.91 to a low of 0.55. However, they have a high capital adequacy ratio among the sample banks. Although only 16 banks are publicly traded on exchanges, their total assets accounted for 61.37% of the 172,335,500 measured in million RMB yuan of the whole banking sector at the end of 2014.[8] Hence, the Big Five absolutely dominate the sample 16 listed banks, and the sample banks dominate China's banking in terms of size.

3.3. Methodology Design

In the literature, an event-study approach is often used to measure the markets' responses (MacKinlay, 1997). Therefore, we use a standard event-study approach in this paper.

[8] The data source is China's Banking Development Report 2015, published by the China Banking Regulatory Commission.

As mentioned above, we define December 1, 2014, as the event day (i.e., day 0). We also present empirical findings for the pre-announcement window [-4, 0) and post-announcement window (0, +4] to consider the leakage of undisclosed information and the time it takes to digest new information.[9] Therefore, our pre-announcement and post-announcement windows correspond to the period from November 25 to 28 and the period from December 2 to 5, respectively. The parameters of the normal performance are estimated over the estimation window, and we specify an estimation period from November 25, 2013, to November 24, 2014 (i.e., from day -249 to day -5, a total of 245 trading days). We chose three models, the three-factor model, market model, and constant-mean-adjusted model, to calculate the daily abnormal returns of stocks.

Residuals over the estimation period will be cross-correlated in samples characterized by industry homogeneity (Binder, 1985). The assumption of the independence of residual returns is likely to be violated (Eyssell and Arshadi, 1990). In order to circumvent the problems, we employ a seemingly unrelated regressions (SUR) technique to estimate the equations over the estimation period. The announcement day is the same for all sample companies. A cross-sectional correlation exists among abnormal returns. Kolari and Pynnönen (2010) point out that even when cross-correlation is relatively low, event date clustering is serious in terms of over-rejecting the null hypothesis of zero average abnormal returns when it is true. A new t-test statistic (i.e., a

[9] In China, the shares of listed firms are traded 5 days per week. We chose an event window of 9 trading days. Hence, the change in abnormal returns over two straight 5-day trading weeks centered on the announcement day can be observed. The length of the window usually reflects the possibility of leakage, the precision of event dating, the target of research, and so on. For example, Yamori (1999) sets an event window of 3 trading days to explore market reaction to the bank liquidation in Japan; Yamori et al. (2016) employ 15 trading days as the full event window to investigate the announcement effects of regional industrial policy in China; and Malmendier et al. (2014) use an event window of 80 trading days to investigate the long-term effects of mergers.

J_2^*-statistic shown later by formula (11)) developed by them to address this problem is calculated and reported.[10]

Specifically, we have

$$AR_{i,t} = R_{i,t} - E\left[R_{i,t}\right], \qquad (1)$$

where $AR_{i,t}$ is the daily abnormal return of stock i in period t, $R_{i,t}$ is the observed daily return in raw stock price, and $E\left[R_{i,t}\right]$ is the expected return for stock i on date t. For any stock i, the expected return is defined as follows:

$$E\left[R_{i,t}\right] - r_f = \begin{cases} \bar{R}_i - r_f & mean - adjusted \\ \hat{\alpha}_i + \hat{\beta}_i\left(R_{M,t} - r_f\right) & market - model \\ \hat{\alpha}_i + \hat{\beta}_i\left(R_{M,t} - r_f\right) + \hat{r}_i R_{SMB,t} + \hat{\delta}_i R_{HML,t} & three - factor\ model \end{cases}, \qquad (2)$$

where $\bar{R}_i$ is the simple average return of stock i over the 240-day estimation period.[11] r_f is the risk-free daily compound return calculated from interest rate on one-year time deposit.[12]. $R_{M,t}$, $R_{SMB,t}$, and $R_{HML,t}$ represent the value-weighted market index return,[13] the return on a diversified portfolio of small stocks minus the return on a diversified portfolio of big stocks (SMB), and the difference between the returns on diversified portfolios of high and low B/M stocks (HML)

[10] To better understand how researchers deal with cross-correlation and event-induced variance inflation, Kolari and Pynnönen (2010) survey all 76 event studies published in the Journal of Finance, the Journal of Financial Economics, the Review of Financial Studies, and the Journal of Financial and Quantitative Analysis in the period from 1980 to mid-2007 and summarize their findings.

[11] As mentioned above, our estimation window consists of 245 trading days. However, the trading data on July 15, 2014, for PINGAN Bank, on January 13, 2014, for NINGBO bank, on March 17, 2014, for SPD bank, on July 16, 2014, for NANJING bank, and on May 21, 2014, for BEIJING bank are not available. After pairwise deletion, 240 trading days are left.

[12] Our data, including daily stock returns, market index returns, risk-free interest rate, SMB, HML, and financial statement data, are from the China Stock Market and the Accounting Research Database (CSMAR). The Treasury bills with maturities of six months and three months were first issued in the second and fourth quarters of 2015 in China, respectively. The risk-free return based on treasury bills is not available during the estimate and event windows and therefore the CSMAR measures the risk-free return based on interest rate on one-year time deposit.

[13] For companies listed on the Shanghai Stock Exchange and Shenzhen Stock Exchange, the value-weighted Shanghai Composite Index and Shenzhen Component Index are employed, respectively.

on day t, respectively.

The abnormal return observations $AR_{i,t}$ must be aggregated in order to draw overall inferences for the deposit insurance announcement effects. The aggregation is along two dimensions, through time and across stocks. Let τ denote the time index in the event window. Define $\widehat{CAR}_i(\tau_1, \tau_2)$ as the sample cumulative abnormal return (CAR) from τ_1 to τ_2. The CAR from τ_1 to τ_2 is the sum of the included abnormal returns,

$$\widehat{CAR}_i(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} \widehat{AR}_i. \quad (3)$$

As the estimation window length increases, the variance of $\widehat{CAR}_i$ is asymptotically

$$\sigma_i^2(\tau_1, \tau_2) = (\tau_2 - \tau_1 + 1)\hat{\sigma}_{\varepsilon_i}^2, \qquad (4)$$

where $\hat{\sigma}_{\varepsilon_i}^2$ is the variance estimate of the error term from the regression. A usable test statistic for the null hypothesis of no impact of the event for stock i is then the standard cumulative abnormal return:

$$\widehat{SCAR}_i(\tau_1, \tau_2) = \frac{\widehat{CAR}_i(\tau_1, \tau_2)}{\sigma_i(\tau_1, \tau_2)} \underset{\sim}{asy} N(0,1). \quad (5)$$

Then we aggregate $\widehat{CAR}_i(\tau_1, \tau_2)$ across *N* stocks:

$$\overline{CAR}(\tau_1, \tau_2) = \frac{1}{N}\sum_{i=1}^{N} \widehat{CAR}_i(\tau_1, \tau_2), \qquad (6)$$

$$Var\left(\overline{CAR}(\tau_1, \tau_2)\right) = \frac{1}{N^2}\sum_{i=1}^{N} \sigma_i^2(\tau_1, \tau_2). \quad (7)$$

In practice, the usual sample variance measure of $\sigma_{\varepsilon_i}^2$ from the regression in the estimation window is usually used as an estimator of $\sigma_{\varepsilon_i}^2$. Inferences about the cumulative abnormal returns can be drawn using

$$J_1 = \frac{\overline{CAR}(\tau_1, \tau_2)}{\sqrt{Var\left(\overline{CAR}(\tau_1, \tau_2)\right)}} \underset{\sim}{asy} N(0,1) \quad (8)$$

to test the null hypothesis of no market response (i.e., the abnormal returns are zero).

Averaging the standardized cumulative abnormal returns $\widehat{SCAR}_i(\tau_1, \tau_2)$ across stocks, we have

$$\overline{SCAR}(\tau_1, \tau_2) = \frac{1}{N}\sum_{i=1}^{N} \widehat{SCAR}_i(\tau_1, \tau_2), \qquad (9)$$

and its variance is as follows:

$$Var\left(\overline{SCAR}(\tau_1, \tau_2)\right) = \frac{L-P-1}{N(L-P-3)}(1 + (N-1)\bar{r}), \qquad (10)$$

where L, P, and $\bar{r}$ denote the length of the estimation period, the number of explanatory variables in the above-mentioned abnormal return generating models, and the average cross-sectional correlation coefficient of abnormal returns in the estimation period, respectively. Under the null hypothesis of no market response, this yields the J_2^*-statistic[14]

$$J_2^* = \frac{\overline{SCAR}(\tau_1, \tau_2)}{\sqrt{\frac{L-P-1}{N(L-P-3)}(1 + (N-1)\bar{r})}} \overset{asy}{\sim} N(0,1). \qquad (11)$$

4. Empirical Results and Discussions

4.1. Cumulative Abnormal Returns of Banks over the Event Window

The results for cumulative abnormal returns (CARs) over the pre- and post-announcement windows, abnormal returns (ARs) on the announcement day, and corresponding statistic inferences are presented in Table 2. We report the results based on the three-factor model, the market model, and the mean-adjusted model.

Insert Table 2 here

Panel A of Table 2 shows the empirical results without correction of clustering for the three

[14] An asterisk is used to differentiate J_2^* from $J_2 = \overline{SCAR}(\tau_1, \tau_2)/\sqrt{\frac{L-2}{N(L-4)}}$ (Campbell et al., 1997).

specifications over three windows. The average ARs on the announcement day under the three-factor model, the market model, and the mean-adjusted model are -0.0119, -0.0048, and -0.0051, respectively. The average AR value from the three-factor specification is around 2.5 times the counterparts from the market model and the mean-adjusted model. The value of -0.0051 from the mean-adjusted model is not significant, but the values from the three-factor and market models are both statistically significant at the 1% and 10% level, respectively.

Turning to the results of the pre-announcement window, we find that the average CARs from the three specifications are all positive at the 1% significance level. The results of the post-announcement window indicate that although the two average CARs from the market and mean-adjusted models are statistically significantly positive, the average CAR from the three-factor specification is nearly zero and is not statistically significant. Average cross-sectional correlation coefficients of abnormal returns over the estimation period from the three-factor, market, and mean-adjusted specifications are 0.2970, 0.4998, and 0.6720, respectively. They indicate that although we use a SUR technique to decrease influence from the cross-sectional correlation, it is still serious in terms of over-rejecting the null hypothesis of zero average abnormal returns.

This indicates that the empirical results from correcting the cross-sectional clustering are more reliable. Panel B of Table 2 reports these empirical results after correcting the clustering. First, the average SCARs over the pre-announcement are statistically significantly positive; second, all three SARs are negative on the announcement day, but only the SAR based on the three-factor model is statistically significant at the 5% level on that day; third, only the SCAR based on the three-factor specification is not statistically significant over the post-announcement. A

comparison of the J_1 value and the corresponding J_2^* value shows that every J_2^* value is much smaller than the corresponding J_1 value. In short, the results in Panel B are almost consistent with those in Panel A.

We focus on the SARs and the corresponding statistics on the announcement day in Panel B of Table 2. The announcement day includes four rows. SARs of the sample of the 16 listed banks are reported in the first row. The corresponding J_2^* values are reported in parentheses in the second row. We also report bootstrap estimates of SARs and the corresponding J_2^* values in the third row and in parentheses in the fourth row, respectively. The average SARs for the three-factor, market, and mean-adjusted specifications in the first row are -1.3686, -0.4775, and -0.3698, respectively. Although all three of them are negative, only the value based on the three-factor model is significant at the 5% level. The empirical results and the corresponding inferences based on the three-factor specification are more liable because, first, the aforementioned formula (4) demonstrates that residual standard errors from the three types of specifications are employed to estimate the variance of CAR, they directly affect the statistical inference in Table 2, and therefore the correct model specification over the estimation period is crucial; second, Table 3 reports the key results of the SUR estimation as a system of all 16 listed banks over the period from November 25, 2013, to November 24, 2014. It shows that all coefficients on R_M are significant at the 1% level, 9 of the 16 coefficients on R_{SMB} are significant, and 12 of the 16 coefficients on R_{HML} are statistically significant. They demonstrate that the three-factor model is more suitable than the market and the mean-adjusted models in the study. Finally, in terms of prediction performance, the specification of the three-factor model is certainly better than those of the market and the mean-adjusted models. Based on the results

from the three-factor specification on the announcement day, we accept the conclusion that on average, the prices of the 16 listed banks fell on the announcement day, and the fall is statistically significant.

The above empirical results are further corroborated by the bootstrap estimates of the average SARs and the corresponding J_2^*. The above results indicate that the stock market responded negatively to the announcement of the introduction of deposit insurance on the announcement day in China.

Insert Table 3 here

Insert Figure 1 here

In order to gain a visual sense of the pattern shown by the numbers in Table 2, Figure 1 is provided. It plots the average CARs on the event day and over the pre- and post-announcement windows, where day 0 represents the event day. The daily average CARs from the three-factor specification are indicated by a solid line with a filled circle. The daily average CARs from the single and mean-adjusted models are indicated by a dashed line with an open circle and by a crossed box, respectively. All daily average CARs from the three types of specifications are above the x axis. On every day within the window [-4, +4], the daily average CAR from the mean-adjusted model is greater than the average CAR from the market model, which is likewise greater than the average CAR from the three-factor model. The three lines show that on average, the stock prices of the 16 listed banks go up for 4 straight trading days before the event day. On the announcement day, the rising trend is steeply reversed. Table 2 shows that the average abnormal return is -0.0119 for the three-factor specification, and this value indicates that the reverse is drastic because the abnormal return is the return after the influences of the market,

small-minus-big portfolio, and high-minus-low portfolio are deducted. After the event day, the three curves diverge gradually after the event date. The daily average CARs for the mean-adjusted and market models keep gaining momentum, but the counterpart of the three-factor model loses momentum and begins a horizontal drift.

The combination of the significant positive SCAR prior to announcement and the significant negative SAR on the announcement day is unexpected. It inspires us to think about whether the significant negative SAR of the banking industry on the announcement day is a consequence of stochastic or systematical irrationality regarding the financial sector of stock markets rather than of the announcement of deposit insurance.

To address this, we investigated China's security industry using the same methodology over the same estimation and event periods.[15] There are two significant differences in empirical results between the sectors. First, the average of ARs starts to become negative on the announcement day for the banking sector, but the average AR first becomes negative on day -1 for the securities industry. Second, for the three-factor specification, the daily average abnormal

[15] As of the end of 2015, there were 26 publicly traded securities firms in total. Among the 26, 5 companies were listed after November 10, 2014, and 1 firm was involved in a merger and acquisition during the event window. This left 20 listed securities enterprises. For the firm coded as 601901, data during the periods from November 11, 2013, to January 10, 2014, and from July 11 to 18, 2014, are not available. For the firm coded as 000750, data over the periods from November 18 to 25, 2013, and from April 1 to 2, 2014, are not available. Data for the listed firm 600061 are not available over the period between July 14 and November 10, 2014. Firm 600369 only has 1 trading day over the event window. Hence, the 4 listed security firms are excluded from our sample, and only 16 listed securities firms are finally included in the sample. They are DONGBEI, GUOYUAN, GUOHAI, GUANGFA, CHANGJIANG, SHANXI, XIBU, ZHONGXING, GUOJING, HAITONG, ZHAOSHANG, PACIFIC, XINGYE, DONGWU, HUATAI, and GUANGDA. The trading data from November 18 to 25, 2013, and data from April 1 to 2, 2014, for GUOHAI security, data on May 5, 2014, for GUANGFA security, data from April 18 to 24, 2014, for CHANGJIANG, trading data from June 20 to 26, 2014, for XIBU, data on March 3 and from September 18 to 29, 2014, for GUOJING, data on March 14, 2014, for ZHAOSHENG security, data on June 27, 2014, for XINGYE security, and data from November 17 to 24, 2014, for HUATAI are not available. After pairwise deletion, 217 trading days are left.

return on the announcement day is -0.0093, and the corresponding J_1 statistic value is -2.2151 (significant at the 5% level). However, the average cross-sectional correlation coefficient of abnormal returns in the estimation period reaches a surprising 0.4981. It is evident that the cross-sectional correlation is serious. The daily average SAR is -0.3657, and the corresponding J_2^* statistic value is -0.5002. Bootstrap estimates of the average SAR and the corresponding J_2^* are -0.4066 and -0.5561, respectively.[16] These results indicate that although the daily average abnormal returns of the securities industry are negative, the null hypothesis that zero average abnormal returns of security firms on the announcement day cannot be rejected. The results above indirectly demonstrate that the significant negative SAR of the banking industry is not a consequence of stochastic or systematical irrationality on the financial sector of stock markets in China.

Conceptually, the essential factors determining stock prices are the risk-free rate of interest, the equity risk premium, and the expected rate of growth of corporate earnings and dividends (Boyd et al., 2005). Investors anticipated that once the regulation of deposit insurance takes effect in China, individual banks would incur a direct earnings reduction because of premium payments.[17] Moreover, a deposit insurance device indicates the further movement of China's

[16] In the interests of space and continuous reading, the full empirical results of the securities firms are not reported here. They are available upon request.

[17] Although we failed to discover the official regulation on premium rate in China, Zhou Xiaochuan, the governor of China's central bank, said the premium rate was 0.01% to 0.02% of annual deposits in China (see http://finance.sina.com.cn/money/bank/cb_2015/). The deposit balance and net profit of the whole banking industry in China were 98,340,000 million RMB yuan and 1,550,000 million RMB yuan at the end of 2014 (China Banking Development Report 2014, by the China Banking Regulatory Commission; see http://www.cbrc.gov.cn/chinese/home/docViewPage/110203.html), respectively. Assuming premium rates of 0.01% to 0.02% of annual deposits for different types of banks, China's banks would have to make a premium payment of 9,834 million RMB yuan to 19,668 million RMB yuan in total in terms of the deposit balance at the end of 2014. This reduces the earnings of China's banks for 2014 by 0.63% to 1.26% on average.

central government toward the monumental step of interest-rate liberalization and the removal of an implicit government guarantee of banks. It is clear that China's banks are facing rising competition and that the net interest margin will drop. The introduction of the deposit insurance also has a negative effect on the growth expectation of banks in China. The negative daily average AR on the announcement day reflects the decreasing earnings and growth expectation of China's banking. A change in the regulatory policy on deposit insurance causes the reduction in banks' market values in China.

4.2. Regression of Abnormal Returns on Banks' Characteristics

The previous section discusses the aggregate effect. As we know, it may conceal considerable inter-bank variations. Hence, we explore the cross-sectional link between abnormal returns on the announcement day and listed banks' characteristics in the section.

The banks are operated in the same environment, such as the country's economic growth and regulation. Hence, the key differences among them are the size of assets, profitability, and internal governance. We regress the abnormal returns of banks on the announcement day on these three variables. The natural logarithm of the total assets measured in millions of RMB yuan on December 31, 2013, is used as a proxy for the size. The return of equity (ROE) in 2013 is used as a proxy for the profitability of listed banks. Many proxies exist that capture the different dimensions of governance of individual banks, such as ownership and control structure, independent directors, managerial compensation, debt and dividend policy, institutional investors, capital adequacy ratio, and so on. Only 16 banks are publicly traded on stock exchanges, and this restricts the number of regressors in specification. We use the z-score of individual banks

as a comprehensive proxy for governance. First, the deposit insurance device is used by a country to prevent banking instability; the z-score measures the distance from insolvency and therefore is a risk-taking proxy for the individual bank (Boyd et al., 1993; Konishi and Yasuda, 2004; Pathan, 2009). Second, the z-score is a consequence of governance, and it reflects the level of an enterprise's governance (Laeven and Levine, 2009; Pathan, 2009; Williams, 2014). We follow the literature and define the inverse of the probability of insolvency as the z-score, which is equal to the ROA (return of asset) plus the capital asset ratio divided by the standard deviation of the ROA. A higher z-score indicates that the bank is more stable. The quarterly ROA and ROE from the first appearance of the bank in our database to December 31, 2013, are used to compute the z-score.

Insert Table 4 here

As is shown in Table 1, the 16 listed banks vary considerably in asset size. A heteroscedasticity consistent (HC) covariance matrix estimation for valid inference is appropriate. Long and Ervin (2000) arrived at the conclusion that among all of the five heteroscedasticity consistent covariance matrix estimations from HC0 to HC4, HC3 provides the best performance in small samples, as it gives less weight to influential observations.[18] In addition to OLS standard errors, we report the heteroscedasticity consistent robust standard errors of "HC3". As another remedy for the small samples, we also employ a bootstrap methodology to give reliable standard errors even in the presence of heteroscedasticity.

The results are reported in Table 4. The three coefficients on asset size from three specifications are positive. All of the OLS, HC3, and bootstrapping standard errors consistently support that these coefficients are statistically significant at the 5% level. The results indicate that

[18] Long and Ervin (2000) define $HC3$ as $(\boldsymbol{X'X})^{-1}\boldsymbol{X'}diag(\omega_1, \dots, \omega_n)\boldsymbol{X}(\boldsymbol{X'X})^{-1}$, where $\omega_i = \hat{\varepsilon}_i^2/(1-h_{ii})^2$, $h_{ii} = x_i(\boldsymbol{X'X})^{-1}x_i'$.

although the announcement of deposit insurance has an adverse influence on the market values of the whole banking sector, capital markets think that the adverse influence is lower for big banks than for small banks. The empirical results for the z-score show that investors are willing to choose less risk-taking banks, but these coefficients are not statistically significant. Likewise, all of the coefficients on ROE are negative but are not statistically significant.

The foregoing combination of the significant positive SCAR before the announcement day and the significant negative SAR on the announcement day inspires us again to think further about whether there is a link between ARs prior to the announcement and the asset size of individual banks. If there is a statistical link, we should cast doubt on all of the aforementioned conclusions, including the announcement day determination, statistically significant negative SAR for the whole banking sector, and robust positive relation between abnormal returns and the asset size of banks. If so, the patterns shown by abnormal returns are likely to be caused by some systematic rational or irrational factor related to asset size, and therefore they are not effects of the announcement of deposit insurance. We ran regressions of the cumulative abnormal returns prior to the announcement day on the same banks' characteristics. Unlike the results on the announcement day, all of the three specifications' results of OLS, HC3, and bootstrap estimates show that the coefficients on the asset size are negative but statistically insignificant.[19]

[19] For the CAR regression corresponding to the three-factor specification, the coefficients on asset size -0.0115 and its standard errors are 0.0098 for OLS, 0.0080 for HC3, and 0.0100 for bootstrap. For the CAR regression of the market model, the coefficient is -0.0099, while its standard errors are 0.0097 for OLS, 0.0083 for HC3, and 0.0103 for bootstrap. For the CAR regression of the mean-adjusted model, the coefficient is -0.0143, while its standard errors are 0.0099 for OLS, 0.0090 for HC3, and 0.0110 for bootstrap. In the interests of space and continuous reading, the full empirical results are not reported here. They are available upon request.

Although compulsory deposit insurance certainly enhances the smaller banks' credibility in China, the increasing competition resulting from the deregulation of interest rates of deposits and loans might exacerbate a liquidity shortage at smaller banks and boost their chance of failure as savings shift to the bigger banks (Tally and Mas, 1992). Moreover, the regulator's actions can produce a wide variety of wealth transfers. O'hara and Shaw (1990) investigated the effect on bank equity values of the Comptroller of the Currency's announcement that some banks were "too big to fail" (TBTF) and found positive wealth effects accruing to TBTF banks and the corresponding negative effects accruing to non-included banks. The above positive empirical link between abnormal returns and the asset size of banks shows that facing the introduction of deposit insurance, capital markets believe that the disadvantages far outweigh the advantages for small banks in China.

5. Conclusions

The introduction of deposit insurance is a major regulatory policy shift for the banking sector around the world. Whether deposit insurance has wealth effects for bank shareholders is a fundamental issue for academics in banking. Existing literature on the link between deposit insurance and bank market values is primarily centered on the U.S. banking system and has usually been limited to investigating minor changes in bank regulations. The latest case on the introduction of deposit insurance is China, and it provides a chance to investigate how the stock market responds to fundamental changes in banking policy, namely, the genuine introduction of deposit insurance.

In this paper, we chose November 30, 2014, as the event day when the market first

evaluated the introduction of the deposit insurance scheme, and an event-study approach was adopted. Although only 16 banks are listed on China's stock exchanges and the sample size is limited, their total assets account for nearly two-thirds of the banking sector in China. They absolutely dominate and therefore represent China's banking industry. The empirical results show that the average abnormal returns of all the listed banks in China are statistically significantly negative. The adverse response to the announcement of deposit insurance indicates that shareholders in listed banks as a whole suffer a reduction in wealth in China. Among the bank characteristics such as asset size, z-score, and ROE, only asset size has a statistically significant positive influence on the abnormal returns of the listed banks on the announcement day. This indicates that China's capital markets think that the adverse influence is lower for big banks than for small banks.

To the best of our knowledge, Bartholdy et al. (2004) is the sole paper examining the link between the announcement of the introduction of deposit insurance and stock markets. Our research is similar to the paper in terms of research topic but fully different from it in terms of financial circumstance, and we obtained different findings. Their results are partially in contrast to those previously found for the United States, and therefore they draw the conclusion that the interaction of deposit insurance with the particular characteristics of the pre-existing Danish regulatory system causes the contrast. China's case also indicates that the financial regulatory regime prior to the announcement influences the stock market's assessment on the announcement of deposit insurance.

Our empirical findings might be helpful for developing countries that are assessing the capital market reaction to the introduction of deposit insurance. Our result suggests that the

introduction of deposit insurance is unfavorable particularly for small banks under a certain environment, such as China. Under this fragile financial environment, the introduction of deposit insurance with limited protection may exacerbate public distrust of banks. That is, without deliberate consideration, the introduction might be counterproductive to the financial stability at least in the short term. If so, countries where small banks play important roles need to consider the negative impact on small banks in order to establish the deposit insurance smoothly.

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Table 1 Summary statistics for the sample publicly traded banks included in the study

Banking firm	Total assets in million RMB yuan	Total loans in million RMB yuan	Total deposits in million RMB yuan	ROE %	Capital adequacy ratio %	Earnings per share in yuan	Stock exchange listed
			Panel A				
PINGAN	2,186,459	1,024,734	1,533,183	16.35	10.86	1.73	SZ
NINGBO	554,113	210,062	306,532	19.45	12.40	1.89	SZ
SPD	4,195,924	2,028,380	2,724,004	21.02	11.33	2.52	SH
HUAXIA	1,851,628	939,989	1,303,216	19.31	11.03	2.02	SH
MINSHENG	4,015,136	1,812,666	2,433,810	20.41	10.69	1.31	SH,HK
MERCHANTS	4,731,829	2,513,919	3,304,438	19.28	12.38	2.22	SH,HK
NANJING	573,150	174,685	368,329	19.00	12.00	1.89	SH
INDUSTRIAL	4,406,399	1,593,148	2,267,780	21.21	11.29	2.47	SH
BEIJING	1,524,437	675,288	922,813	17.98	11.08	1.48	SH
CITIC	4,138,815	2,187,908	2,849,574	16.84	12.33	0.87	SH,HK
EVERBRIGHT	2,737,010	1,299,455	1,785,337	17.36	11.21	0.62	SH,HK
ABC	15,974,152	8,098,067	12,533,397	19.57	12.82	0.55	SH,HK
BoCom	6,268,299	3,431,735	4,029,668	14.87	14.04	0.89	SH,HK
ICBC	20,609,953	11,026,331	15,556,601	19.96	14.53	0.78	SH,HK
CCB	16,744,130	9,474,523	12,898,675	19.74	14.87	0.91	SH,HK
BOC	15,251,382	8,483,275	10,885,223	17.28	13.87	0.61	SH,HK
			Panel B				
Mean	6,610,176	3,435,885	4,731,411	18.73	12.30	1.42	
SD	6,554,480	3,623,818	5,085,007	1.78	1.38	0.69	
Median	4,167,370	1,920,523	2,578,907	19.30	12.17	1.40	
Min	554,113	174,685	306,532	14.87	10.69	0.55	
Max	20,609,953	11,026,331	15,556,601	21.21	14.87	2.52	

Notes:

The data are extracted from financial statements, and they are measured for December 31, 2014.

SZ, SH, and HK represent the Shenzhen Stock Exchange, Shanghai Stock Exchange, and Hong Kong Stock Exchange, respectively.

Table 2 Cumulative abnormal returns and statistical inference

		Three-factor model	Market model	Mean-adjusted model
Panel A: Average CAR/AR and inference without correcting clustering				
		Average CAR/AR	Average CAR/AR	Average CAR/AR
	[-4, 0)	0.0737	0.1044	0.1432
		(15.1445)***	(18.4904)***	(20.4683)***
Announcement day		-0.0119	-0.0048	-0.0051
		(-4.9172)***	(-1.7288)*	(-1.4795)
	(0, 4]	0.0059	0.0655	0.1314
		(1.2258)	(11.5992)***	(18.7803)***
	$\bar{r}$	0.2970	0.4998	0.6720
Panel B: Average SCAR/SAR and inference with correcting clustering				
		Average SCAR/SAR	Average SCAR/SAR	Average SCAR/SAR
	[-4, 0)	4.1709	4.9581	5.3860
		(7.1126)***	(6.7747)***	(6.4449)***
Announcement day	*Standard SAR*	-1.3686	-0.4775	-0.3698
		(-2.3338)**	(-0.6525)	(-0.4425)
	Bootstrap SAR	-1.4318	-0.4246	-0.3420
		(-2.4417)**	(-0.5802)	(-0.4093)
	(0, 4]	0.6727	3.4225	5.1924
		(1.1471)	(4.6765)***	(6.2132)***

Notes:

Average AR and SAR are for the event day.

Average CAR and SCAR are for the windows of pre- and post-event days.

Statistic values J_1 and J_2^* are in parentheses in panels A and B, respectively.

The results on the announcement day include four rows in Panel B. We define the results in the first two rows as Standard SAR. They report the SARs and the corresponding J_2^* values of the sample of the 16 listed banks. We define the last two rows as Bootstrap SAR. These rows report bootstrap estimates of the average SARs and the corresponding J_2^* values. We define them as Bootstrap SAR. We set in R the random number seed 123 and 1,000 bootstrap replicates for the bootstrap estimates.

***, **, and * indicate the 1%, 5%, and 10% significance levels, respectively.

Table 3 Results of SUR estimates over the period from Nov 25, 2013 to Nov 24, 2014

Equation	R_M	R_{SMB}	R_{HML}	Residual standard error	Adj. R^2
PINGAN	0.9087	0.0321	0.5350	0.0098	0.6069
	(0.0536)***	(0.1384)	(0.1338)***		
NINGBO	0.7314	-0.1636	0.6366	0.0098	0.5204
	(0.0529)***	(0.1385)	(0.1339)***		
SPD	1.0592	0.3247	0.2728	0.0082	0.6548
	(0.0596)***	(0.1178)***	(0.1131)**		
HUAXIA	0.9886	0.4469	0.1618	0.0102	0.5293
	(0.0750)***	(0.1463)***	(0.1405)		
MINSHENG	0.9910	0.2115	0.3289	0.0098	0.5402
	(0.0716)***	(0.1401)	(0.1345)**		
MERCHANTS	0.8636	0.4319	0.0529	0.0067	0.6540
	(0.0485)***	(0.0953)***	(0.0915)		
NANJING	0.9233	-0.0792	0.4431	0.0102	0.4822
	(0.0716)***	(0.1448)	(0.1390)***		
INDUSTRIAL	1.1577	0.3502	0.2332	0.0090	0.6490
	(0.0640)***	(0.1282)***	(0.1231)*		
BEIJING	1.0251	0.0630	0.4665	0.0098	0.5521
	(0.0717)***	(0.1403)	(0.1347)***		
CITIC	1.0789	0.0285	0.5739	0.0199	0.2710
	(0.1463)***	(0.2839)	(0.2725)**		
EVERBRIGHT	0.8928	-0.0116	0.4720	0.0076	0.6130
	(0.0550)***	(0.1085)	(0.1042)***		
ABC	0.6077	0.2340	0.2019	0.0063	0.5446
	(0.0468)***	(0.0905)**	(0.0868)**		
BoCom	0.8633	0.3453	0.1762	0.0098	0.4812
	(0.0720)***	(0.1406)**	(0.1350)		
ICBC	0.5854	0.2316	0.1854	0.0055	0.5869
	(0.0410)***	(0.0791)***	(0.0759)**		
CCB	0.6471	0.3889	0.1100	0.0062	0.5831
	(0.0467)***	(0.0897)***	(0.0861)		
BOC	0.6705	0.3064	0.2902	0.0079	0.5237
	(0.0591)***	(0.1136)***	(0.1091)***		

Notes:

The dependent variable is the listed banks' daily rate of returns.

Intercepts are not reported.

Standard errors are reported in parentheses.

***, **, and * indicate the 1%, 5%, and 10% significance levels, respectively.

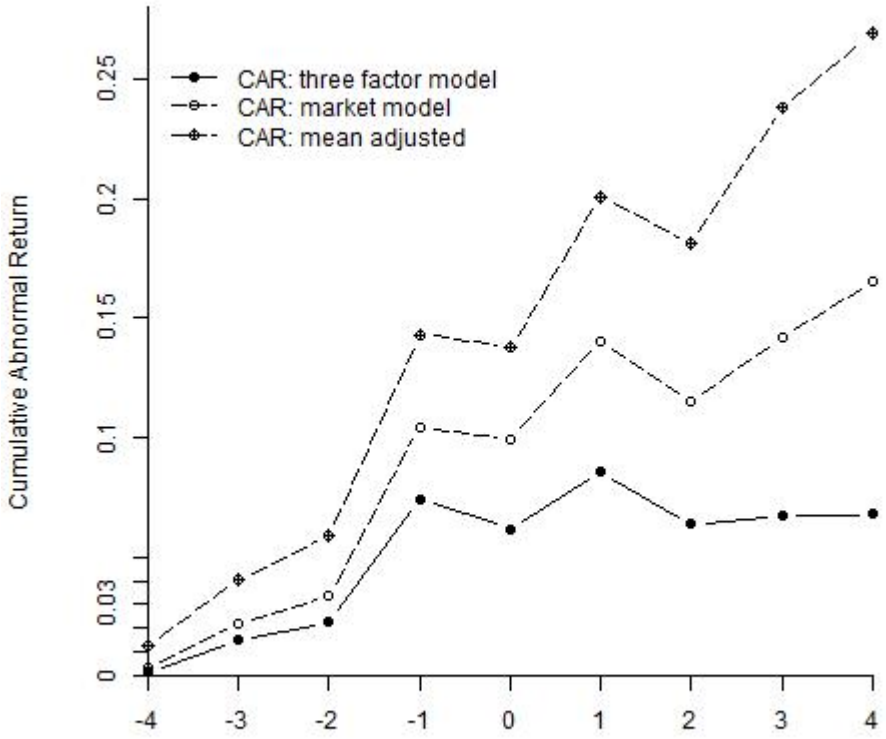

Figure 1 Cumulative Abnormal Returns over Event Windows

Table 4 Regression of abnormal returns on the event date on bank characteristics

	Three-factor model	Market model	Mean-adjusted model
Log(Assets)	0.0111	0.0115	0.0107
	(0.0049)**	(0.0050)**	(0.0048)**
	(0.0044)**	(0.0046)**	(0.0045)**
	(0.0057)**	(0.0055)**	(0.0050)**
Z-score	0.0069	0.0044	0.0026
	(0.0161)	(0.0163)	(0.0157)
	(0.0232)	(0.0232)	(0.0212)
	(0.0210)	(0.0218)	(0.0192)
ROE	-0.1344	-0.1404	-0.1645
	(0.2382)	(0.2408)	(0.2323)
	(0.2190)	(0.2194)	(0.1937)
	(0.2414)	(0.2302)	(0.2245)
Num. of obs.	16	16	16
Adjusted R^2	0.1379	0.1434	0.1220
F-statistic	1.8000	1.8370	1.6950

Notes:

Intercepts are not reported.

Standard errors are reported in parentheses.

The dependent variable is the abnormal returns of banks on the event day of November 30, 2014.

For each regression, the results of OLS standard errors, HC3 robust standard errors, and bootstrapping standard errors are reported from top to bottom in parentheses under every estimate of coefficient. Bootstrap estimates are based on setting the random number seed to 123 and 1,000 bootstrap replicates in R.

** indicates the 5% significance level.