THE GRADUATE INSTITUTE GENEVA

INSTITUT DE HAUTES ÉTUDES INTERNATIONALES ET DU DÉVELOPPEMENT
GRADUATE INSTITUTE OF INTERNATIONAL AND DEVELOPMENT STUDIES

Graduate Institute of International and Development Studies

International Economics Department

Working Paper Series

Working Paper No. HEIDWP09-2016

Saving China's Stock Market

Yi Huang
The Graduate Institute, Geneva

Jianjun Miao
Boston University

Pengfei Wang
The Hong Kong University of Science and Technology

Chemin Eugène-Rigot 2
P.O. Box 136
CH - 1211 Geneva 21
Switzerland

Saving China's Stock Market*

Yi Huang† Jianjun Miao‡ Pengfei Wang§

August 2016
Preliminary, Comments Welcome

Abstract

What were the economic benefits and costs of preventing a stock market meltdown during the summer of 2015 by the Chinese government intervention? We answer this question by estimating the value creation for the stocks purchased by the government between the period starting with the market crash in mid-June and the market recovery in September. We find that the government intervention increased the value of the rescued firms with a net benefit between RMB 5,697 and 6,635 billion, which is about 10% of the Chinese GDP in 2014. The value creation came from the increased stock demand by the government, the reduced default probabilities, and the increased liquidity.

JEL classification Numbers: G14, G15, G18

Keywords: China, Stock Market Crash, Government intervention

*We have benefitted from comments by participants in Conferences held in Fudan University and Jinan University, and to seminars at the China Securities Regulatory Commission and Zhejiang University for insightful comments and suggestions. In particular, we would like to thank Harald Hau, Shang-Jin Wei, Bin Zhang and Michael Song Zheng for their valuable comments. We gratefully acknowledge research assistance from Ye Zhang and Yadong Huang, and financial support from Sino-Swiss Science and Technology Cooperation.

†Graduate Institute, Geneva, Maison de la paix, Chemin Eugene-Rigot 2, 1202 Geneva, Switzerland. Tel: (+41) 22 908 59 40. E-mail: yi.huang@graduateinstitute.ch.

‡Department of Economics, Boston University, 270 Bay State Road, Boston MA 02215, USA. Email: miaoj@bu.edu. Tel: (+1) 617 353 6675.

§Department of Economics, The Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong. Office: (+852) 2358 7612. Email: pfwang@ust.hk

1. Introduction

From mid-June to early July of 2015, the Chinese Shanghai Stock Exchange Composite Index (SSECI) plunged by 32%, wiping out more than 18 trillion Yuan in share value from its June 12 peak.[1] The value lost was equivalent to about 30% of China's GDP in 2014 and about 20% of the US GDP in 2014. The Shenzhen market, which has more tech companies and is often compared to the US Nasdaq index, was down 41% over the same period.

This large stock market crash produced widespread panic and pushed the Chinese government to implement a range of rescue policies. In addition to halting IPOs, restricting short selling, and restricting share sales by large shareholders, the Chinese government directly or indirectly participated in stock market trading. In particular, China Securities Finance Corporation Limited (CSF) lent money to 21 brokerages for them to buy stocks in the stock markets. Moreover, the CSF and China Central Huijin Investment Limited (CCH), the so called national team, also directly purchased stocks of more than 1,000 firms starting from July 6, 2015.

In this paper we study the following questions: Did the government intervention create value or was it simply a redistribution of value from taxpayers to the rescued firms. If it created value, where did the value added come from?

To answer these questions, we estimate the costs and benefits of the government's purchases of stocks during the period from July 1 to September 30. We focus on the national team instead of the brokerages due to data availability. The national team continually purchased stocks starting from July 6, but we do not observe its daily trading behavior. We can only observe the national team's share holdings of the rescued firms from their quarterly balance sheets. From the balance sheets in the second and third quarters of 2015, we can infer the net purchases by the government in that period.

Given the global turbulence in financial markets during the period from July 1 to September 30, it is impossible to estimate the systemic effects of the government intervention. However, it is possible to estimate its effects on the rescued firms. To compute the intervention's effects on the value of these firms, we do not limit ourselves to the changes in the value of common stocks, but we study the changes in the entire enterprise value by also studying changes in the value of existing debt.

We use the capital asset pricing model (CAPM) to compute the effects on equity value and use the Merton (1974) model to compute debt value. We find that the abnormal variation in the

[1] Based on the exchange rate of June 30 2015 (RMB 6.11 per dollar), there is a roughly 3 trillion dollar lost.

market value of common equity is RMB 113 billion. To separate the effect of the government purchase from that of other events occurring at the same time, we control for the change in debt value of not rescued firms. This difference-in-difference approach gives the estimate of the total increase in debt value due to the government purchase. We find that the increase is RMB 3,169 billion. Adding up the increase in equity value and debt value, we obtain that the enterprise value of the rescued firms increased by RMB 3,282 billion.

This increase might come at a cost to the taxpayers. To estimate this cost, we compute the difference between the purchasing value and the holding value on September 30, 2015. Since the government continually purchased stocks during the period between July 6 and September 30 and since we do not observe its daily trading behavior in the data, we estimate its purchasing cost by computing the product of the government's net share holdings of rescued firms and the estimated purchase price. We consider three estimates of the purchase price using the average price, the highest price and the lowest price between July 6 and September 30. We find that the corresponding actual costs are 321.9 billion, 818.6 billion, and -119.8 billion, respectively. Subtracting these costs, we obtain that the value created by the government purchases is RMB 2,960, 2,464, and 3,402 billion, respectively. This value is between 10% and 12% of the market capitalization of the China's stock market on June 30, 2015, and is about 10% of China's GDP in 2014.

Where did this created value come from? What issues did the government purchase help to resolve? To answer these questions, we study the cross section of more than 1,000 rescued firms. We find that the value creation came from three major sources. First, the government purchase increased the demand for shares and raised equity value and firm value and debt value. Second, the government purchase reduced default probabilities of rescued firms. Third, the government purchase raised liquidity of rescued firms. We compute default probabilities using the Merton model and measure liquidity using the Amihud index. We regress changes in firm value, changes in default probabilities, and changes in liquidity between June 30 and September 30, 2015 on the shares purchased by the government by including a number of control variables. We find that the coefficients are significant and have the right signs.

Our paper contributes to the literature by providing the first analysis of the costs and benefits of the government purchase during China's stock market crash in the summer of 2015. Our paper is related to Veronesi and Zingales (2010) who analyze the costs and benefits of the US government intervention (Paulson's plan) during the financial crisis of 2008. Our analysis is

different from theirs in that the nature of the intervention in the two countries is different. The Chinese government directly purchased shares of more than 1000 firms, while the US government provided $125 billion preferred equity infusion in the nine largest US commercial banks joined by a three-year government guarantee on new unsecured bank debt issues. Our methodology is similar, but different from theirs. Veronesi and Zingales (2010) use the credit default swap rates to estimate debt value and default probabilities. But data of these rates are not available in China. Instead, we use the Merton model to estimate debt value and default probabilities. Importantly, since the Chinese government purchased shares of more than 1,000 firms, we can conduct cross-sectional regressions to analyze the effects of the government purchase. But Veronesi and Zingales (2010) do not conduct a cross-sectional regression analysis because they have a very small sample size.

The rest of the paper proceeds as follows. Section 2 describes the Chinese stock market crash in the summer of 2015 and the government intervention. Section 3 provides an estimate of the costs and benefits of the government intervention. Section 4 studies the heterogeneous effects of the government intervention by conducting a cross-sectional regression analysis. Section 5 provides a robustness analysis. Section 6 concludes.

2. The Chinese Stock Market Crash and Government Intervention

2.1. A Chronology: 07/01/2014-9/30/2015

In this section we briefly describe the chronology of the Chinese stock market from July 1, 2014 to September 30, 2015. Since our study focuses on the short-run effects of the government's rescue plan implemented in July, we will not discuss the events happened after September 30, 2015. Figure 1 summarizes the chronology.

Insert Figure 1 Here.

Since the global financial crisis in 2008, the Chinese stock market was in the bear market until July 2014. Starting from July 1, 2014 to June 12, 2015, the Chinese stock market skyrocketed and the SSECI rose from 2,050.38 to 5,166.35, a 152% increase. This bull market was due to four factors. First, the third Plenum of the 18th Communist Party of China Conference declared that China would continue to reform. In particular, China would promote a mixed-ownership economy by diversifying the shareholding structure of the state-owned enterprises

(SOEs). Since many listed firms are state owned, this policy boosted the stock market. Second, the Chinese central bank (People's Bank of China, PBC for short) conducted loose monetary policies. In particular, on November 22 of 2014, PBC cut the loan rate by 40 basis points and the deposit rate by 25 basis points for the first time since July 2012. On February 5, 2015, PBC lowered the required reserve ratio by 50 basis points to 19.5% for the first time since May 2012. On March 1, 2015, PBC cut the benchmark interest rate by another 25 basis points. Third, new investors kept flooding in the stock market. Many people with little financial knowledge entered the market with the false belief that they could easily make quick and big money. Optimistic beliefs were prevalent in the market. Even the most important official newspaper, People Daily, declared on April 10, 2015 that 4,000 index points were merely the start of a bull. Fourth, margin financing rose rapidly. As the stock market kept rising, the demand for margin financing rose. Many brokerages violated the government regulation by loosening the lending standard.

The China Security Regulator Committee (CSRC) became concerned about the rapid increase in margin financing and started investigating brokerages in December 2014. Three major brokerages were forbidden to open new margin accounts for three months. This caused many investors to turn to fund-matching companies, which provided unregulated margin loans to traders. These companies permitted much lower entry barrier and much higher leverage. Another form of unregulated leverage was through umbrella-trusts. An umbrella-trust investor effectively obtained financing from the retail savers who bought "wealth-management-products" at banks. Umbrella-trust companies acted as financing vehicles that charged high fees by offering larger leverage ratios than regulated brokerages.

As the banking sector was channeling money into the stock market by unregulated umbrella-trust companies, the CSRC was worried about the risk involved. The CSRC issued a very strong regulation order on June 13, 2015 that banned all security companies from providing facility for off-market or shadow margin lending, which was estimated to be in the range of RMB 500 to 1,600 billion. In response, the SSECI lost 13.1% between June 15 and June 19, the largest weekly loss in 2008. The market continued to drop. On June 26, the SSECI plummeted by 7.3% and 2,284 among the 2,456 publicly listed stocks fell by 10%, hitting the lower limit. Investors with leverage ratio of 10 at fund-matching companies first went bust. Their portfolios were liquidated, expediting the fall of stock prices. The forced liquidation spread to umbrella-trusts, which allowed a leverage ratio of 3, and then to the margin accounts in regulated brokerages,

which allowed a maximal leverage ratio of 2.

On June 26, PBC cut the interest rate for the fourth time by 25 basis points and the required reserve ratio by 50 basis points. The stock market briefly rebounded a little. But between June 29 and July 3, 2015, the SSECI lost another 12.27% in five trading days. Within just three weeks, the SSECI lost 28.6%. On July 4 (Saturday), Premier Li Keqiang held a State Council Meeting by convening 21 major brokerages, 25 mutual fund companies, and major regulators. Right after the meeting, the 21 brokerages announced a joint RMB 120 billion purchase plan to purchase blue-chip ETFs and alleged not to sell them when the SSECI was below 4500 points. On July 5, CSRC announced that IPOs of 28 companies would be suspended and PBC would provide financing for CSF. On the night of July 5, CCH announced that it had purchased ETFs in the past few days and would continue to purchase in the stock market.

On Monday, July 6, the SSECI opened up 7.8% higher than the previous close, but then declined again with only 2.41% up. More than 900 stocks, which accounted for 42% of total stocks, dropped by 10%, closed at the daily lower limit. The CSF was reported to start buying big blue-chips in the afternoon session.

On July 7, the SSECI lost 1.3% and on July 8, the SSECI lost another 5.9%, with about one third of all listed companies suspended trading and 915 of remaining stocks closed at the daily lower limit. From June 15 to Jul 8, the SSECI lost 32.1%. Retail investors lost a lot of money and the balance sheets of the brokerages and state-owned banks were in danger.

At this critical moment, the Chinese government reached a consensus on rescuing the stock market. A number of measures were taken:

- PBC announced officially that it would provide liquidity to the CSF and make sure no systematic risks.
- The State-owned Assets Supervision and Administration Commission required SOEs not to sell stocks.
- The CCH pledged it would not sell shares.
- The CSF announced it would provide RMB 260 billion margin loans to finance stock purchases by the 21 brokerages.
- The CSRC banned large shareholders with 5% of holdings or above from selling stocks in the next 6 months.

- China Banking Regulatory Commission allowed more flexible mortgage terms of share-secured loans.
- The China Insurance Regulatory Commission relaxed insurance companies? restriction in holding stocks.
- The China Financial Futures Exchanges increased the margin requirement of CSI 500 index futures further from 20% to 30%.
- The CSRC and the Ministry of Public Security initiated joint investigation on rules-breaking short-sellers and rumor makers.

On July 9 the market rebounded and the SSECI gained 5.8%. The market temporarily stabilized until August 11 when PBC unexpectedly weakened the RMB, lowering its official exchange rate by almost 2%. Although PBC stated that it was a move toward the market determination of the exchange rate. Many interpreted that the devaluation was PBC's increasing concern of the weak economy. The stock market responded by losing 28.33% from August 12 to August 26. There were no measures that were announced to further stabilize the stock market by the Chinese government. It was widely believed that this might be due to the fact that the Chinese government was tied by intervening in the foreign exchange market.

2.2. Summary Information about Purchased Stocks

After a dramatic drop in the stock market in mid-June of 2015, the Chinese government started to purchase stocks from the first week of July. These interventions were conducted primarily through two central government owned investment funds, the CSF and the CCH.[2] In our sample, we first collect all the information of the top ten largest shareholders of all Chinese stocks, and then manually match the names of the CSF and the CCH with the list of shareholders from quarterly reports between Q2 and Q3 of 2015. We define our sample to include those stocks which were purchased by the government, and match them with their balance sheets, market prices, market returns, and fundamental performance information.

We find that, by the end of September 2015, the CSF and the CCH together invested in 1,365 stocks in the Chinese stock market, which accounted for about 50% of the total number

[2]There are other investment vehicles funded by the China Securities Finance Corporation, a stock market stabilization fund, as well as the Wutongshu investment platform, the equity fund owned by the central bank of China. We did not include stocks purchased by those investment vehicles and shadow funds due to data limitations. Therefore, the purchased stocks included in our sample might underestimate the total amount of the rescue plan.

of stocks in the stock market. There were 494 stocks purchased by both the CSF and the CCH. Out of the total number of invested stocks, 41% were in the Shanghai main board, 18% were in the Shenzhen market, 26% were in the Small and Medium (SME) board, and 15% were in the Growth Enterprise board (GEM) board. Only the CCH purchased stocks from the GEM and SME boards, in a total 544 firms. Based on the market prices on September 30, 2015, the CCH and the CSF invested in more than 77% in the Shanghai main board, 14% in the Shenzhen market, 6% in the SME board, and 3% in the GEM board. More than 60% of the purchased stocks were concentrated on those stocks that accounted for more than RMB 50 billion in market capitalization. The CSF purchased more than 66% of stocks with the capitalization over RMB 50 billion, while the CCH held only 43% stocks with a similar size.

Insert Table 1A, B, C Here.

Panel A of Table 1 presents that the market capitalization of the stocks purchased by the CSF accounted for 61% of the total market capitalization in terms of the market prices on June 30, 2015. The corresponding share for the CCH is 65% and the market capitalization of all stocks purchased by both the CSF and CCH accounted for 74% of the total market capitalization.

Panel B of Table 1 reports the balance sheet information about the purchased stocks. After the government intervention, the balance sheets of the purchased stocks improved with an increasing return to assets (ROA), return to equity (ROE), and slightly decreasing leverage (debt/assets) ratio. Specifically, the average ROA and ROE increased from 3.01% to 4.39% and 2.87% to 4.93% respectively, while the leverage ratio remained almost unchanged at 45%. In contrast, the average market to book (M/B) ratio declined from 5.32 to 3.55.

Panel C of Table 1 presents the industry-wise allocation at the end of September 2015. The CSF and CCH invested more than 30% and 25% respectively in banking and non-banking stocks. The remaining investments were distributed among various industries ranging from 7% to less than 1%. In terms of the market capitalization on September 30, banking and non-banking financial stocks contributed to about 25% of the total invested stocks by the SCF and CCH. This indicates that the government purchased mainly stocks in the financial sector.

3. Gains/Costs of the Government Intervention

In this section we estimate the gains or costs of the government intervention by an event study analysis. An event study cannot measure the systemic effect of the government intervention because such an effect is affected by many other market events taking place at the same time. Thus we can estimate only the differential impact of the government intervention on the rescued stocks compared to the rest of the market. Following Veronesi and Zingales (2010), we calculate the change in the entire firm value between 2015Q2 and 2015Q3 by considering both equity and debt and then estimate the net gains after deducting the actual cost of the intervention.

3.1. Market Value of the Firm

Veronesi and Zingales (2010) use the credit default swap (CDS) rates data to estimate debt value and default probabilities. Since these data for Chinese stocks are not available, we have to use a different approach. As a starting point, we adopt the Merton (1974) model to estimate firm value and default probabilities. We then compute debt value as firm value minus equity value.

Now we briefly review the Merton (1974) model. Suppose that firm value V follows a geometric Brownian motion process

$$dV = \mu dt + \sigma_V dW, \tag{1}$$

where μ is the expected continuously compounded return on V, σ_V is the volatility of firm value and W is the Wiener process. Suppose that debt is a discount bond with face value F and maturity T. If firm value is lower than F at the maturity date, then the firm defaults and debt holders get V, but equity holders get nothing. Thus equity can be viewed as a call option on the underlying firm value with the strike price F and the time-to-maturity T. Its value can be derived by the Black-Scholes formula:

$$\begin{aligned} E &= V\mathcal{N}(d_1) - e^{-rT}F\mathcal{N}(d_2), \\ d_1 &= \frac{\ln(V/F) + \left(r + 0.5\sigma_V^2\right)T}{\sigma_V\sqrt{T}}, \\ d_2 &= d_1 - \sigma_V\sqrt{T}, \end{aligned} \tag{2}$$

where E is equity value, r is the risk-free rate and $\mathcal{N}$ denotes the standard cumulative normal distribution function.

By Ito's Lemma, equity volatility satisfies

$$\sigma_E = \frac{V}{E}\mathcal{N}(d_1)\,\sigma_V. \tag{3}$$

We then use the values of r, T, E, and σ_E as input to solve for two variables V and σ_V using two equations (2) and (3). After obtaining this solution, we can compute expected default probability under the risk-neutral measure as

$$EDP = N(-DD), \tag{4}$$

$$DD = \frac{\ln(V/F) + \left(r - 0.5\sigma_V^2\right)T}{\sigma_V\sqrt{T}}, \tag{5}$$

where DD is often called the (risk-neutral) distance to default. Under the physical measure, we replace r with μ in equation (5) and obtain the (physical) expected default probability. We choose to compute the risk-neutral default probability instead of physical default probability for computation simplicity because we do not need to estimate the unknown parameter μ. Crosbie and Bhon (2003) and Vassalou and Xing (2004) propose a complicated iterative procedure to compute daily V and then estimate μ as the mean of the daily growth of V. Bharath and Shumway (2008) propose a simpler approach.

In our application we observe stock prices data and can compute equity value E on June 30 and September 30, 2015. We then take a rolling 250 day standard deviation of equity returns to estimate the volatility of equity σ_E. We take the one-year government bond yield as the risk-free rate r. Following Vassalou and Xing (2004) and Bharath and Shumway (2008), we use the short-term plus one half of the long-term liability of June 30 to represent the face value of debt for non-financial firms. Due to the special liability structure of the financial firms (banks, insuance and security firms), we use the total book liability on June 30 as the face value of debt. Suppose that the debt has one year maturity and set $T = 1$ on June 30. On September 30, T becomes 3/4. Once the values for r, T, E, and σ_E are obtained, we can compute firm value V on June 30 and September 30 and the default probabilities on those dates.

To apply the Merton method, we need to know the previous year's information about equity value to estimate equity volatility. Some stocks lack this information due to either new listings or mergers and acquisitions. For this reason, we exclude those stocks from our sample. We then have a smaller sample of 2,650 stocks, among which 1,316 stocks are purchased by the national team and the remaining stocks are not purchased.

Table 2 presents the computed market values of all financial and non-financial firms in our sample on June 30 and September 30. Note that the CSF and the CCH both invested in the

same 483 stocks, which were mainly financial and large market capitalization firms. We have to be careful about double counting when computing values.

Insert Table 2 Here.

Panel A of Table 2 shows that the CSF purchased 680 non-financial firms. The value of these firms increased by 3.8% and the increase in value was RMB 1,086 billion. The CCH purchased 1,041 non-financial firms and these firms lost value of RMB 708 billion. The loss was 2.2% of June 30 value. The CSF and the CCH both purchased 449 non-financial firms. These firms gained value of RMB 1,282 billion and the gain is 5.3%. In aggregate, the total rescued stocks lost 2.4% of firm value worth RMB 904 billion. There were 1,329 non-financial stocks not purchased by either the CSF or the CCH. These firms lost 13.5% of value worth RMB 2,352 billion.

Panel B of Table 2 presents the corresponding numbers for financial stocks. the CSF and the CCH purchased 40 and 38 financial stocks, respectively. There were 34 financial stocks purchased by both the CSF and the CCH. There were 5 financial stocks not purchased by either the CSF or the CCH. These firms lost 19.6% of value worth RMB 246 billion.

3.2. Change in Debt Value

Next we estimate debt value by subtracting equity value from firm value. Equity value is computed as the stock market price multiplied by the total outstanding shares or market capitalization. Table 3 presents computed equity value.

Insert Table 3 Here.

Panel A of Table 3 shows that the purchased non-financial stocks lost by about 30.9% of their equity value worth RMB 9,495 billion. The not-purchased stocks lost a smaller percentage of 24.8% of equity value worth RMB 3,800 billion. Panel B shows the corresponding results for financial stocks. The total purchased financial stocks lost 26.1% of equity value worth RMB 2,586 billion. By contrast, the total of not purchased stocks lost a much larger percentage of 46.9% of equity value worth RMB 231 billion.

In summary, Table 3 shows that rescued financial stocks lost a much smaller percentage of equity value compared to not rescue financial stocks, but the opposite is true for non-financial stocks.

Insert Table 4 Here.

Table 4 presents the estimated debt value. Panel A shows that debt value of rescued non-financial firms increased by about more than 100%, while debt value of not rescued non-financial firms also increased but by a much smaller magnitude. Panel B shows that debt value of rescued financial firms barely changed, but debt value of not rescued financial firms lost by about 2%.

Since debt value changed for both rescued and not rescued firms during the period from June 30 to September 30 and since there were many market events happened during this period, we isolate the effect of the government intervention by using not rescued firms as control. For each rescued stock, we use not rescued stocks in the same industry as control. The adjusted change in debt value of the rescued stock is computed as

$$adjusted\ \Delta\left(debt\right) = \Delta\left(debt\right) - debt_{06/30} * \frac{\Delta\left(debtn\right)}{debtn_{06/30}}$$

where *debtn* denotes debt value of all not rescued firms in the same industry of the rescued firm. Since the government purchased many stocks in various industries, we have to take industry effects into account. We use the industry classification presented in Table 1C.

Panel A of Table 4 shows that the adjusted debt value change is about half of the raw change for all purchased non-financial stocks, which is RMB 4,146 billion. By contrast, Panel B shows that adjusted debt value changed increases significantly, which is RMB 2,257 billion. This means that debt value of rescued financial firms benefitted much more significantly than that of rescued non-financial firms.

3.3. Change in Equity Value

Table 3 shows that the market value of equity plummeted from June 30 to September 30, 2015 for both rescued and non-rescued firms. This could be due to a number of market events happened in this period. To estimate the effects of the government intervention, we have to control these market events. As is standard in the literature, we use the CAMP model summarized by the following equations:

$$\begin{aligned}
Equity\ Value\ Gain &= MKTCAP * Abnormal\ Return, \\
Abnormal\ Return &= Raw\ Return - \widehat{\beta} * R_m, \\
Raw\ Return &= \frac{Stock\ Price_{09/30} - Stock\ Price_{06/30}}{Stock\ Price_{06/30}}, \\
R_m &= \frac{Market\ Index_{09/30} - Market\ Index_{06/30}}{Market\ Index_{06/30}},
\end{aligned}$$

where $MKTCAP$ is the market capitalization on June 30, 2015, the betas are estimated from daily stock prices during the period from January 1, 2014 and June 29, 2015. We use the SSECI as the market index.

Panel A of Table 5 shows that even though the raw returns dropped much more for purchased non-financial stocks than for not purchased non-financial stocks, the abnormal returns dropped much less. All abnormal returns are negative and range from 1% to 4%. By contrast, Panel B of Table 5 shows that the abnormal returns on purchased financial stocks are positive and are about 6% to 7%. The abnormal returns on not purchased financial stocks are about -47%. This means that financial stocks benefitted from the government intervention much more than non-financial stocks.

Insert Table 5 Here.

Combining Panels A and B shows that more than RMB 113 billion gain in equity value of total purchased stocks during the period from June 30 to September 30, 2015. Equity value of the stocks purchased by the CSF alone and the CCH alone increased by RMB 475 and 275 billion, respectively.

3.4. Actual Cost of the Stock Purchases

Both CSF and CCH bought stocks in July and August of 2015. We compute the purchasing cost using the following equation:

$$Cost\ of\ Stock\ Purchase = Purchased\ Shares * Price\ Per\ Share.$$

The information about the exact purchasing dates and the purchasing prices is not available from public sources. We can find the information about large shareholders and their shareholdings from a firm's balance sheets in Q2 and Q3 of 2015. We can estimate the purchased shares of all rescued firms as the shareholdings of the CSF and the CCH in Q3 minus their shareholdings in Q2. We use three ways to estimate the price per share: the average price between June 30 and September 30, 2015, the highest price in this period, and the lowest price in this period.

The purchasing cost is not the actual cost because both the CSF and the CCH owned the purchased stocks. We have to subtract the market value of the purchased stocks on September 30 to obtain the actual cost incurred in the period from June 30 to September 30.

Insert Table 6 Here.

Table 6 shows that the total costs of stock purchases by the CSF and the CCH range from RMB 770.5 to 1,708.8 billion. The CSF purchased fewer stocks, but the purchasing costs were higher. The market value of purchased stocks by the CSF on September 30 was RMB 599.2 billion, compared to RMB 291 billion for CCH. Subtracting the market value on September 30, we obtain the total actual costs of stock purchases by both the CSF and the CCH, RMB 321.9 (average price), 818.6 (highest price), and -119.8 (lowest price). Thus if the CSF and the CCH purchased stocks at the lowest prices, they made money from capital gain in equity. But if they purchased stocks at the average or higher prices, they had a capital loss at the expense of taxpayers. Unfortunately the data on the precise purchasing prices and quantities are not available from public sources. Thus we do not know whether the government received capital gains from equity between September 30 and June 30, 2015.

3.5. Net Gains of the Government Purchase Plan

We are ready to compute the net costs and benefits of the stock purchase plan using the following equation:

$$Net\ gains = Adjusted\ change\ in\ debt\ value + Change\ in\ equity\ value - Actual\ cost.$$

Plugging the estimates obtained in Tables 4, 5, and 6, we obtain the net gains for financial and non-financial firms in Table 7. From the two panels, we observe the following: (1) Both purchased financial stocks and non-financial stocks benefitted by about RMB 3,000 billion. (2) The net gains came mostly from the adjusted increase in debt value. (3) The net gains of both financial and non-financial stocks purchased by the CSF were larger than purchased by the CCH.

Insert Tables 7 and 8 Here.

Table 8 presents the aggregate of Panels A and B of Table 7. This table shows that the net gains of all stocks purchased by the CSF only are between RMB 7,024 and 7,056 billion. The net gains of all stocks purchased by the CCH only are between RMB 5,427 and 5,967 billion. The net gains of all stocks purchased by both the CSF and the CCH are between RMB 6,280 and 6,890 billion. The total net gains of all purchased stocks are between RMB 5,697 and 6,635 billion and the net gains per stock are between RMB 4.3 and 5.0 billion. To have a sense the magnitude of the net gains, we present the net gains relative to the market capitalization of the

Chinese stock market and GDP in Figure 2. This figure shows that the net gains are between 10 to 12% of the market capitalization on June 30, 2015 and between 9 to 10% of GDP in 2014.

Insert Figure 2 Here.

4. Sources of Value Creation

In the previous section we have shown that the government purchase plan created a substantial amount of value. This section addresses the following questions: What kind of firms was more likely to be saved? Where did the value creation come from? Since the government purchased shares of more than 1000 firms, we have a fairly large sample for a cross-sectional regression analysis. We begin by examining all stocks in the Shanghai and Shenzhen stock exchanges using Wind and CSMAR financial statement data matched with the stock purchase information by the CSF and the CCH. We exclude financial firms and newly listed firms from the sample in our regression analysis.

Insert Table 9 Here.

Table 9 describes the main variables in our regression analysis including firm value, debt value, default probability, return on assets (ROA), market-to-book ratio (M/B), leverage, cash flow, and dividend ratio. Following the recent study by Brogaard et al. (2016), we construct the Amihud index, a measure of illiquidity. In our summary statistics, we also include dummy variables SOE (which equals 1 if the actual controller of a company is a state-owned enterprise, otherwise 0), export (which equals 1 if a company had foreign sales in 2015Q1, otherwise 0) and blue chip (which equals 1 if a company is a blue chip, otherwise 0).

Panel B of Table 9 reports summary statistics of the variables between June 30 and September 2015. There are several extreme values among the observations in the sample. Too exclude outliers, we winsorize both the top and bottom 1% for our empirical analysis. Overall, we have more than 2,500 observations in the regression analysis. The main regression results of this paper are based on the balance sheet information at 2015Q2. As a robustness in section 5, we will use the balance sheet information from 2015Q3.

4.1. What Kind of Firms was More Likely to Be Saved?

As Table 1 shows, the government purchased many firms with various characteristics in various industries. What kind of firms was more likely to be saved? To answer this question, we study

a Probit model specified below:

$$\Pr\left(Government\ Purchased\ Stock = 1\right) = b_0 + \sum_{n=1}^{k} b_n X_n + \varepsilon,$$

where the vector X includes variables related to firm characteristics, ownership dummy, and export dummy. The reason we add export dummy is that during the period under consideration, China experienced a devaluation of its currency, RMB. This may affect the market value of exporting firms significantly.

Insert Table 10 Here.

We present the regression results in Table 10. As seen in columns 1 to 4, there is a very strong and significant positive correlation between the probability of being purchased by the government and firm characteristics including ROA, market-to-book ratio, dividend ratio, SOE dummy, and blue-chip dummy. These results hold true both with and without industry fixed effects specifications. Moreover, the higher the ROA or the higher the dividend ratio, the more likely a firm is included in the government purchase plan. Being a SOE or a blue-chip firm also increases the likelihood of being included in the government purchase plan. A firm with a larger market-to-book ratio is less likely to be included in the government purchase plan. These regression results indicate that the government is more likely to purchase value stocks, blue-chip stocks, high-dividend-yield stocks, and stocks of profitable firms or SOEs. Interestingly, there is no statistical relationship between the export status and the probability of being purchased by the government. This result is consistent with the official announcements that the government did not intervene the stock market in response to the currency devaluation in August 2015.

4.2. Did Purchasing More Shares Create More Values?

Intuitively, if the government purchases more stocks, it will raise more demand for stocks and hence raise more equity value, firm value, and debt value. Tables 3 and 5 show that although equity value fell significantly during the period from June 30 to September 30, 2015, the fall would be more significant without the government purchase. To examine whether value creation would be higher if the government purchased more stocks, we run the following cross-sectional regression:

$$Value\ Creation = b_0 + \sum_{n=1}^{k} b_n X_n + \varepsilon.$$

Table 11 summarizes the results. The key variable is GOV, the ratio of the shares purchased by the government to the total outstanding shares. Value growth represents either the change in log firm value or in log debt value between June 30 and September 30, 2015. For the various specifications considered, the control variables include industry fixed effect, export status, SOE dummy, blue-chip dummy, and other variables commonly used in the literature such as ROA, M/B, leverage, cash flow, and dividend ratio.

We find a significant positive relationship between the number of shares purchased by the government and value creation, after including many control variables. This result holds true for various specifications considered in columns 1 through 5 and in columns 6 through 10. Moreover, ROA, dividend yield, and leverage as well as the blue-chip, and export dummies have a positive correlation with the value creation. But M/B is negatively related to the value creation. This indicates that fundamentals matter for value creation.

When we gradually add more control variables from columns 1 to 5 for the regressions on firm value growth, the slope of GOV gradually decreases, but is still significant, and R-squared gradually increases. A similar result holds true for the regressions on debt value growth. In columns 5 and 10 we find that the slope of GOV is 0.009 and 0.155, respectively, when we include all control variables. The interpretation based on our definition of GOV in Table 9 is that a one percentage point increase in the ratio of the number of shares purchased by the government to the total outstanding shares will raise firm value by 0.9% and debt value by 15.5%.

Insert Table 11 Here.

The positive and significant relationship between government intervention and value creation documented above is consistent with the aggregate evidence of the government purchase plan reported in Section 3.

4.3. The Impact on Default Probabilities and Liquidity

In this previous section we have shown that if the government purchased more shares, it would create more values. This could be due to the abnormal returns of equity generated by the increased demand for stocks. In this section we examine two additional channels: reduced default probabilities and increased liquidity.

As shown in section 3, we can compute the expected default probabilities using the Merton (1974) model. We then compute the change in default probabilities between June 30 and

September 30, 2015 for each stock. We use the Amihud index to describe illiquidity for each stock. We then run the following cross-sectional regressions:

$$\begin{aligned} \Delta(EDP) &= a_0 + a_1 GOV + \sum_{n=1}^{k} a_n X_n + \varepsilon, \\ Illiqudity &= a_0 + a_1 GOV + \sum_{n=1}^{k} a_n X_n + \varepsilon. \end{aligned}$$

Table 12 reports the regression results. Columns 1 to 5 of Table 12 show that there is a significant negative relationship between the change in default probabilities and the number of shares purchased by the government across various specifications. This implies that an increase in the number of shares purchased by the government tends to reduce the stock's default probability. The slope of GOV varies from -0.004 to -0.007 with different control variables. In column 5 the slope of GOV is -0.006 when we include all control variables. The interpretation is that a one percentage increase in the ratio of the number of shares purchased by the government to the total outstanding shares will reduce the default probabilities by 0.6%.

Insert Table 12 Here.

In columns 6 through 10, we find that there is a significant negative relationship between the Amihud index, our proxy for illiquidity, and GOV across various specifications. This implies that an increase in the number of shares purchased by the government relative to total outstanding shares tends to increase the liquidity of stocks.

5. Robustness

5.1. Alternative Control Variables

In the regressions reported in Tables 10 to 12, we use firm characteristics collected from the balance sheets in 2015Q2 as the control variables. As a robustness check, we now consider the balance sheet variables in 2015Q3 as the new control variables.

Tables 13 and 14 report the results. We find that our result, that value creation is positively related to GOV, is robust to using alternative measures of control variables. The magnitudes of the slope of GOV are similar, except that the slope of GOV is 0.018 in column 5 of Table 13, while it is 0.009 in column 5 of Table 11. This difference might be due to the relatively small sample in our cross-sectional regressions.

Insert Table 13 Here.

Table 14 shows that the negative relationship between GOV and default probabilities and the positive relationship between GOV and liquidity are robust to alternative measures of control variables. Moreover the slope of GOV is significant across various specifications and the magnitudes of the slope are quite similar in Tables 12 and 14.

Insert Table 14 Here

5.2. The Government Purchase Dummy

In the previous section we have studied the impact of the number of shares purchased by the government on value creation, default probabilities, and liquidity. We find that if the government purchases more shares, then the value creation will be higher, the default probabilities will be lower, and the liquidity will be higher. Now we ask whether the government purchase plan indeed raised liquidity and reduced default probabilities relative to the stocks not purchased by the government. We use the government purchase dummy (GOVD) as a regressor to study this question. Table 15 reports the results.

Insert Table 15 Here.

Table 15 shows that the slopes of GOVD are negative and significant for both regressions on default probabilities and illiquidity across various specifications. Overall, we conclude that there is a positive effect of the government intervention plan on the liquidity and default probabilities of the stock.

6. Conclusions

In this paper we have estimated the benefits and costs of the government purchase plan. We find that the plan increased the value of the rescued firms with a total net benefit between RMB 5,697 and 6,635 billion, which is about 10% of the Chinese GDP in 2014. The value creation came from the increased stock demand by the government, the reduced default probabilities, and the increased liquidity.

Our estimated value creation is based on an event study and the identification of the sources of value creation is based on a cross-sectional regression analysis. It would be interesting to use the difference-in-difference methodology to study the heterogeneous effects of the government

purchase plan. We have not conducted such an analysis because of the data limitation. We leave such a study for future research.

References

Bharath, Sreedhar, and Tyler, Shumway, 2008, Forecasting Default with the Merton Distance to Default Model, *Review of Financial Studies* 21, 1339-1369.

Brogaard, Jonathan, Dan Li, and Ying Xia, 2016, The Effect of Stock Liquidity on Default Risk, *Journal of Financial Economics*, Forthcoming

Merton, Robert, 1974, On the Pricing of Corporate Debt: The Risk Structure of Interest Rates, *Journal of Finance* 29, 449-470.

Sundaresan, Suresh, 2013, A Review of Merton's Model of the Firm's Capital Structure with its Wide Applications, *Annual Review of Financial Economics.*

Vassalou, Maria, and Yuhang Xing, 2004, Default Risk in Equity Returns, *Journal of Finance* 2, 831-868.

Veronesi, Pietro and Zingales, Luigi, 2010, Paulson's Gift, *Journal of Financial Economics* 3, 339-368.

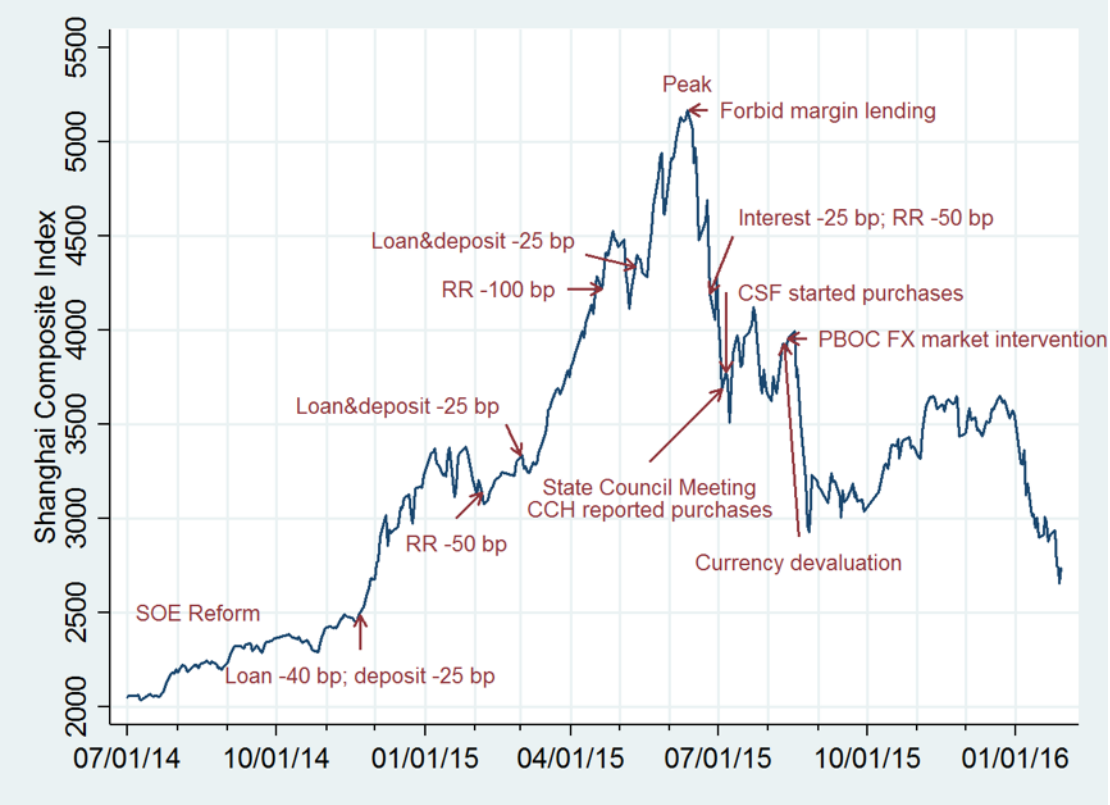

Figure 1: A Chronology of China's Stock Market

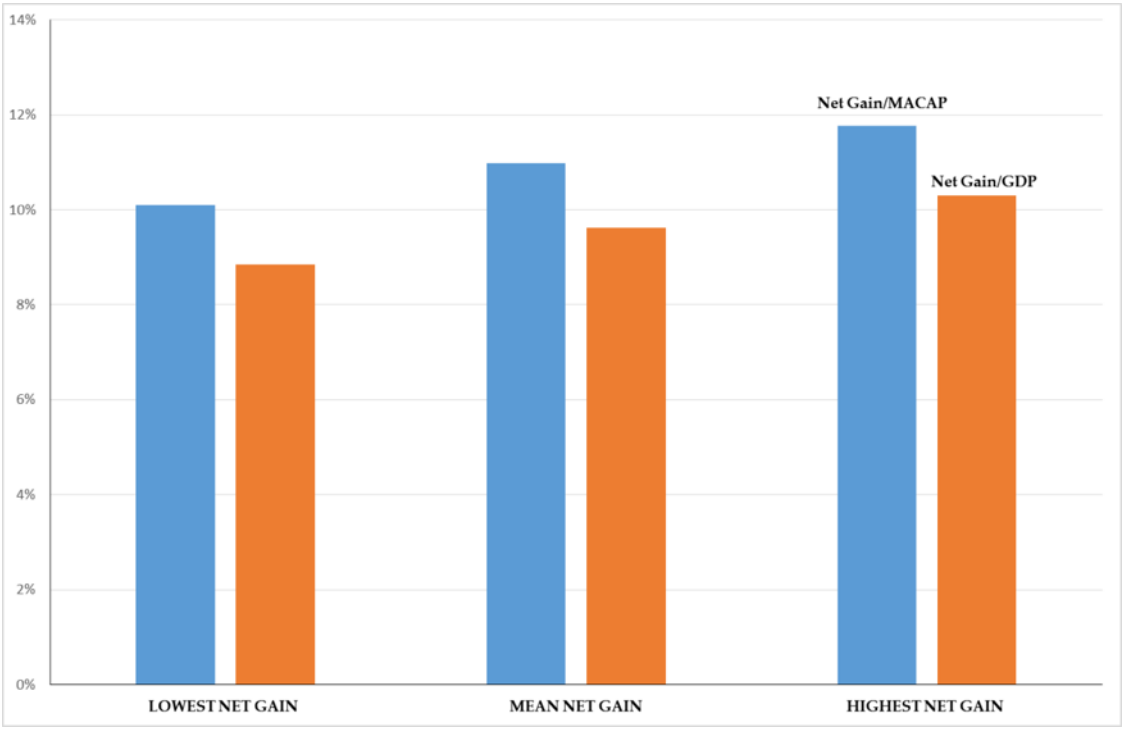

Figure 2: Net Gains of Government Intervention

Note: MACAP is the market capitalization on June 30, 2015 and GDP is 2014 value.

Table 1: Main information about Purchased Stocks

Panel A reports the number and market capitalization of purchased stocks in terms of market prices on June 30, 2015. Panel B reports the balance sheet information about the purchased stocks. Panel C reports the stock's industry allocation. The purchase information is collected from the ownership structure of all Chinese stocks on their quarterly financial statements on June 30 and September 30, 2015.

Panel A: Purchased Stock Information

6/30/2015	No. of Stocks Purchased	No. of All Stocks	Purchased/Total No. of Stocks	Market Cap of Purchased Stocks (Billion)	Total Market Cap (Billion)	Purchased/Total Market Cap
CSF	742	2,830	26.22%	39,682	64,685	61.00%
CCH	1,117	2,830	39.51%	41,966	64,685	65.00%
Total	1,365	2,830	48.23%	47,917	64,685	74.00%

Panel B: Balance Sheet Data

6/30/2015	Total Asset (Billion)	Total Liabilities (Billion)	ROA (%)	ROE (%)	Leverage	M/B
CSF	155,316	135,602	2.79	3.57	0.52	3.76
CCH	138,118	119,398	3.15	3.14	0.43	5.89
Total	159,249	138,047	3.01	2.87	0.45	5.32
6/30/2015	Total Asset (Billion)	Total Liabilities (Billion)	ROA (%)	ROE (%)	Leverage	M/B
CSF	156,512	136,271	3.99	4.28	0.52	2.45
CCH	139,178	119,994	4.55	5.31	0.43	3.91
Total	160,486	138,705	4.39	4.93	0.45	3.55

Note:

a) CSF: China Securities Finance Corporation; CCH: China Central Huijin Investment Corporation
b) Both CSF and CCH invested in the same 494 stocks
c) Sources: Bloomberg, WIND and CSRC

Panel C: Industry Allocation

6/30/2015	CSF Market Cap Share	CCH Market Cap Share	Total Market Cap Share
Banking	22.50%	10.50%	18.50%
Non-Banking Financial	14.10%	13.50%	13.90%
Mining	5.40%	3.30%	4.70%
Chemical industry	3.40%	4.60%	3.80%
Pharmaceutical Biotechnology	3.40%	6.50%	4.40%
Transportation	5.30%	4.00%	4.80%
Real estate	4.60%	4.90%	4.70%
Building Decoration	5.20%	4.50%	5.00%
Equipment	3.50%	5.10%	4.10%
Utilities	4.70%	3.10%	4.20%
Car	3.00%	3.10%	3.00%
Computer	1.20%	4.20%	2.20%
Food & drink	3.20%	2.70%	3.00%
Non-ferrous metal	3.00%	3.00%	3.00%
Electronic	1.40%	3.70%	2.20%
Electrical Equipment	1.80%	3.50%	2.40%
Media	1.90%	2.80%	2.20%
Defense industry	3.00%	2.90%	2.90%
Commercial trade	1.20%	2.50%	1.70%
Household appliances	2.10%	2.40%	2.20%
Steel	2.10%	1.50%	1.90%
Communication	1.30%	1.70%	1.50%
Building materials	0.80%	1.50%	1.00%
Textile and Apparel	0.50%	1.60%	0.80%
Agriculture, forestry, animal husbandry & fisheries	0.50%	1.50%	0.80%
Light manufacturing	0.30%	0.60%	0.40%
Others	0.30%	0.60%	0.40%
Leisure services	0.30%	0.50%	0.30%
Total	100.00%	100.00%	100.00%

Table 2: Estimated Firm Value

Panel A and B report the market value of non-financial and financial firms, respectively, estimated using the Merton model.

Panel A: Non-Financial Stocks

Date	Number 06/30-09/30	Firm Value (Billion) 06/30	Firm Value (Billion) 09/30	Firm Value Change (Billion) 06/30-09/30	Firm Value Change per Stock (Billion) 06/30-09/30	Firm Value Change (%) 06/30-09/30
CSF	680	28,814	29,900	1,086	1.6	3.80%
CCH	1,041	32,678	31,969	−708	−0.7	−2.20%
Both CSF and CCH	449	24,177	25,459	1,282	2.9	5.30%
Total Purchased Stocks	1,272	37,315	36,411	−904	−0.7	−2.40%
Total Not Purchased Stocks	1,329	17,446	15,094	−2,352	−1.8	−13.50%
Total Stocks	2,601	54,761	51,505	−3,256	−1.3	−5.90%

Panel B: Financial Stocks Only

Date	Number 06/30-09/30	Firm Value (Billion) 06/30	Firm Value (Billion) 09/30	Firm Value Change (Billion) 06/30-09/30	Firm Value Change per Stock (Billion) 06/30-09/30	Firm Value Change (%) 06/30-09/30
CSF	40	124,229	121,797	−2,432	−60.8	−2.00%
CCH	38	108,084	105,763	−2,321	−61.1	−2.10%
Both CSF and CCH	34	106,665	104,512	−2,154	−63.3	−2.00%
Total Purchased Stocks	44	125,648	123,049	−2,598	−59.1	−2.10%
Total Not Purchased Stocks	5	1,257	1,011	−246	−49.2	−19.60%
Total Stocks	49	126,904	124,060	−2,845	−58.1	−2.20%

Table 3: Equity Value

Panels A and B report equity value for non-financial and financial stocks respectively. Equity value is equal to market capitalization computed as the market price multiplied by the number of outstanding shares.

Panel A: Non-Financial Stocks

Unit: Billion	Number	Market Cap	Market Cap	Market Cap Change	Market Cap Change per Stock	Market Cap Change (%)
Date	06/30-09/30	06/30	09/30	06/30-09/30	06/30-09/30	06/30-09/30
CSF	680	23,248	15,887	−7,362	−10.8	−31.70%
CCH	1,041	26,983	18,776	−8,207	−7.9	−30.40%
Both CSF and CCH	449	19,531	13,457	−6,073	−13.5	−31.10%
Total Purchased Stocks	1,272	30,700	21,205	−9,495	−7.5	−30.90%
Total Not Purchased Stocks	1,329	15,292	11,492	−3,800	−2.9	−24.80%
Total Stocks	2,601	45,992	32,697	−13,295	−5.1	−28.90%

Panel B: Financial Stocks

Unit: Billion	Number	Market Cap	Market Cap	Market Cap Change	Market Cap Change per Stock	Market Cap Change (%)
Date	06/30-09/30	06/30	09/30	06/30-09/30	06/30-09/30	06/30-09/30
CSF	40	9,493	7,067	−2,426	−60.7	−25.60%
CCH	38	8,586	6,278	−2,308	−60.7	−26.90%
Both CSF and CCH	34	8,187	6,038	−2,148	−63.2	−26.20%
Total Purchased Stocks	44	9,892	7,306	−2,586	−58.8	−26.10%
Total Not Purchased Stocks	5	493	262	−231	−46.3	−46.90%
Total Stocks	49	10,385	7,568	−2,817	−57.5	−27.10%

Table 4: Estimated Debt Value

Panels A and B report estimated debt value for non- financial and financial stocks respectively. Debt value is equal to firm value minus equity value from Tables 2 and 3. "Adjusted debt value change" is equal to the industry aggregate of the estimated debt value change of purchased stocks, adjusted for the debt value change of not purchased stocks in the same industry.

Panel A: Non-Financial Stocks

Unit: Billion	Number	Debt Value	Debt Value	Debt Value Change	Adjusted Debt Value Change
Date	06/30-09/30	06/30	09/30	06/30-09/30	06/30-09/30
CSF	680	5,566	14,014	8,448	4,708
CCH	1,041	5,695	13,194	7,499	3,672
Both CSF and CCH	449	4,646	12,002	7,356	4,234
Total Purchased Stocks	1,272	6,615	15,206	8,591	4,146
Total Not Purchased Stocks	1,329	2,154	3,602	1,448	N/A
Total Stocks	2,601	8,769	18,808	10,039	N/A

Panel B: Financial Stocks

Unit: Billion	Number	Debt Value	Debt Value	Debt Value Change	Adjusted Debt Value Change
Date	06/30-09/30	06/30	09/30	06/30-09/30	06/30-09/30
CSF	40	114,736	114,731	−5	2,244
CCH	38	99,498	99,486	−12	1,938
Both CSF and CCH	34	98,479	98,473	−5	1,925
Total Purchased Stocks	44	115,755	115,743	−12	2,257
Total Not Purchased Stocks	5	764	749	−15	N/A
Total Stocks	49	116,519	116,492	−27	N/A

Table 5: Value Gain of Common Equity of Purchased Stocks

Panel A reports the non- financial stocks' information, while Panel B reports the financial stocks' information. The market capitalization is the price per share on 06/30/2015 multiplied by the number of shares outstanding. The estimated beta is based on the average daily return between 01/01/2014 and 06/29/2015. The abnormal return equals raw return – estimated beta multiplied by the market return. "Equity value gain" is the product of the market capitalization (June 30) multiplied by the abnormal return.

Panel A: Non-Financial Stocks

Unit: Billion	Number	Market Cap	Estimated Beta	Raw Return (%)	Abnormal Return (%)	Equity Value Gain	Equity Value Gain Per Stock (Billion)
Date	06/30-09/30	06/30	09/30	06/30-09/30	06/30-09/30	06/30-09/30	06/30-09/30
CSF	680	23,248	1.03	−31.7	−2.1	−480	−0.7
CCH	1,041	26,983	1	−30.4	−1.9	−479	−0.5
Both CSF and CCH	449	19,531	1.06	−31.1	−0.8	−132	−0.3
Total Purchased Stocks	1,272	30,700	0.99	−30.9	−2.7	−827	−0.7
Total Not Purchased Stocks	1,329	15,292	0.73	−24.8	−3.9	−603	−0.5
Total Stocks	2,601	45,992	0.9	−28.9	−3.1	−1,430	−0.5

Panel B: Financial Stocks Only

Unit: Billion	Number	Market Cap	Estimated Beta	Raw Return (%)	Abnormal Return (%)	Equity Value Gain	Equity Value Gain Per Stock (Billion)
Date	06/30-09/30	06/30	09/30	06/30-09/30	06/30-09/30	06/30-09/30	06/30-09/30
CSF	40	9,493	1.14	−25.6	7.1	955	23.9
CCH	38	8,586	1.15	−26.9	6	754	19.8
Both CSF and CCH	34	8,187	1.14	−26.2	6.4	769	22.6
Total Purchased Stocks	44	9,892	1.14	−26.1	6.6	940	21.4
Total Not Purchased Stocks	5	493	0.58	−46.9	−30.5	−150	−30
Total Stocks	49	10,385	1.12	−27.1	4.9	790	16.1

Table 6: Actual Cost of Government Purchase Plan

The cost of stock purchase is equal to the purchased shares multiplied by the estimated purchase prices. The average, highest, and lowest costs of stock purchase are based on the average, highest, lowest prices of common equity between 06/30/2015 and 09/30/2015. "Market value of shareholdings by government" is the value of the shareholdings of the government purchased stocks on 09/30/2015. The "actual cost of stock purchase" is the difference between the cost of stock purchase and the market value of shareholdings by the government.

Unit: Billion Date	Number of Purchased Stocks 06/30-09/30	Costs of Stock Purchase (Average) 06/30-09/30	Costs of Stock Purchase (Highest) 06/30-09/30	Costs of Stock Purchase (Lowest) 06/30-09/30	Market Value of Shareholdings by Government 09/30	Actual Cost of Stock Purchase (Average) 06/30-09/30	Actual Cost of Stock Purchase (Highest) 06/30-09/30	Actual Cost of Stock Purchase (Lowest) 06/30-09/30
CSF	720	758.12	1,000.13	521.5	599.2	158.9	400.9	−77.8
CCH	1,079	454.08	708.67	249	291	163.1	417.7	−42.1
Total	1,316	1,212.2	1,708.8	770.5	890.2	321.9	818.6	−119.8

Note

a) China Securities Finance Corporation (CSF) and China Central Huijin Investment (CCH)
b) Both CSF and CCH invest in same 483 stocks
c) Purchase prices of market value are based on the average, highest and lowest prices between June 30 and Sep. 30, 2015
d) Sources: Bloomberg, WIND and CSRC

Table 7: Net Gains of the Government Purchase Plan

Panel A reports the non- financial stocks' net gains, while Panel B reports the financial stocks' net gains. The value gain of the debt equals to the adjusted debt value change, which comes from Table 4. The value gain of common equity comes from Table 5. The actual cost of the government purchase plan comes from Table 6. The net gain is the sum of the value gains from common equity and adjusted debt value minus actual costs.

Panel A: Non-Financial Stocks

Unit: Billion	Number of Purchased Stocks	Debt Value Gain	Common Equity Gain	Actual Cost (Average)	Actual Cost (Highest)	Actual Cost (Lowest)	Net Gain (Average)	Net Gain (Highest)	Net Gain (Lowest)
CSF	680	4,708	−480	97.2	254.3	−47.5	4,130	3,973	4,275
CCH	1,041	3,672	−479	107	286.2	−32.8	3,086	2,907	3,226
Both CSF and CCH	449	4,234	−132	125	327	−61.7	3,977	3,775	4,164
Total Purchased Stocks	1,272	4,146	−827	204.2	540.5	−80.3	3,115	2,778	3,399

Panel B: Financial Stocks Only

Unit: Billion	Number of Purchased Stocks	Debt Value Gain	Common Equity Gain	Actual Cost (Average)	Actual Cost (Highest)	Actual Cost (Lowest)	Net Gain (Average)	Net Gain (Highest)	Net Gain (Lowest)
CCH	38	1,938	754	56	131.5	−9.3	2,636	2,561	2,701
Both CSF and CCH	34	1,925	769	78.6	189.3	−31.8	2,616	2,505	2,726
Total Purchased Stocks	44	2,257	940	117.7	278.1	−39.5	3,079	2,919	3,236

Note

a) China Securities Finance Corporation (CSF) and China Central Huijin Investment (CCH)
b) Both CSF and CCH invest in same 483 stocks
c) Purchase prices of market value are based on the average, highest and lowest prices between June 30 and Sep. 30, 2015
d) Sources: Bloomberg, WIND and CSRC

Table 8: Total Net Gain of Purchased Stocks

This table reports the aggregate of Panels A and B of Table 7.

Unit: Billion	Number of Purchased Stocks	Adjusted Debt Value Gain	Common Equity Gain	Actual Costs (Average)	Actual Costs (Highest)	Actual Costs (Lowest)	Net Gain (Average)	Net Gain (Highest)	Net Gain (Lowest)	Net Gain Per Stock (Average)	Net Gain Per Stock (Highest)	Net Gain Per Stock (Lowest)
CSF	720	6,951	475	158.9	400.9	−77.8	7,268	7,026	7,504	10.1	9.8	10.4
CCH	1,079	5,610	275	163	417.7	−42.1	5,722	5,467	5,927	5.3	5.1	5.5
Both CSF and CCH	483	6,159	637	203.6	516.3	−93.5	6,592	6,280	6,890	13.6	13	14.3
Total Purchased Stocks	1,316	6,403	113	321.9	818.6	−119.8	6,194	5,697	6,635	4.7	4.3	5

Note

a) China Securities Finance Corporation (CSF) and China Central Huijin Investment (CCH)
b) Both CSF and CCH invest in same 483 stocks
c) Purchase prices of market value are based on the average, highest and lowest prices between June 30 and Sep. 30, 2015
d) Sources: Bloomberg, WIND and CSRC

Table 9: Variable Description, Sources and Summary Statistics

Panel A reports variable definition and sources and Panel B reports the summary statistics of variables from quarterly balance sheet information between June 30 and September 30, 2015.

(**This table cannot be displayed properly**)

Panel A: Variable Description, Sources

Name	Variable	Description	Source
GOV	Government Purchase Share	Shares purchased by government / total outstanding shares * 100	Wind
GOVD	Government Purchase Dummy	Dummy variable equals 1 if government purchased the stock, otherwise 0.	Wind
GFV	Firm Value	Change of Log(Firm value)	Author's calculation
GDV	Debt Value	Change of Log(Debt value)	Author's calculation
ROA	Return of Assets	Net Income/Total assets *100	Wind
M/B	M/B ratio	Market /book value of equity	Wind
LEV	Leverage	Total liabilities/Total assets	Wind
CF	Cash Flow	Net Operating Cash Flow / Total assets	Wind
DIV	Dividend Ratio	Dividend / Price*100	CSMAR
Export	Export	Dummy variable equals 1 if a company had foreign sales in 2015Q1, otherwise 0.	Wind
BC	Bluechip	Dummy variable equals 1 if a company is a bluechip share, otherwise 0.	Wind
SOE	State-owned Enterprise	Dummy variable equals 1 if the actual controller of a company is State-owned Enterprise, otherwise 0.	Wind
DPC	Default Probability Change	Change of expected default probability estimated by KMW model	Author's calculation
LIQ	Amihud Index	Average of amihud index between Jun. 1 and Aug. 10, 2015, where amihud index is daily ratio of absolute value stock return/Trading volume*1 billion.	CSMAR

Panel B: Summary Statistics

Variables	Obs	Mean	Std	Min	P25	Median	P75	Max
GOV	2,583	0.96	1.41	0	0	0	1.37	6.89
GOVD	2,589	0.5	0.5	0	0	0	1	1
GFV	2,589	−0.27	0.31	−1.17	−0.48	−0.28	−0.06	1.08
GDV	2,299	−0.03	1.97	−4.7	−0.76	0.32	1.26	2.9
DPC	2,589	−0.0052	0.067	−0.35	−0.049	−0.0044	0.035	0.33
LIQ	2,104	1.21	2.36	0.033	0.17	0.37	0.87	10
ROA	2,587	2.73	2.61	−1.76	0.97	2.32	4.27	8.47
M/B	2,587	6.6	4.37	1.76	3.44	5.37	8.32	18.66
Leverage	2,587	0.43	0.21	0.11	0.25	0.41	0.59	0.8
Cash Flow	2,587	0.0036	0.04	−0.09	−0.02	0.01	0.03	0.08
Dividend Ratio	2,587	0.35	0.46	0	0	0.15	0.51	1.6
Export	2,589	0.5	0.5	0	0	0	1	1
Bluechip	2,589	0.1	0.3	0	0	0	0	1
SOE	2,587	0.3	0.5	0	0	0	1	1

Table 10: Government Purchase Choice Model (Probit model =1, Government Purchase)

This table presents the linear Probit choice model to estimate the factors determining the government purchase plan, which includes firm and industry characteristics. All variables are defined in Table 9. All firm level variables are based on the balance sheet information at Q2 2015. * p < 0.1; ** p < 0.05; *** p < 0.01.

	(1)	(2)	(3)	(4)
ROA	0.055***	0.046***	0.032***	0.038***
	(0.010)	(0.011)	(0.012)	(0.012)
Export	−0.002	0.019	0.023	−0.011
	(0.051)	(0.051)	(0.051)	(0.058)
M/B	−0.065***	−0.054***	−0.044***	−0.050***
	(0.006)	(0.006)	(0.007)	(0.007)
SOE		0.211***	0.195***	0.203***
		(0.060)	(0.060)	(0.062)
BC		0.837***	0.716***	0.737***
		(0.121)	(0.125)	(0.126)
LEV		−0.02	−0.004	0.116
		(0.136)	(0.136)	(0.147)
CF			−0.314	0.321
			(0.644)	(0.695)
DIV			0.324***	0.321***
			(0.065)	(0.066)
Constant	0.247***	0.087	−0.046	−0.106
	(0.058)	(0.091)	(0.095)	(0.178)
Pseudo- R2	0.04	0.06	0.07	0.08
N	2,587	2,587	2,587	2,587
Industry FE	No	No	No	YES

Table 11. The Impact on Value Creation

This table presents the regressions to estimate the correlation between the government purchase plan and value creation, which includes firm and industry characteristics. All variables are defined in Table 9. All firm level variables are based on the balance sheet information at Q2 2015. * p < 0.1; ** p < 0.05; *** p < 0.01

	Firm Value Growth					**Debt Value Growth**				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GOV	0.044***	0.031***	0.017***	0.014***	0.009**	0.353***	0.294***	0.214***	0.195***	0.155***
	(0.004)	(0.004)	(0.003)	(0.003)	(0.004)	(0.021)	(0.022)	(0.021)	(0.022)	(0.022)
ROA		0.008***	0.020***	0.019***	0.020***		0.014	0.096***	0.095***	0.095***
		(0.002)	(0.003)	(0.003)	(0.003)		(0.016)	(0.018)	(0.018)	(0.019)
Export		0.013	0.01	0.012	0.028**		0.223***	0.234***	0.249***	0.316***
		(0.012)	(0.011)	(0.011)	(0.013)		(0.077)	(0.071)	(0.071)	(0.083)
M/B		−0.017***	−0.013***	−0.013***	−0.015***		−0.088***	−0.076***	−0.072***	−0.079***
		(0.002)	(0.002)	(0.002)	(0.002)		(0.011)	(0.011)	(0.011)	(0.011)
LEV			0.584***	0.566***	0.565***			3.741***	3.594***	3.836***
			(0.030)	(0.031)	(0.034)			(0.193)	(0.196)	(0.209)
CF			0.097	0.08	0.182			−0.171	−0.265	0.139
			(0.140)	(0.140)	(0.151)			(0.968)	(0.969)	(1.021)
DIV			0.034***	0.025**	0.027**			0.183**	0.146*	0.178**
			(0.012)	(0.012)	(0.012)			(0.079)	(0.081)	(0.081)
BC				0.076***	0.062***				0.268**	0.230*
				(0.018)	(0.019)				(0.122)	(0.123)
SOE				0.008	0				0.192***	0.122*
				(0.012)	(0.012)				(0.071)	(0.073)
Constant	−0.315***	−0.220***	−0.522***	−0.515***	−0.507***	−0.386***	0.071	−1.873***	−1.889***	−1.930***
	(0.007)	(0.015)	(0.022)	(0.023)	(0.023)	(0.052)	(0.092)	(0.149)	(0.152)	(0.150)
R2	0.04	0.1	0.24	0.24	0.27	0.07	0.11	0.25	0.25	0.29
N	2,583	2,582	2,582	2,582	2,582	2,293	2,292	2,292	2,292	2,292
Industry FE	No	No	No	No	YES	No	No	No	No	YES

Table 12. The Impact on Default Probabilities and Liquidity

This table presents the regressions to estimate the impact of the government purchase plans on default probability change and liquidity separately, which includes firm and industry characteristics. All variables are defined in Table 9. All firm level variables are based on the balance sheet information at Q2 2015. * p < 0.1; ** p < 0.05; *** p < 0.01

	Default Probability Change					**Liquidity (Amihud Index)**				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GOV	−0.004***	−0.004***	−0.007***	−0.007***	−0.006***	−0.400***	−0.395***	−0.323***	−0.286***	−0.267***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.023)	(0.027)	(0.025)	(0.024)	(0.025)
ROA		−0.005***	−0.003***	−0.002***	−0.002***		0.074***	0.117***	0.108***	0.111***
		(0.000)	(0.001)	(0.001)	(0.001)		(0.021)	(0.025)	(0.025)	(0.026)
Export		−0.012***	−0.013***	−0.013***	−0.013***		−0.220**	−0.227**	−0.259***	−0.383***
		(0.003)	(0.002)	(0.003)	(0.003)		(0.097)	(0.097)	(0.096)	(0.119)
M/B		−0.002***	−0.001***	−0.001***	−0.001***		0.017	−0.09	−0.031	−0.026*
		(0.000)	(0.000)	(0.000)	(0.000)		(0.012)	(0.013)	(0.014)	(0.014)
LEV			0.097***	0.096***	0.092***			−0.602**	−0.246	−0.12
			(0.007)	(0.007)	(0.008)			(0.237)	(0.246)	(0.274)
CF			0.02	0.02	−0.007			−2.628**	−2.433*	−2.233*
			(0.031)	(0.031)	(0.033)			(1.315)	(1.304)	(1.335)
DIV			0.006	0.006*	0.006			−0.828***	−0.776***	−0.798***
			(0.004)	(0.004)	(0.004)			(0.111)	(0.111)	(0.114)
BC				−0.004	−0.004				−0.286***	−0.272**
				(0.006)	(0.006)				(0.096)	(0.108)
SOE				0.003	0.001				−0.565***	−0.499***
				(0.003)	(0.003)				(0.084)	(0.092)
Constant	−0.002	0.031***	−0.020***	−0.021***	−0.021***	1.665***	1.441***	2.050***	2.164***	2.091***
	(0.002)	(0.003)	(0.005)	(0.005)	(0.005)	(0.072)	(0.123)	(0.184)	(0.190)	(0.191)
R2	0.01	0.06	0.14	0.14	0.16	0.06	0.07	0.1	0.11	0.12
N	2,583	2,582	2,582	2,582	2,582	2,103	2,103	2,103	2,103	2,103
Industry FE	No	No	No	No	YES	No	No	No	No	YES

Table 13. Robustness Check: Value Creation

This table presents the regressions to estimate the impact of the government purchase plan on value creation. All variables are defined in Table 9. All firm-level variables are based on the balance sheet information in 2015Q3. * p < 0.1; ** p < 0.05; *** p < 0.01

	Firm Value Growth					Debt Value Growth				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GOV	0.044***	0.041***	0.027***	0.021***	0.018***	0.353***	0.282***	0.204***	0.185***	0.143***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.021)	(0.022)	(0.021)	(0.022)	(0.023)
ROA		0.007***	0.016***	0.016***	0.016***		0.012	0.062***	0.061***	0.058***
		(0.002)	(0.002)	(0.002)	(0.002)		(0.011)	(0.013)	(0.013)	(0.013)
Export		0.027**	0.024**	0.027**	0.044***		0.217***	0.230***	0.245***	0.308***
		(0.012)	(0.011)	(0.011)	(0.012)		(0.076)	(0.071)	(0.071)	(0.083)
M/B		−0.004*	0	0.001	0.002		−0.134***	−0.115***	−0.110***	−0.120***
		(0.002)	(0.003)	(0.003)	(0.003)		(0.015)	(0.016)	(0.017)	(0.017)
LEV			0.617***	0.579***	0.543***			3.654***	3.509***	3.771***
			(0.030)	(0.031)	(0.033)			(0.195)	(0.198)	(0.212)
CF			0.097	0.072	0.067			0.079	−0.03	0.182
			(0.114)	(0.114)	(0.124)			(0.749)	(0.748)	(0.782)
DIV			0.019**	0.01	0.011			0.157***	0.129**	0.171***
			(0.009)	(0.009)	(0.009)			(0.060)	(0.061)	(0.063)
BC				0.083***	0.070***				0.288**	0.252**
				(0.020)	(0.020)				(0.125)	(0.125)
SOE				0.045***	0.034***				0.184**	0.104
				(0.013)	(0.013)				(0.072)	(0.073)
Constant	−0.315***	−0.335***	−0.649***	−0.648***	−0.640***	−0.386***	0.096	−1.813***	−1.822***	−1.871***
	(0.007)	(0.015)	(0.022)	(0.022)	(0.022)	(0.052)	(0.091)	(0.147)	(0.151)	(0.149)
R2	0.04	0.05	0.2	0.21	0.24	0.07	0.11	0.25	0.25	0.29
N	2,583	2,582	2,582	2,582	2,582	2,293	2,292	2,292	2,292	2,292
Industry FE	No	No	No	No	YES	No	No	No	No	YES

Table 14. Robustness Check: Default Probabilities and Liquidity

This table presents the regressions to estimate the impact of the government purchase plans on default probability change and liquidity separately, which includes firm and industry characteristics. All variables are defined in Table 9. All firm level variables are based on the balance sheet information at Q3 2015. * p < 0.1; ** p < 0.05; *** p < 0.01

	Default Probability Change					**Liquidity (Amihud Index)**				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GOV	−0.004***	−0.004***	−0.006***	−0.006***	−0.006***	−0.400***	−0.356***	−0.294***	−0.263***	−0.234***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.023)	(0.025)	(0.023)	(0.023)	(0.024)
ROA		−0.003***	−0.002***	−0.002***	−0.001***		0.045***	0.074***	0.070***	0.075***
		(0.000)	(0.000)	(0.000)	(0.000)		(0.014)	(0.017)	(0.017)	(0.018)
Export		−0.012***	−0.012***	−0.012***	−0.012***		−0.171*	−0.170*	−0.199**	−0.302**
		(0.003)	(0.003)	(0.003)	(0.003)		(0.096)	(0.095)	(0.095)	(0.118)
M/B		−0.002***	−0.001**	−0.001*	0		0.095***	0.046**	0.032	0.047**
		(0.000)	(0.000)	(0.000)	(0.000)		(0.019)	(0.020)	(0.020)	(0.021)
LEV			0.099***	0.096***	0.090***			−0.621***	−0.326	−0.335
			(0.007)	(0.007)	(0.007)			(0.239)	(0.248)	(0.280)
CF			0.057**	0.054**	0.034			−1.973*	−1.76	−1.915*
			(0.024)	(0.024)	(0.026)			(1.099)	(1.092)	(1.122)
DIV			−0.001	−0.001	−0.001			−0.500***	−0.472***	−0.517***
			(0.003)	(0.003)	(0.003)			(0.080)	(0.082)	(0.087)
BC				−0.001	−0.001				−0.260**	−0.252**
				(0.006)	(0.006)				(0.101)	(0.111)
SOE				0.006*	0.004				−0.458***	−0.400**
				(0.003)	(0.003)				(0.080)	(0.088)
Constant	−0.002	0.023***	−0.025***	−0.027***	−0.027***	1.665***	1.101***	1.681***	1.770***	1.711***
	(0.002)	(0.003)	(0.005)	(0.005)	(0.005)	(0.072)	(0.111)	(0.177)	(0.183)	(0.187)
R2	0.01	0.05	0.13	0.13	0.15	0.06	0.09	0.1	0.11	0.13
N	2,583	2,582	2,582	2,582	2,582	2,103	2,103	2,103	2,103	2,103
Industry FE	No	No	No	No	YES	No	No	No	No	YES

Table 15. Robustness Check: Government Purchase Dummy

This table presents the regressions to estimate the impact of the government purchase plans on default probability change and liquidity separately, which includes firm and industry characteristics. All variables are defined in Table 9. All firm level variables are based on the balance sheet information at Q2 2015. * p < 0.1; ** p < 0.05; *** p < 0.01

	Default Probability Change				**Liquidity (Amihud Index)**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GOVD	−0.017***	−0.019***	−0.019***	−0.020***	−0.716***	−0.661***	−0.635***	−0.488***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.106)	(0.105)	(0.113)	(0.114)
SOE		0.021***	0.008***	0		−0.881***	−0.699***	−0.608***
		(0.003)	(0.003)	(0.003)		(0.086)	(0.091)	(0.093)
ROA			−0.004***	−0.002***			0.040*	0.107***
			(0.001)	(0.001)			(0.022)	(0.026)
Export			−0.011***	−0.014***			−0.443***	−0.418***
			(0.003)	(0.003)			(0.122)	(0.120)
M/B			−0.001***	−0.001***			0.011	−0.023
			(0.000)	(0.000)			(0.013)	(0.014)
LEV				0.089***				−0.273
				(0.007)				(0.273)
CF				−0.009				−2.390*
				(0.033)				(1.349)
DIV				0.004				−0.898***
				(0.003)				(0.118)
BC				−0.006				−0.462***
				(0.006)				(0.106)
Constant	0.003	−0.002	0.024***	−0.014***	1.619***	1.891***	1.836***	2.231***
	(0.002)	(0.002)	(0.004)	(0.005)	(0.087)	(0.097)	(0.165)	(0.202)
R2	0.02	0.04	0.11	0.17	0.02	0.05	0.08	0.11
N	2,589	2,587	2,587	2,587	2,104	2,103	2,103	2,103
Industry FE	No	No	YES	YES	No	No	YES	YES