The Value and Real Effects of Implicit Government Guarantees*

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Abstract

Exploiting the first default by a large state-owned enterprise (SOE) in China's onshore bond market for identification, we find that implicit government guarantees account for at least 1.75% of bond value, translating into a total value of 184 billion CNY (28 billion USD) in China's corporate bond markets. The implicit guarantees take effect not only for firms in sectors operating at overcapacity but also for firms in other sectors. The implicit guarantees have real effects on corporate investment and financing policies. The reduction of implicit guarantees leads to a decline in investment and net debt issuance, and an increase in cash holding for SOEs compared to non-SOEs.

Keywords: implicit government guarantees, bonds, investment, cash, state-owned enterprise, China
JEL classification: G12, G15, G30, G38

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"A little-known power equipment manufacturer became the first state-owned company to default in China's huge domestic bond market, throwing doubt on the long-held notion that such businesses have implicit government backing."

– New York Times (April 21, 2015)

I. Introduction

It is well documented that governments will bail out large financial institutions to keep them afloat to avoid systemic risks. The value of such implicit government guarantees is large for the financial sector in the United States.[1] The experience of GM and Chrysler during the 2008–2009 financial crisis, for example, highlights U.S. government support for bailing out systemically important non-financial corporations during economic downturns. In fact, real-sector firms in many other countries have these implicit government guarantees (Faccio, Masulis, and McConnell, 2006).[2] Moody's (2014) articulates that such implicit guarantees have real implications for firms' credit ratings and financing costs. Despite their prevalence and importance however, little is known about their value embedded in corporate bonds, nor on their effects on corporate investment and financial policies. Our paper intends to fill this void. We examine the effects of implicit guarantees on corporate policies, and quantify the economic magnitude of such guarantees in the world's largest transitional economy, by exploiting a quasi-natural event.

The implicit government guarantee provision—also known as the "soft budget constraint" phenomenon—is prevalent in most socialist and mixed economies (Kornai, 1986; Lin and Tan, 1999). Firms in such economies enjoy implicit guarantees for two primary reasons: political

[1] For example, Veronesi and Zingales (2010) show a distribution of $21–$44 billion from taxpayers to banks during financial crises. Ueda and di Mauro (2012) suggest that large banks worldwide enjoyed an estimated funding cost advantage of 80 basis points during the 2008–2009 financial crisis, which translated to a taxpayer subsidy of $83 billion. Tsesmelidakis and Merton (2013) show that the wealth transfer to investors through implicit government guarantees ex-ante amounts to $365 billion. Acharya, Agniner, and Warburn (2016) show that U.S. financial institutions in the 90th percentile in terms of assets enjoy a 32bps funding advantage on average over smaller institutions between 1990–2012. Moreover, Moody's (2011) provides methodologies for quantifying the value of implicit government guarantees for large financial institutions.

[2] Examples of real-sector firms that have been bailed out by their home governments include Groupe Bull SA (France), Norilsk Nickel (Russia), Bangkok Land (Thailand), Malaysian Airline System (Malaysia), and Railtrack (UK), among others.

considerations—e.g., the government's goal of creating jobs, supporting strategic industries, or gaining political support—and accountability problems and policy burdens. However, the ex-ante effects of implicit guarantees on corporate policies remain unclear. On the one hand, they help firms alleviate financial constraints and thus encourage investment as the government promises lenders that it is willing to pre-empt defaults by directly injecting capital or guaranteeing new capital raising. On the other hand, implicit guarantees may directly influence the efficiency of firms through their effect on the expectations of managers (Maskin and Xu, 2001). Managers are incentivized to overinvest given lower financing costs and the downside protection provided by the government (Jensen, 1986). As a result, the disciplinary effect of debt (Jensen and Meckling, 1976) is weakened.

State-owned enterprises (SOEs) in China shoulder more political responsibilities—such as creating jobs and maintaining stability—than do non-SOEs. Both the central and local governments typically subsidize SOEs and guarantee their debt implicitly (Zhu, 2016).[3] As a result, investors have long held the view that the Chinese government would never let large SOEs default.[4] However, on April 21, 2015, Baoding Tianwei Group—a large SOE owned by the central government—shocked the markets by announcing that it was defaulting on one of its onshore bonds.

Tianwei's default was the first bond default by an SOE in the fast-developing Chinese corporate bond markets. Investors perceived the event as an *explicit* reduction of *implicit* government guarantees on SOEs as, in the middle of an unprecedented credit boom, Chinese

[3] Such guarantees even resulted in favorable government credit allocation towards these firms under economic stimulus (Cong, Gao, Ponticelli, and Yang, 2017).
[4] When SOEs become financially distressed and have difficulty meeting debt obligations, local governments may provide direct cash injection, arrange for stronger SOEs to provide loans and assets or to merge with them, or ask banks to extend debt maturities and provide payment waivers (Moody's, 2016b).

leaders began to adopt a market-based approach to restructuring troubled companies.[5] The Tianwei default event serves as a unique setting that allows us to answer two questions: (1) How much are implicit government guarantees worth in the Chinese domestic corporate bond market? (2) What are the effects of implicit government guarantees on corporate investment and financial policies?

The reduction in implicit guarantees should increase perceived borrower risk and thus be reflected in corporate bond price. To quantify the value of implicit guarantees, we adopt an event study to compute the abnormal bond returns of SOEs and non-SOEs around the Tianwei event. Our results show that the bonds of SOEs experience significantly greater negative returns than those of non-SOEs. On average, the abnormal bond returns of SOEs are from 1.44% to 1.75% lower (39–48 basis points higher in yield spread given the average bond duration of 3.64 years) than those of non-SOEs. This translates into a total value of 184 billion CNY (28 billion USD) in China's domestic bond markets for the corporate sector. Our estimated value, however, likely reflects a lower bound of the true value of implicit government guarantees in bond prices, given that the market's expected probability of a government bailout of SOEs was not one before Tianwei (reflected by rating downgrades) and that such probability does not necessarily go down to zero after the event.

Our heterogeneity tests show that bond prices decline for SOEs not only in sectors operating at overcapacity (mining, steel, and construction industries) but also in other sectors (such as commercial services). Our results hold after we remove bonds issued by "Chengtou"—enterprises set up by municipal governments to finance the development of infrastructure and utility. Taken together, our results suggest that implicit government guarantees account for a

[5] China's corporate debt accounted for 160% of its gross domestic product as of 2016; see Lingling Wei, "China lays out guidelines on debtor-for-equity swaps between banks, companies," *Wall Street Journal*, October 11, 2016.

sizable value of corporate bonds, enabling SOEs to borrow at costs that do not reflect the risks otherwise inherent in their operations when compared to non-SOEs.

We next investigate the effects of such guarantees on corporate investment and financial policies. Presumably, a reduction of implicit guarantees exacerbates a firm's financial constraints and, as a result, firms reduce their total investments. Relatedly, the reduction in government bailout probability should affect the type of investments that firms take. In particular, managers are less likely to overinvest as the disciplinary role of debt strengthens. Moreover, as external funding costs rise, firms are compelled to cut down debt financing and rely more on internal financing (cash balance). To test these conjectures, we adopt a difference-in-differences (DID) analysis with firm and time fixed effects to account for unobservable heterogeneity.

We find that SOEs reduce their total investments by up to 3.3% of book assets semiannually, compared to non-SOEs, in the three semiannual fiscal periods after the Tianwei default. The magnitude of investment reduction is similar between SOEs in overcapacity industries and those in other industries. The evidence alleviates the concern that our results primarily reflect the government's policy of cutting the production capacity of SOEs in certain industries. Furthermore, our semi-annual time-series dynamics of investment show that the largest drop in investment occurs in the second half of 2015, i.e. the first semi-annual period immediately after the Tianwei event.

Further examination reveals that, compared to non-SOEs, SOEs are less likely to overinvest relative to the industry norm and such a change in investment behavior is accompanied by an improvement in operation efficiency reflected by a higher asset turnover ratio. The evidence is consistent with the notion that hardened budget constraints helps reinforce the disciplinary role of debt for corporate managers. Finally, in response to the reduction of government guarantees,

SOEs reduce their net debt issuance (by 0.6% of book assets, semiannually) and increase their cash holding (by 1.0% of book assets, semiannually) more than non-SOEs.

To further address the concern that the first default event of China's SOEs may be correlated with a macro shock that is expected to affect SOEs and non-SOEs differently—that is, the first default of its kind signals default risk changes arising from non-guarantee related factors—we conduct two sets of tests. First, we perform a falsification test using the first non-SOE default as a pseudo-SOE-default event. Our results show no difference in bond price reactions between SOEs and non-SOEs around this event. Second, we perform a propensity-score-matching (PSM) analysis in which we match each non-SOE with an SOE in the same industry and with the closest propensity of being a non-SOE. The matched group of firms should be similar on all observable matched dimensions and, thus, be similarly susceptible to the macro shock.

Our main results are robust to using the matched sample. Moreover, we do not find evidence that the stocks of SOEs decline more than those of non-SOEs in the second half of 2015, when the Chinese stock markets experienced a large crash (Appendix Figure 1). The evidence together is inconsistent with the notion that the first SOE default reflects a macro shock that affects SOEs differently than non-SOEs.

Our paper contributes to the literature on implicit government guarantees. Understanding the effects of such guarantees on bond prices and corporate policies is important and relevant not only to policymakers, who pay close attention to the long-term, sustainable growth of the economy, but also to debt investors, who pay close attention to default risks of borrowers. Our paper differs from prior studies on three counts. First, to the best of our knowledge, our study constitutes the first effort to document the magnitude of implicit guarantees in the *real sector*; existing studies in this area predominantly focus on guarantees extended to large *financial institutions* (Acharya et

al., 2016; Demirgüç-Kunt and Detragiache, 2002; Ghandi and Lustig, 2015; Kelly et al., 2016; Lucas and McDonald, 2006; Mariathasan, Merrouche, and Werger, 2014; Tsesmelidakis and Merton, 2013; Ueda and di Mauro, 2012). Second, the first-ever SOE default provides a desirable experimental setting, allowing us to measure the causal effects of implicit government guarantees on industrial firms. Third, despite the appealing theoretical framework of soft budget constraints (Lin and Tan, 1999; Maskin and Xu, 2001), no prior empirical studies examine their effects on firm investment and financial policies. Taking advantage of the Tianwei event, therefore, our empirical findings advance the literature by providing evidence on the real effects of soft budget constraints.

Our paper also relates to the literature on the effects of financial constraints. There is ongoing research on how financing frictions are factored into the real activities of corporations (see, e.g., Almeida, et al., 2012; Campello, Graham, and Harvey, 2010; Farre-Mensa and Ljungqvist, 2015; Fazzari, Hubbard, and Petersen, 1988; Hoshi, Kashyap, and Scharfstein, 1991; Kaplan and Zingales, 1997; Whited, 1992; Whited and Wu, 2006; Whited and Zhao, 2016). We extend this line of research by delineating the effects of financial constraints, arising from the reduction of implicit guarantees, on corporate investments. Our findings suggest that even though financial constraints arising from the reduction of implicit guarantees seem to discourage investment, they may in fact strengthen the disciplinary role of debt and help resolve the overinvestment problem.

The remainder of this paper is organized as follows. Section II describes the background of the Chinese bond market and the first SOE default. Section III introduces the data source, while Section IV lays out the empirical methodology. Section V presents our empirical results, and Section VI concludes.

II. Background on China's Bond Markets and First SOE Default

II.1. China's Bond Markets

China's bond market has grown rapidly in recent years and is now the third largest in the world, after the United States and Japan. Government bonds, financial bonds, and repos all trade in the interbank market—equivalent to the over-the-counter (OTC) market in the United States—while bonds issued by corporations vary in both type and the market in which they trade. There are three types of corporate bonds issued and traded in China: corporate bonds, enterprise bonds, and mid-term notes (MTNs). Corporate bonds trade in securities exchanges under the regulation of the China Securities Regulatory Commission (CSRC); MTNs trade in the interbank market under the regulation of the People's Bank of China (PBC); and enterprise bonds trade both in the interbank market and on securities exchanges, regulated by the National Development and Reform Commission (NDRC).

China's corporate bond market has experienced an unprecedented boom since the mid-2000s (see Figure 1). The rapid expansion of this bond market is mainly due to the government's intention to boost direct financing in capital markets.[6]

[Insert Figure 1 about here]

Investors have long considered bonds issued by corporations in China's domestic markets to have implicit guarantees by the government and were optimistic that the government would bail out systemically important enterprises, if necessary. The default by Baoding Tianwei on April 21,

[6] In early 2014, the State Council issued the Guiding Principles for the Healthy Development of Capital Markets, a policy document that called for the government to increase its share of direct financing in the economy and ease restrictions on bond issuance.

2015, shocked the market and marked the first ever SOE default in the Chinese corporate bond market.

II.2. The Baoding Tianwei Default

Baoding Tianwei Group Co., Ltd. (hereafter referred to as Tianwei) was a wholly owned subsidiary of the China South Industries Group (CSIG), which in turn was owned by the central government of China, and was ranked 102 on the Fortune Global 500 in 2016. Established in 1958, Tianwei was a manufacturer in the power transmission and distribution industry and the renewable energy industry (photovoltaic power and wind power). It sold products in more than 30 countries, including the United States. Tianwei invested aggressively in the photovoltaic industry, which fell into a weak cycle in 2011. As a result, Tianwei suffered a net operating loss of 1.54 billion CNY in 2011, and its losses continued over the next three years. During the same period, Tianwei's credit rating was downgraded several times, sliding from AA+ in 2011 to BBB in 2014.[7] From July 2013 through December 2014, Tianwei and several of its subsidiaries were unable to pay the overdue interest on loans provided by the Bank of China and the Export-Import Bank of China. As a result, these lenders requested that the government freeze Tianwei's assets to secure their claims. Of note, during this same period, interest on corporate bonds was still duly paid.

On April 13, 2015, Tianwei announced that the Agriculture Bank of China had accessed Tianwei's deposits to recoup its loan to the company. This left the company with insufficient cash to pay the interest on its bonds. Tianwei tried to secure a government bailout—something that had

[7] Product market competition was not the only cause of Tianwei's failure. In 2013, the company gradually transferred its shares of Baobian Electric, one of its subsidiaries, to the parent company, CSIG, which then became the controlling shareholder of Baobian. Later that same year, through a series of asset swaps, Tianwei substituted most of its profitable assets (producing power transformers) for Baobian's non-profitable assets (producing photovoltaic equipment). These operations further aggravated Tianwei's financial status, jeopardizing its ability to repay debtholders. Several other lenders even sued Tianwei for its asset swap transactions with Baobian and appealed for their revocation; this appeal was later rejected by the court.

previously been a standard government policy toward state-backed companies—but failed. Consequently, Tianwei officially announced its default on its interest payments of *11 Tianwei MTN2* on April 21. The giant maker of power transformers became the first central government-backed company to default on an onshore bond. Five months later, the Baoding Tianwei Group Co. and three of its business units filed for bankruptcy.[8]

Figure 2 shows a graphical illustration of the events leading to the Tianwei default. The default of an SOE was a shocking event for investors as government support failed to materialize. In fact, several large SOEs defaulted or restructured their debt immediately after Tianwei's 2015 default (see Figures 3a and 3b).[9] The serial defaults of SOEs indicated that the absence of government guarantees of Tianwei was not an isolated event but rather reflected the Chinese government backing off its traditional practice of bailing out SOEs.[10] In fact, the absence of government bailouts for Tianwei and other SOEs falls into the government's central agenda to "de-leverage" and "de-capacity" industrial firms (The Central Economic Work Conference, December 2015; No. 41 Document of the State Council, 2013).

[Insert Figure 2 and Figures 3a and 3b about here]

The unprecedented credit boom and excessive capacity in certain industries (such as mining, steel, and construction) in the early 2010s posed a real threat to the economy. The Chinese

[8] See Bloomberg, "*Baoding Tianwei Group to File for Bankruptcy after April Default*," September 18, 2015.

[9] The following is a list of several examples of SOE defaults on bonds. In October 2015, Sinosteel Co., a state-owned steelmaker, failed to pay interest due on 2 billion CNY notes maturing in 2017. On March 28, 2016, Dongbei Special Steel Group, owned by the government of Liaoning province, failed to make an 852 million CNY bond payment and filed for bankruptcy on October 10, 2016. In April 2016, Shanxi Huayu, which is 49% owned by state-owned China National Coal Group Corp., failed to pay 637.7 million CNY in principal and interest on its domestic short-term commercial paper. In April 2016, China Railway Materials Co., China's largest supplier of iron-rail track and other railroad building materials, suspended trading of 16.8 billion CNY worth of outstanding bonds and was pursuing potential debt restructuring plans with creditors.

[10] In the aftermath of the Tianwei default, Moody's stated, "Chinese regional and local governments (RLGs) have less scope to support state-owned enterprises (SOEs) facing financing distress than before. Recent episodes of SOE distress show that RLG's autonomy to provide direct financial support to struggling SOEs is diminishing as a result of restrictive central government regulations" (Moody's, 2016b).

regulators encouraged firms to de-leverage and called for cutting inefficient productions of overcapacity sectors. These government objectives ultimately contributed to the absence of government bailouts during the overcapacity firms' debt defaults. Even though the original intention of the Chinese government was to gradually eliminate zombie firms in overcapacity industries, the concern caused by the removal of implicit government guarantees spilled over to other industries. The first non-bailout event clearly reflected the government's changing tolerance for corporate failures and its attempt to allow market forces to play a more decisive role in restructuring the economy. This shift became official when China's State Council formally issued guidelines on the reorganization of SOEs in July 2016. [11] As a result, the Chinese corporate bond markets cooled down and anecdotal evidence suggests that from 2014 through 2016, approximately 70 companies canceled or postponed new bond issuance. [12]

III. Data and Sample

We obtain bond characteristics from the China Stock Market & Accounting Research (CSMAR) and WIND databases for three types of bonds—corporate bonds, enterprise bonds, and MTNs. The CSMAR covers corporate bonds (all exchange-traded) and a subsample of dual-listed enterprise bonds (traded both on the exchange and the interbank market). We rely on the WIND database for MTN characteristics and trading information. For the event study, most of our analysis is based on the CSMAR sample. That is, we use all the exchange-traded bonds because they are more liquid than those traded in the interbank market.[13] CSMAR provides daily, security-specific trading information for bonds, including opening price, closing price, yield to maturity, trading

[11] See Chinese government releases at http://english.gov.cn/policies/latest_releases/2016/07/26/content_281475402145108.htm
[12] See Federal Reserve Bank of San Francisco, "China's Bond Market: Larger, More Open, and Riskier," 2016.
[13] In robustness tests, we manually collect trading prices of MTNs for the event study.

volume, accrued interest, and daily return. Our initial sample consists of 10,748 corporate bonds[14] issued and traded in China's domestic market during the period June 2012 to June 2016.

Our sample of bond-issuing firms includes both public (listed) and private firms (non-listed). The PBC imposes regulations on the financial reporting of firms issuing bonds: they are required to disclose audited semiannual and annual financial statements for the three years before bond issuance and for each year after the issuance and before its maturity date (PBC, 2012).[15] We collect semiannual financial information for bond-issuing firms from the WIND database. Our sample is restricted to a period between January 2013 and December 2016, and includes all firms that have at least one bond (corporate, enterprise, or MTN) outstanding during that period. We also collect information on the ownership structure of each issuer, including the identity and characteristics of the controlling shareholder (individual, central SOE, local SOE, private firm, foreign firm). The issuer is classified into central SOE, local SOE, and non-SOE, based on the type of controlling shareholder. We rely upon industry definitions from the CSRC to classify the bond issuers by sector.[16]

Table 1 provides key summary statistics of the variables used in this paper, while Appendix Table 1 defines the respective variables. To mitigate the influence of outliers, we winsorize all continuous variables at the 1st and 99th percentiles. Panel A reports summary statistics for the characteristics of 1,424 unique bonds that are used in our event study, including 1,187 SOE bonds

[14] Among these bonds, 7,116 are SOE bonds, representing 66% of the whole sample. None of these bonds is convertible.

[15] Rules for Information Disclosure on Debt Financing Instruments of Non-financial Enterprises in the Inter-bank Bond Market, 2012, National Association of Financial Market Institutional Investors (under PBC).

[16] These sectors consist of Agriculture, Mining and Steel, Manufacturing, Utility, Construction, Retail and Wholesale, Transportation/Storage/Postal, Hotel and Restaurant, IT, Finance, Real Estate, Rental and Commercial Services, Environmental and Public Facilities, Residential Services, Health and Community Services, Entertainment, others. They are further classified into three groups: Overcapacity (Coal Mining, Steel, and Construction), Public Services (Utility, Agriculture, Transportation/Storage/Postal, Environmental and Public Facilities), and Commercial Services (the remainder).

and 237 non-SOE bonds that traded at least once in the 30-day window before the Tianwei default date and at least once in the 30-day window after the Tianwei default date.[17] Panel A shows that bonds issued by SOEs tend to carry higher coupon rates and have higher yield spreads than those issued by non-SOEs. They also have a larger issue size, carry higher credit ratings, and have a longer maturity than non-SOE bonds.

[Insert Table 1 about here]

Panel B reports issuing-firm characteristics for SOEs and non-SOEs separately as they differ in several dimensions. SOEs have larger total assets, lower leverage, lower ROA, lower asset tangibility, less cash flow, lower cash holdings, and lower capital expenditures than non-SOEs. Furthermore, SOE firms tend to have stronger dominance in the construction and public services sectors, while non-SOEs tend to compete in commercial services and manufacturing.

IV. Methodology

Our identification strategy for studying the effects of implicit government guarantees on corporate policies exploits the first-ever bond default by a Chinese SOE. We first adopt an event study to quantify the value of implicit guarantees and then conduct DID tests to examine the effects of the reduction of implicit guarantees on corporate policies.

IV.1. Event Study

Given the low trading frequency of corporate bonds, we select a relatively large event window of 30 days before to 30 days after the event date—to cover sufficient bond trading; this approach follows prior studies (Bessembinder, et al.; Billett, King, and Mauer, 2004; 2009; Klein

[17] Altogether, there are 4,103 bonds outstanding during our event window. We compare 1,424 bonds used for the event study and 2,679 bonds that did not trade during the event window and find that they are not statistically different in their coupon rate, yield spread, bond issuance size, maturity, or credit ratings.

and Zur, 2011). We adopt three different methods to compute the abnormal bond returns in the event window. First, we compute the cumulative abnormal return (CAR) of the event window by defining abnormal returns as the bond raw return[18] in excess of the China Securities Index Co.'s (CSI) Aggregate Bond Index return.[19]

Second, we calculate CAR using a market model (using CSI Aggregate Bond Index returns as a proxy for market returns) with an estimation window of 200 days (day –240 to day –41). We eliminate bonds with fewer than five observations in the estimation window.

Finally, we follow Klein and Zur (2011) to construct a matched bond sample. Since we have more SOE bonds than non-SOE bonds, we conduct the matching in a reverse way, i.e., by finding a matched SOE bonds for each non-SOE bond. First, for each non-SOE bond, we find a group of SOE bonds that are classified by the CSRC as being in the same industry as the non-SOE bond. Second, to ensure that the default risks of the matched bonds are similar, we choose those bonds from this group that have the same rating as that of the non-SOE bond. Third, we pare down potential matches by choosing SOE bonds with remaining maturities similar to the non-SOE bonds —that is, the difference between remaining maturities being less than a year—thereby controlling for differences in bond returns attributable to the term structure of the bond yield. These procedures yield a sample of 572 matched SOE bonds for 269 non-SOE bonds. We estimate the following regression model of CAR:

$$CAR_i = \alpha \times SOE_i + \gamma \times Controls_i + P_i + I_i + \varepsilon_i, \quad (1)$$

[18] The bond raw return of the event window is calculated as $\frac{B_t - B_0 + Accrued\ interest}{B_0}$, where B_0 is the bond open price at the first day of the event window, and B_t is the bond close price on the last day of the event window.

[19] The CSI Aggregate Bond Index contains samples from treasury bonds, corporate bonds, and financial bonds, which explains why both SOE and non-SOE bonds underperformed the index in our later tests.

where SOE_i is an indicator variable that equals one if the bond issuer is an SOE and zero for non-SOEs; $Controls_i$ represents a vector of bond characteristics, including time-to-maturity, issuance amount, credit rating, coupon rate, and illiquidity as well as firm characteristics such as leverage, ROA, size, and tangibility; P_i and I_i stand for the province and industry fixed effects, respectively. We have 31 provinces and primary municipalities, and 17 industries classified by the CSRC. Moreover, we use equation (1) to conduct a falsification test around the default date of the first default by a non-SOE—i.e., March 7, 2014, by Shanghai Chaori Solar Energy— to show that our findings are genuinely due to the effect of the loss of implicit guarantees on SOEs, reflected in the first SOE default.

IV.2. Difference-in-Differences Tests

To capture the real effects of implicit guarantees, we estimate the difference-in-differences (DID) model as follows:[20]

$$Investment_{i,t} = \alpha \times SOE_i + \beta \times Post_t \times SOE_i + \gamma \times Controls_{i,t} + I_j + \tau_t + \varepsilon_{i,t} \quad (2)$$

where *Post* equals one for the three semiannual periods after the first SOE default (excluding the period ending June 30, 2015) and zero for the three semiannual periods prior; I_i represents industry fixed effects; and τ_t represents semiannual time fixed effects. The coefficient of interest is β, which captures the treatment effect with respect to the counterfactual control group. To capture firm-level, unobservable, time-invariant heterogeneity, we replace the industry fixed effects presented in equation (2) with firm fixed effects, and estimate the following DID model:

$$Investment_{i,t} = \beta \times Post_t \times SOE_i + \gamma \times Controls_{i,t} + \alpha_i + \tau_t + \varepsilon_{i,t} \quad (3)$$

[20] We are not the first study that tries to build causal inferences using SOE and matched non-SOEs. Liao, Liu, and Wang (2014), among others, study the effect of privatization using the Split-Share Structure Reform that granted trading rights to state-owned shares of listed SOEs.

where α_i represents firm fixed effects.

Although the series of defaults by SOEs in China (see Figures 3a and 3b, above) justifies our identification of the reduction of implicit guarantees, it may be correlated with the declining performance of traditional industries. For example, coal mining, power equipment, and steel production—industries in which SOEs have a dominant presence—have experienced significant underperformance in recent years. As a result, one may be concerned that the effect we capture in this study is attributable to the economic downturn in these industries/sectors, or to a systematic shock that negatively affected all SOEs in China, rather than to the loss of implicit guarantees.

The above explanations are unlikely the case for the following reasons. First, note that our identification strategy takes advantage of the exact default date of Tianwei, thus capturing the effect *after* the default. Unless the economic downturn for the entire SOE system started around the same date, our findings should be attributed to the loss of implicit government guarantees. Second, the number of defaults by non-SOEs also increased sharply, even more so than by SOEs, after the Tianwei default. It is hard to argue that an observable shock affected only SOEs while non-SOEs stayed insulated. Third, our regressions control for industry fixed effects that capture industry time-invariant heterogeneity. Our DID results are robust to the inclusion of interactions of industry and semiannual fixed effects. Fourth, we directly examine the dynamics of stock price for SOEs and non-SOEs during the stock market crash in the second half of 2015 and find that they are quite similar after the Tianwei default (Appendix Figure 1).

Nevertheless, we adopt several approaches to further address the concern that our results may be driven by a systematic shock to SOEs or the government's policymaking on other fronts,

such as the reduction of excessive capacity that occurred after Tianwei's default.[21] First, we adopt a PSM DID test for which we build a propensity score using a wide range of firm characteristics including industry, size, leverage, and performance. Second, we conduct falsification tests showing that bond prices of SOEs do not respond to a pseudo event that can largely capture the declining performance of Tianwei's industry. Third, we show that bond value decreases and investment reductions hold for SOEs not only in overcapacity industries but also in other industries. Fourth, we compare bond price reactions between secured bonds and unsecured bonds issued by the same SOE and find that the result is mainly concentrated among unsecured bonds.

V. Empirical Results

V.1. Value of Implicit Government Guarantees

Table 2 presents the univariate results of bond returns using various measures for the event study. Panel A, based on excess bond returns over the market, shows that SOE bonds decline 0.91% more than non-SOE bonds during the event window. Panel B shows that the difference becomes even larger when the market model is considered; SOE bonds have a negatively significant CAR of –1.468%, while that of non-SOE bonds is –0.254% and not significant. The difference in their returns (-1.213%) is statistically significant. Furthermore, Panel C shows that the average return difference is –1.314% using the matched sample. All three panels suggest that SOE bond returns declined significantly more than non-SOE bond returns in the event window. The univariate analysis in Table 2 confirms our conjecture that investors adjust their valuation of SOE bonds immediately after the first SOE default event, and such a negative abnormal return

[21] In 2016, the Chinese government announced a policy to cut excessive industrial capacity for the mining, steel, and construction industries (No.5 Document of State Council, 2016). Even though this policy applies to all firms (SOEs and non-SOEs), the Chinese government should have a stronger influence on SOEs' policymaking.

approximates the value of reduction in implicit guarantees embedded in the SOE bonds before the default event.

[Insert Table 2 about here]

Table 3 presents the regression analysis of the CAR based on the market model of an SOE dummy, a set of control variables, province fixed effects, and industry fixed effects. In columns (1) to (4), we keep the most actively traded bond of each firm. In columns (1) and (2), the regression estimates show that the abnormal return differences between SOE bonds and non-SOE bonds are –0.90% and –0.97%, which are statistically significant at the 1% level. In columns (3) and (4), we instead include a central SOE dummy and a local SOE dummy. Both types of SOE bonds react negatively to the default event. Although central SOEs seem to react more negatively than local SOEs, the difference in coefficient estimates is not statistically significant.

[Insert Table 3 about here]

Considering that a potential bias may result from selecting the most liquid bond for each firm, we include all bonds that were traded during the event window for our regressions in columns (5) to (8). For a firm with multiple bonds, we weight each bond return by the number of bonds in the firm to ensure the balance of comparison across firms. The results remain almost unchanged. Bonds issued by SOEs react –1.20% to –1.27% more than SOE bonds. To further account for the fact that SOE and non-SOE bonds could be systematically different in many dimensions, we run the regression with a matched sample, as specified in Section IV. Columns (9) and (10) show that the SOE bonds react –1.44% to –1.75% more than non-SOE bonds (or 39–48 basis points higher in yield spread, given the average bond duration of 3.64) after matching.

Our results suggest that implicit guarantees by the government account for up to 1.75% of the value of SOE bonds. Given the total market value of SOE bonds—roughly 10.5 trillion CNY in 2016[22]—our results reveal that implicit guarantees account for a market value of 184 billion CNY (approximately $28 billion USD) in the domestic bond markets. Notably, to the extent to which the expected probability of a government bailout of large SOEs was not 100% before the Tianwei event, and that such probability does not necessarily go down to 0 after the event, our estimates serve as a lower bound for the actual value of implicit guarantees in the Chinese bond markets.

In robustness tests, we use two different samples for our event study. First, we drop the dual-listed enterprise bonds in the CSMAR sample from our sample and find that the coefficients for SOE, Central_SOE, and Local_SOE are all larger than those presented in Table 3. Our results in Appendix Table 2 (columns (1)–(2)) show that the implicit guarantees account for as large as 2.3% or 2.1% of the bond value. All coefficients on Central_SOE and Local_SOE continue being negative and statistically significant. Next, we manually collect trading prices for MTNs of our sample firms from WIND, add these MTNs into the original sample, and re-estimate the bond reactions. The estimation results using the new sample, presented in columns (3)–(4) of Appendix Table 2, show that the coefficient for SOE remains statistically significant at the 1% level. All regressions in Appendix Table 2 include exchange fixed effects.

To substantiate our findings, we perform a subsample analysis. First, we partition our sample by industry. We identify coal mining, construction, and steel production as the sectors with

[22] The total outstand corporate bonds, enterprise bonds, MTNs and short-term commercial papers amount to 12.2 trillion CNY at the end of 2016 (source: WIND). Given the average annual issuance of bonds by SOE firms account for 86% of total bond issuance in the period 2011-2016, the outstanding value of SOE bonds in 2016 is estimated to be 10.5 trillion CNY.

potential overcapacity, according to the No. 41 Document of State Council (2013). We also classify public services as the sector with the greatest government support. Given that the central government is less likely to provide support to SOEs in sectors with overcapacity after the Tianwei event, while it continues to support sectors that produce public goods (Moody's, 2016a&b), we expect the effect of the reduction of implicit guarantees to be more pronounced in sectors with overcapacity and less pronounced in sectors producing public goods. Column (1) of Table 4 shows that the decline in bond returns for overcapacity industries (-2.39%) is larger than the whole sample estimate. Importantly, SOEs operating in public services do not suffer a decline in bond prices (column (2)).

However, the evidence raises the concern that the reduction in bond return may merely reflect the government's intention to cut the excessive capacity of SOEs in underperforming industries, and not the removal of implicit guarantees. Thus, we examine whether our results hold even in industries that are not classified as in overcapacity. Notably, column (3) of Table 4 shows that the effect is statistically and economically significant for manufacturing and commercial service sectors as well. Since these two industries do not suffer overcapacity or underperformance problems, this result helps us isolate the effect of implicit guarantees from unobserved firm fundamentals. Column (4) shows that SOE bonds decline 0.9% more than non-SOE bonds after we remove all firms in the overcapacity industries (steel, coal mining, and construction).

Second, to develop urban infrastructure and utility, Chinese local governments often issue urban-construction investment bonds (known as "Chengtou" bonds) using financing vehicles (Ang, Bai, and Zhou, 2016; Chen, He, and Liu, 2017; Liu, Lyu, and Yu, 2017). Chengtou bonds are essentially municipal bonds and are regarded largely as local government liabilities rather than corporate liabilities; thus, they are not the genuine focus of our study. We therefore exclude bonds

that are potentially issued by these firms from our sample.[23] Column (5), Table 4 shows that our results hold but the coefficients for SOE (-0.923%) are smaller after excluding bonds issued by Chengtou firms.

[Insert Table 4 about here]

Finally, we divide the sample into subsamples based on leverage, explicit guarantee on the bonds (i.e., a bond has a guarantor), government subsidy[24], and loan-to-debt ratio. The results are reported in Appendix Table 3. Columns (1) and (2) suggest that the loss of implicit guarantees affects bondholders of financially risky firms more severely. Columns (3) through (8) show that bonds with no explicit guarantee, lower government subsidy, and lower loan-to-debt ratio are more affected by the default, indicating that firms relying more on other forms of finance/financial support could be flexible enough to substitute these supports for implicit guarantees. Taken together, the heterogeneous responses of bond returns suggest that the value of implicit government guarantees is more important for firms with a higher default risk or fewer alternative sources of financial support.

To address the potential concern that the market reactions between SOE and non-SOE bonds may be due to their unobservable differences rather than the reduction of implicit guarantees, we follow Acharya, Anginer, and Warburton (2016) to compare the bond price reactions between secured bonds and unsecured bonds issued by the same firm. This approach allows us to examine within-firm variations and compare unsecured bonds to secured bonds issued by the *same* firm. Implicit guarantees should have little effect on secured bonds but a strong effect

[23] We retrieved a list of potential Chengtou firms from industry experts. We checked the company names manually and excluded Chengtou firms from our sample.
[24] Government subsidy is a direct benefit provided by the government to the firm, including technology-related, tax-related, project-related, import-/export-related, environment-related, and discretionary subsidies (Jin and Zhang, 2017).

on unsecured bonds. There are only 154 secured bonds issued by SOEs in our sample and, for 40 of them, we are able to find an unsecured bond by the same SOE. To maintain the power of the test, for each of the remaining 114 SOE bonds we repeat the Klein and Zur (2011) match process to identify a best match non-SOE bond. We then regress CAR on a dummy, indicating whether the bond is unsecured. Columns (1) and (2) of Appendix Table 4 show that the unsecured SOE bonds react –1.85% to –1.89% more than the secured SOE bonds, a magnitude similar to that presented in Table 3.

To alleviate the concern that the first SOE default does not signal risk changes arising from non-guaranteed related sources, we conduct a falsification test. Specifically, we define a pseudo-event: the first corporate bond default by a non-SOE, Shanghai Chaori Solar Energy, on March 7, 2014. Shanghai Chaori is a privately owned solar panel manufacturer. Its default is similar to the Tianwei default not only because it symbolizes the first default of its kind (non-SOE) but also because both defaulting firms operate in the solar power sector. However, since non-SOEs are not believed to have implicit guarantees in the first place, and since the Chaori default had a limited effect on investors' expectations about the government's attitude towards bailing out SOEs, we should not observe any differential abnormal returns on SOEs and non-SOEs. In contrast, if the first non-SOE default signifies the rising default risk of all non-SOE firms due to non-guarantee related factors, we should see a larger bond price decline of non-SOE bonds. We compute CAR for SOE and non-SOE bonds around the pseudo-event using the market model, then regress them on SOE dummies, bond and issuing-firm characteristics, and province and/or industry fixed effects. The results reported in Appendix Table 5 indeed show that none of the SOE dummies is significant.

One remaining concern is that the government might bail out an SOE because the government itself is a large shareholder in the firm, rather than because the firm is systemically

important. The effect of the latter is what we want to capture. To differentiate these effects, we explicitly control for equity ownership by the government. Specifically, we replace the three SOE dummies (*SOE, Central SOE, Local SOE*) with the exact ownership by, first, both central and local governments and, second, central government and local governments separately. The results are reported in Appendix Table 6. Columns (1) and (2) reveal that a 50% increase in state ownership holdings leads to a 55 basis points reduction in abnormal returns. To interpret this finding, an absolute majority holding by the government produces only a 0.65% bond value, less than half of the total value of the guarantees we estimated earlier (1.44% to 1.75%). Therefore, this evidence does not alter our interpretation that most of the loss in value of a corporate bond is derived from implicit government guarantees rather than their role as a large shareholder.

V.2. Real Effects of Implicit Guarantees

A. Corporate investment

Our evidence so far has shown that bond prices of SOEs react negatively to the Tianwei default event, indicating that the reduction of implicit guarantees results in higher borrowing costs for SOEs. This may exacerbate the financial constraints faced by SOEs and lead to a reduction in investment. To test this conjecture, we adopt DID tests of firms' investment policies, as specified in equations (2) and (3), with firm and time fixed effects to account for unobservable heterogeneity.[25]

Table 5 presents our results using three different measures of investment (all scaled by lagged total assets): capital expenditures in columns (1) through (3), capital expenditures plus investments in intangible assets in columns (4) through (6), and capital expenditures plus investments in intangible assets plus cash acquisitions in columns (7) through (9). For the sake of

[25] All our empirical results in this section are robust to control for industry×year fixed effects.

brevity, below we only interpret the estimates controlling for firm and time fixed effects. On average, after the Tianwei default, the reduction in capital expenditures, in capital expenditures plus investment in intangibles, and in capital expenditures plus investment in intangibles plus cash acquisitions amounts to 1.6%, 1.6%, and 1.9%, respectively.[26] Note that since we are using semiannual variables, these estimates would double in annualized terms.

[Insert Table 5 about here]

We further conduct a PSM algorithm to ensure the robustness of our findings. We match SOEs and non-SOEs on observable characteristics to ensure that the two groups of firms are not systematically different before the Tianwei event; specifically, in the first stage we estimate, for each firm, the propensity score of being a non-SOE. The estimation is based on a Logit model, in which the dependent variable equals one when the firm is a non-SOE and zero otherwise; the control variables include firm size, ROA, sales growth, leverage, tangibility, and industry fixed effects. The first-stage Logit regression results are presented in Appendix Table 7. The estimated coefficients are used to compute the fitted probability of being a non-SOE. Then we perform a nearest-neighbor, one-to-one match—that is, we match each non-SOE with an SOE that has the closest value of propensity score with replacement. The results are reported in columns (3), (6), and (9) in Table 5 for the three investment measures, respectively. We find that the coefficients are even larger than those based on the entire sample (and statistically significant). Specifically, the respective reduction in the three investment measures is 2.6%, 3.1%, and 3.3%, respectively.

We exclude overcapacity industries and conduct the same analysis. The results are even stronger, as reported in Appendix Table 8. The respective reduction in the three investment

[26] We run the same regressions after deleting potential Chengtou firms. In untabulated results, the reduction for the three investment measures amounts to 1.5%, 1.3%, and 1.5%, respectively, all significant at the 1% level.

measures is 2.9%, 3.3%, and 3.5%, respectively. This evidence indicates that our investment results are not primarily driven by the policy changes to cut down overcapacity industries.

To verify the parallel trend assumption—that the outcome variable of non-SOEs is parallel to that of SOEs before the event—and document the time-series magnitude of changes in investment after the Tianwei event, we interact dummies variables for each semi-annual period and SOE to estimate the model below.

$$Investment_{i,t} = \beta_1 \times Period_{-2} \times SOE_i + \beta_2 \times Period_{-1} \times SOE_i + \beta_3 \times Period_{+1} \times SOE_i + \beta_4 \times Period_{+2} \times SOE_i + \beta_5 \times Period_{+3} \times SOE_i + \gamma \times Controls_{i,t} + \alpha_i + \tau_t + \varepsilon_{i,t} \quad (4)$$

We estimate model (4) to examine the time dynamics of the effect of the Tianwei event on corporate investment in Table 6. The insignificant coefficients for the pre-treatment periods indicate that the investments of SOEs and non-SOEs are not substantially different from one another compared to the benchmark period (i.e., the six-month period ending December 31, 2013). The evidence ensures that the identification assumption holds in our DID regressions. We also perform the same set of regressions using a PSM sample. Compared with the whole sample regressions, the parallel trend before the event is even better satisfied (coefficient magnitudes are smaller), and the decline in investment after the event is more salient (coefficient magnitudes are larger).[27] Figure 4 plots the coefficients for the interacted terms of SOE and the semi-annual period from columns (2), (4), and (6) of Table 6. This graph clearly shows that the largest decline in investment occurs from period (-1) to period (+1).

[Insert Table 6 about here]

[27] The investment reduction occurring immediately after the Tianwei event provides reassuring evidence that our result is not dependent on the de-capacity policy of the government, which started in 2016.

B. Reduction in overinvestment and improvement in asset turnover

It remains unclear whether the reduction of implicit guarantees helps reinforce the disciplinary role of debt for corporate managers such that managers invest more efficiently. On the one hand, a reduction in implicit guarantees leads to an increase in corporate financing costs and, thus, exacerbates a firm's financing constraints. Shouldering policy burdens, SOEs may forgo growth opportunities and investment efficiency decreases as a result. On the other hand, when SOEs' budget constraints are hardened, managers facing higher funding costs have a greater incentive to improve investment efficiency and avoid possible defaults. Investment efficiency therefore improves as a result of the strengthened disciplinary effects of debt.

It is empirically challenging to provide direct inferences on investment efficiency in our setting. We cannot use the widely recognized investment-*q* sensitivity because our sample mostly contains private firms whose *q* values cannot be computed. Nevertheless, we explore two measures that may help us provide evidence on the disciplinary role of the reduction of soft budget constraints, namely investment relative to the industry norm and operation efficiency (asset turnover).

First, we follow Biddle, Hilary, and Verdi (2009) to measure under- and overinvestment relative to a benchmark level. Specifically, we estimate the following regression model:

$$Investment_{i,t} = \alpha + \beta \times Sales\ growth_{i,t-1} + \varepsilon_{i,t}, \quad (5)$$

where *Investment* is measured by the sum of capital expenditures, investments in intangibles, and acquisitions, scaled by lagged assets. We estimate Equation (4) for each industry-semiannual group, obtain regression estimates, and compute the residual for each firm within each industry-semiannual group. Then we classify the firm-semiannual observations into terciles based on the residuals. Firms whose residuals are in the top tercile are defined as overinvesting firms, while

firms whose residuals are in the bottom tercile are regarded as underinvesting firms. The middle tercile is used as the benchmark (industry norm). Using a multinomial logit model, we then apply the difference-in-differences analysis to estimate the likelihood of SOEs overinvesting or underinvesting, compared to non-SOEs over- or underinvesting, after the Tianwei default.

Table 7 reports the difference-in-differences multinomial logit regression results. The significantly negative coefficients of *SOE×Post* in columns (1) through (3) suggest that, after the Tianwei default, SOEs are less likely to overinvest than non-SOEs. In columns (4) to (6), we find no distinguishable difference between SOEs and non-SOEs after the Tianwei default when estimating the probability of underinvestment. This result suggests that the reduction in investment by SOEs is mainly driven by overinvesting SOEs cutting their capital expenditures. To the extent that the benchmark tercile measures the optimal investment level of the industry-semiannual group, our result implies an improved investment decision-making of SOE firms after the reduction of implicit guarantees. However, caution should be taken when interpreting our results since the industry norm may not be a perfect measure of optimal investment level.

Second, we provide evidence on the asset turnover of SOEs and non-SOEs in the post-Tianwei period. The difference-in-differences estimation results presented in Table 8 show that the coefficients on *SOE×Post* are positive and statistically significant throughout. This evidence suggests that SOEs enjoy a significant gain in their asset turnover ratio relative to non-SOEs, indicating that SOEs become more efficient in utilizing their assets. Taken together, the evidence in this section is suggestive of the disciplinary effects induced by the reduction of soft budget constraints.

[Insert Tables 7 and 8 about here]

C. Debt issuance and cash holdings

In addition to documenting the real effects on investment activities, we explore how the reduction of implicit guarantees impacts firms' financing and cash policies. Specifically, we examine firms' net debt issuance (debt issuance minus debt retirement) and cash balance, both scaled by lagged total book assets. After the Tianwei default, SOEs may choose to rely more on internally generated cash flows to finance investment activities as the cost of financing through bond markets rises. Therefore, firms are expected to issue less debt and keep a larger cash balance. In Table 9, we use the whole sample in columns (1) and (2) for net debt issuance and in columns (4) and (5) for cash holdings. Furthermore, column (3) and column (6) use the PSM sample for net debt issuance and cash holdings, respectively.

[Insert Table 9 about here]

Table 9 shows that, on average, SOEs reduce net debt issuance by 0.3% to 0.7% of their total assets in each semiannual period, compared to non-SOEs. In annualized terms, this amounts to 0.6% to 1.4% of the total assets of SOE firms. Given that the average size of SOE assets is 52 billion CNY, the total reduction in annual bond issuance amounts to 300 to 800 million CNY. Moreover, when controlling for firm and semiannual year fixed effects, we find that, after the default of Tianwei, average cash holdings of SOEs increase by 0.8% of total assets relative to non-SOEs (1.6% annually). Using a PSM sample generates similar results. The evidence reveals SOEs' inability to maintain sufficient financing from the debt market and their greater reliance on internal cash as an alternative financing policy. A higher level of cash holdings also suggests that SOEs adopt a more conservative financial policy after observing the reduction of implicit guarantees.

VI. Conclusion

We exploit the first bond default by a large SOE in China—Baoding Tianwei Group—to quantify the value of implicit guarantees in China's domestic corporate bond market and study the effects of such guarantees on corporate investment and financing policies.

We first adopt an event study around the default date of Tianwei to estimate the value of implicit guarantees and find that they account for at least 1.75% of SOEs' bond value. This translates into a total value of 184 billion CNY (28 billion USD) in China's domestic bond markets for the corporate sector. Our results show that the effect of implicit government guarantees applies to firms in both overcapacity industries and other industries.

Our difference-in-differences tests, which include both firm and time fixed effects to account for unobservable heterogeneity, show that SOEs subsequently reduce their investment more than non-SOEs. The reduction in investment is accompanied by a contemporaneous reduction in over-investment and an improvement in operation efficiency, suggesting that moral-hazard problems arising from soft budget constraints are lessened as managers become more disciplined. In response to the reduction in implicit guarantees, we find that SOEs borrow less in external financing markets and hoard more cash on their balance sheets. Furthermore, our empirical findings survive a number of robustness tests. Finally, our study sheds light on the long-run objective of the Chinese government: to develop a more market-oriented approach to restructuring troubled companies and improve the long-term value of corporations.

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Figure 1: Total Amount of New Bond Issuance by Chinese Enterprises

This figure presents the total number of new issuances of corporate bonds, enterprise bonds, and MTNs between 2000 and 2016, in billions of CNY.

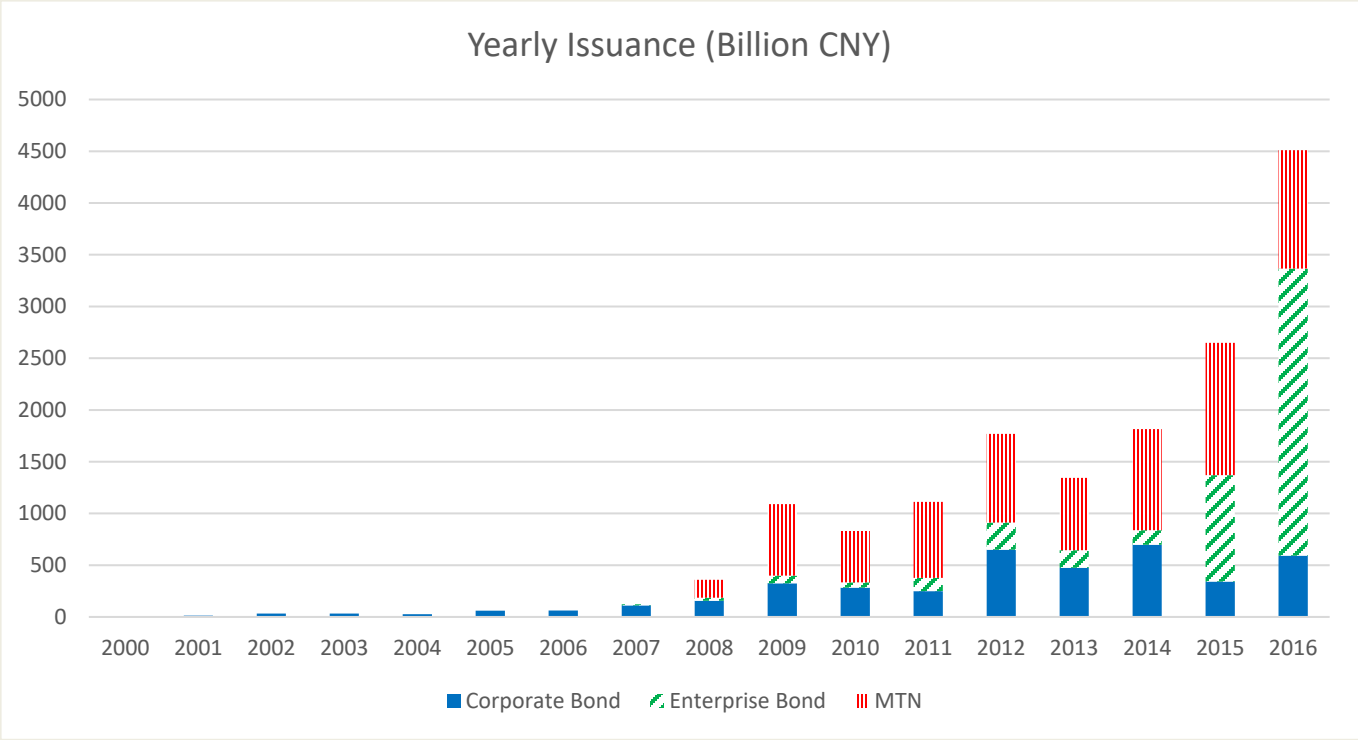

Figure 2: Timeline of the Tianwei Default

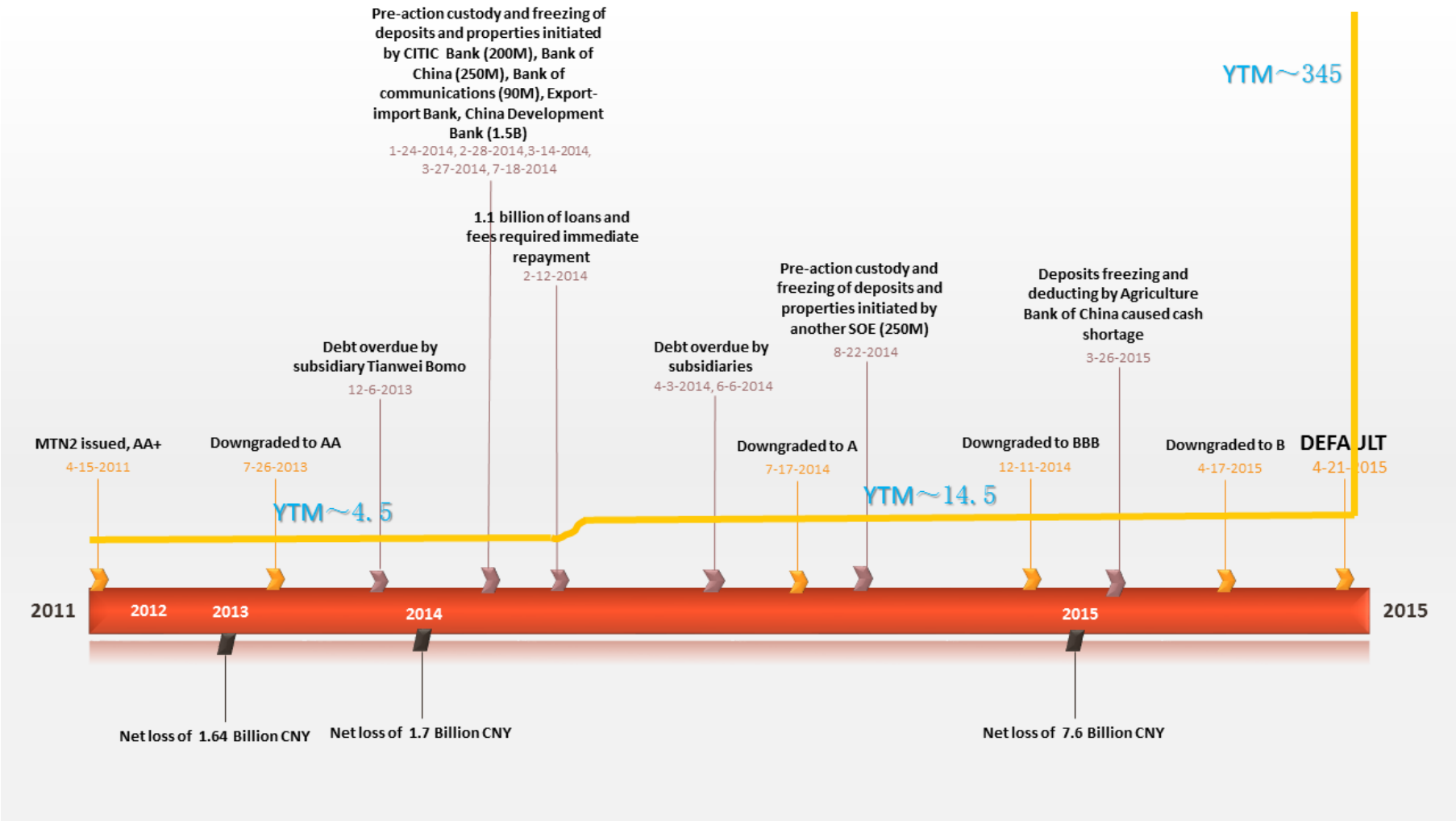

Figure 3a: Number of Defaults in Chinese Domestic Bond Markets from 2014–2016

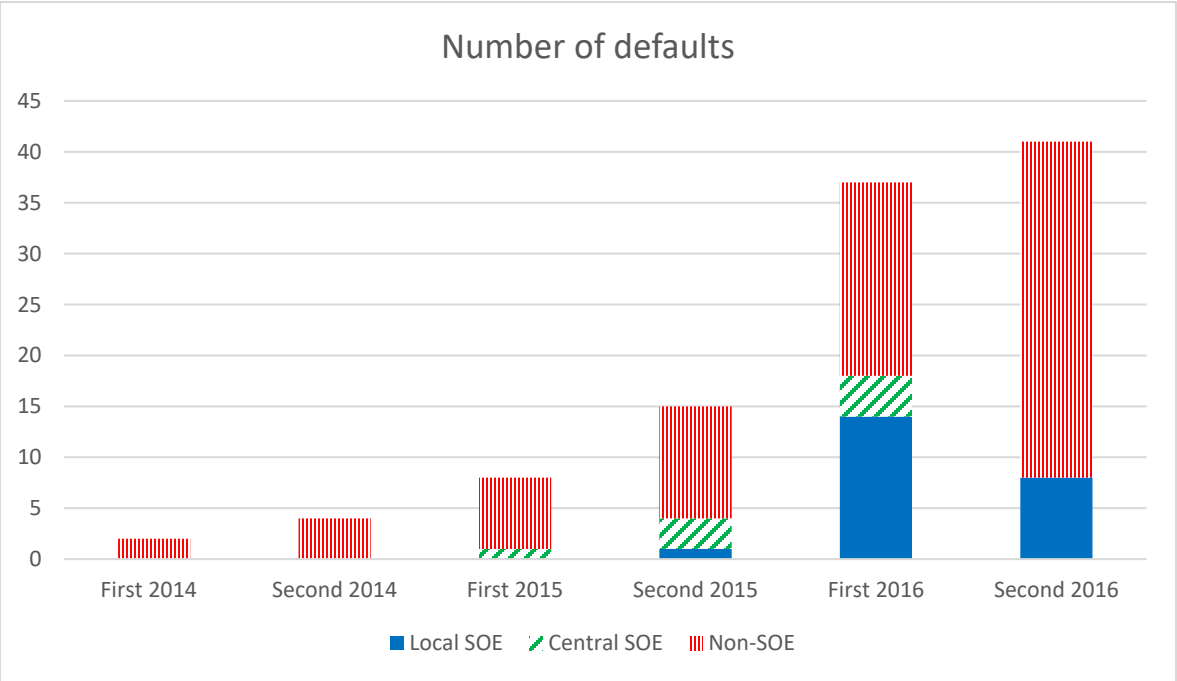

Figure 3b: Value of Defaults in Chinese Domestic Bond Markets from 2014–2016

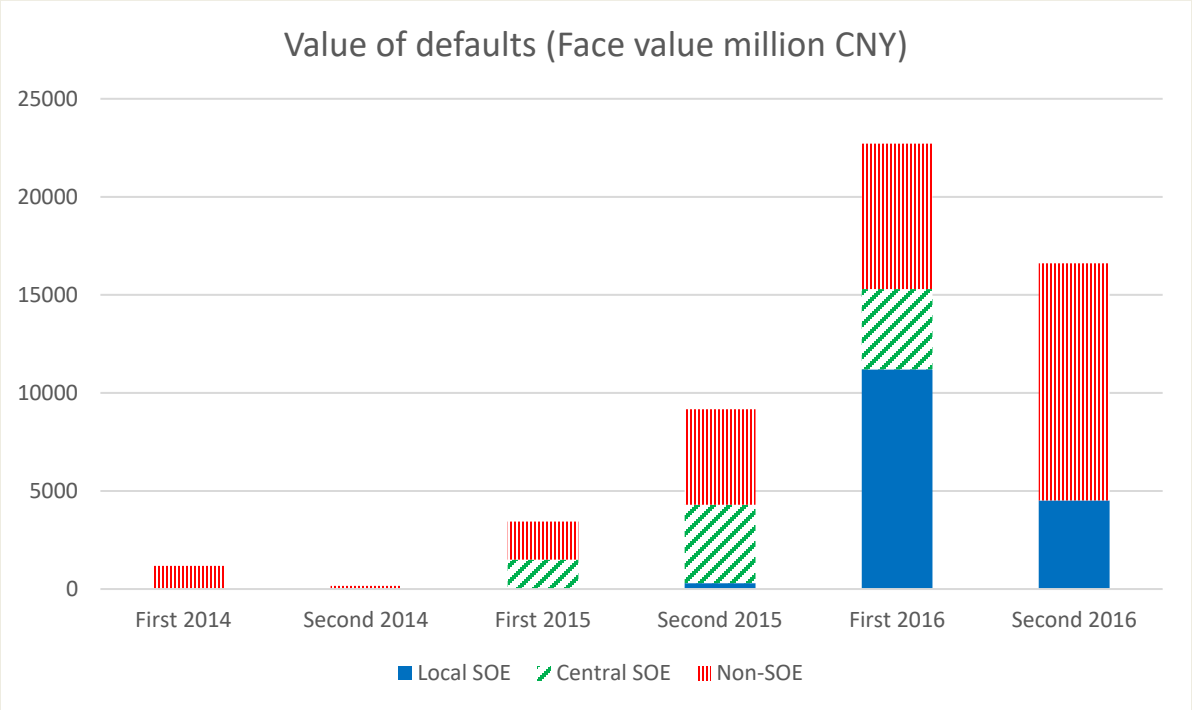

Figure 4 Time-Series Investment Dynamics

This figure plots the time-series dummies of column (2), (4), and (6) in Table 6.

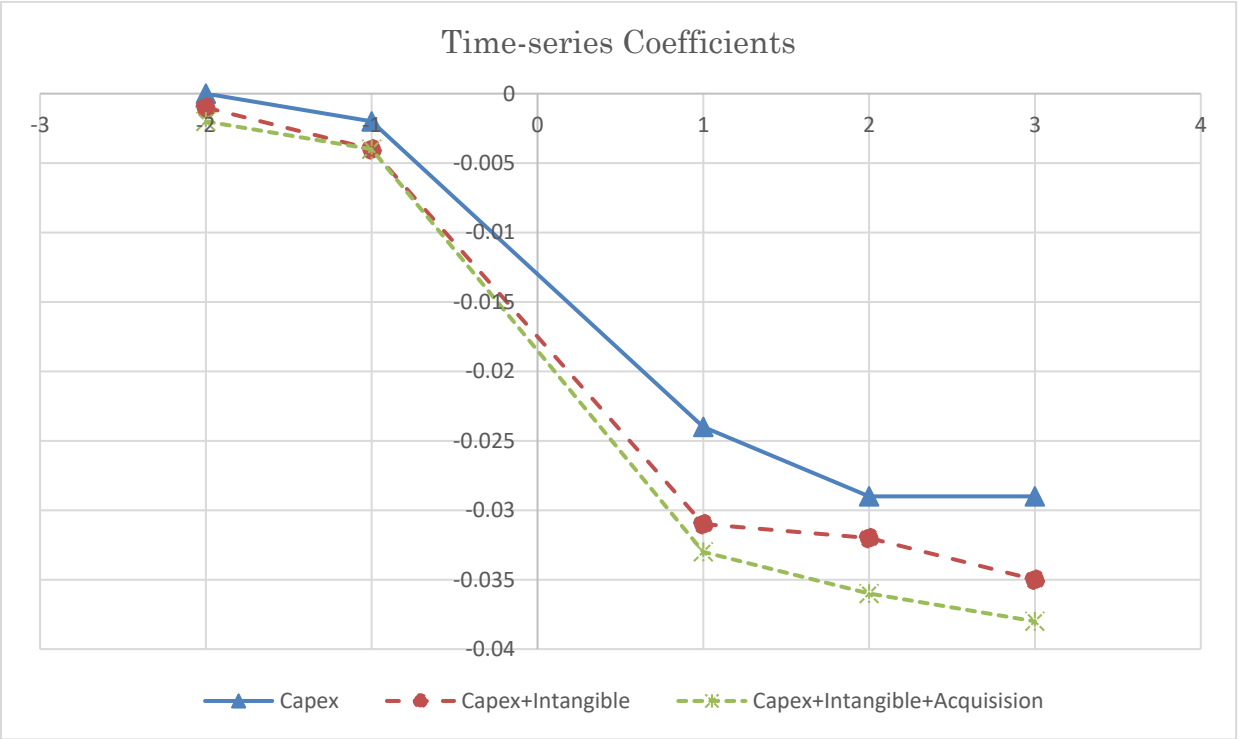

Table 1: Summary Statistics

This table provides the summary statistics of bond characteristics and firm characteristics. Panel A reports the summary statistics of bond characteristics for SOE and non-SOE bonds, respectively. We restrict our sample to the bonds used for the event study. In Panel B, we report issuing-firm characteristics before the first SOE default event (April 21, 2015) for SOEs and non-SOEs separately. All values are winsorized at the 1% and 99% level. ***, **, * denote significance level at 1%, 5%, and 10%, respectively.

Panel A Bond characteristics

	SOE bonds			Non-SOE bonds			Difference	
	N=1,118			N=269				
	Mean	Median	Std	Mean	Median	Std	Difference	t-statistics
Coupon rate (%)	6.58	6.71	1.06	6.33	6.20	1.13	0.25***	2.74
Yield spread (%)	6.48	6.12	2.43	5.99	5.61	2.07	0.49***	3.30
Issue amount (billion CNY)	1.44	1.10	1.45	1.19	0.80	1.07	0.64***	3.34
Credit rating	16.22	16.00	1.51	16.20	16.00	1.69	0.02	0.19
Maturity	4.22	4.00	2.18	2.56	2.00	1.72	1.66***	13.48
Duration	3.88	3.87	1.61	2.67	2.56	1.38	1.21***	11.54

Panel B Firm characteristics

	SOE firms			Non-SOE firms			Difference	
	N=2,927			N=1,570				
	Mean	Median	Std	Mean	Median	Std	Difference	t-statistics
Log(Assets)	23.70	23.60	1.09	23.36	23.35	1.57	0.34***	16.67
Leverage	0.55	0.56	0.17	0.59	0.62	0.16	–0.04***	-22.36
ROA(%)	1.23	0.88	1.83	2.54	1.96	3.05	–1.31***	-31.57
Tangibility	0.16	0.08	0.19	0.22	0.18	0.19	–0.06***	-22.53
Cash flow	0.00	0.01	0.06	0.02	0.02	0.06	–0.02***	-21.28
Cash holding	0.11	0.09	0.08	0.12	0.10	0.10	–0.01***	-12.02
Net debt issuance	-0.07	-0.05	0.08	-0.11	-0.09	0.10	0.04***	28.56
Capex	0.06	0.03	0.10	0.09	0.05	0.14	–0.03***	-13.12
Acquisitions	0.00	0.00	0.01	0.00	0.00	0.03	0.00***	5.58
Intangible investment	0.07	0.02	0.13	0.05	0.03	0.10	0.02**	-2.10
Overcapacity Industry	0.35	0.00	0.48	0.15	0.00	0.34	0.20***	46.35
Public services	0.14	0.00	0.35	0.04	0.00	0.20	0.10***	3.77
Commercial services	0.09	0.00	0.28	0.60	1.00	0.49	–0.51***	-19.23

Table 2: Bond Returns around the First SOE Default

This table presents bond (abnormal) returns based on three different measures in the trading window [–30,+30], where date 0 is April 21, 2015. In Panel A, we subtract the CSI Aggregate Bond Index returns from bond raw returns. In Panel B, we report abnormal bond returns using a market model (with CSI Aggregate Bond Index returns as market returns), with an estimation window of 200 days (day –240 to day –41). In Panel C, we follow Klein and Zur (2011) to construct matched bond returns. For each non-SOE bond, we select matched SOE bonds based on industry, credit rating, and years to maturity and report the difference in returns between the non-SOE bonds and SOE bonds. The numbers in parentheses are standard errors. ***, **, * denote significance level at 1%, 5%, and 10%, respectively.

Panel A: Raw bond returns in excess of market returns (%)

	SOE	Non-SOE	Difference
	Mean	Mean	Mean
CAR (–30, +30)	-2.161***	-1.253***	-0.909***
t-statistics	(-17.643)	(-9.841)	(-3.244)
Observations	1,187	237	

Panel B: Abnormal bond returns with market model (%)

	SOE	Non-SOE	Difference
	Mean	Mean	Mean
CAR (–30, +30)	-1.468***	-0.254	-1.213***
t-statistics	(-8.189)	(-1.105)	(-2.874)
Observations	1,130	216	

Panel C: Matched raw bond returns in excess of market returns (%)

	SOE	Non-SOE	Difference
	Mean	Mean	Mean
CAR (-30, +30)	-2.544***	-1.230***	-1.314***
t-statistics	(-13.507)	(-8.950)	(-3.969)
Observations	633	218	

Table 3: Abnormal Bond Returns of SOEs vs. Non-SOEs

This table reports regression results of market model–adjusted, cumulative abnormal bond returns around the first SOE default event (April 21, 2015) on dummy variables indicating SOEs, central SOEs, local SOEs, and controls. In columns (1) through (4), we select the most actively traded bond for each issuing firm. In columns (5) through (8), we include all the outstanding bonds. For firms with multiple bonds, we weight each bond return by the number of bonds in the firm to ensure a balanced comparison across firms. In columns (9) through (10), we run the regression with a matched sample. We define province fixed effects using 31 provinces and municipal cities, and industry fixed effects using 17 industries classified by the CSRC. Numbers in parentheses are standard errors corrected for heteroscedasticity and firm-level clustering. ***, **, * denote significance level at 1%, 5%, and 10%, respectively.

	One bond per firm				Multiple bonds per firm				Matched sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SOE	-0.902**	-0.971**			-1.202***	-1.265***			-1.754***	-1.442***
	(0.368)	(0.383)			(0.381)	(0.376)			(0.445)	(0.413)
Central_SOE			-1.150**	-1.216**			-1.504***	-1.661***		
			(0.460)	(0.474)			(0.453)	(0.470)		
Local_SOE			-0.865**	-0.907**			-1.165***	-1.187***		
			(0.382)	(0.396)			(0.392)	(0.382)		
Maturity	0.256	0.279	0.256	0.280	0.146	0.160	0.150	0.167	0.146	0.160
	(0.228)	(0.231)	(0.228)	(0.231)	(0.167)	(0.165)	(0.166)	(0.165)	(0.167)	(0.165)
Issue amount/assets	-0.346	-3.273	-0.334	-3.270	-2.370	-4.725	-2.254	-4.589	-2.370	-4.725
	(3.793)	(3.936)	(3.795)	(3.943)	(3.675)	(3.888)	(3.676)	(3.885)	(3.675)	(3.888)
Coupon	-1.093***	-1.086***	-1.099***	-1.088***	-1.029***	-1.015***	-1.038***	-1.022***	-1.029***	-1.015***
	(0.225)	(0.232)	(0.226)	(0.232)	(0.198)	(0.204)	(0.200)	(0.205)	(0.198)	(0.204)
Credit rating	-0.449	-0.504	-0.438	-0.495	-0.191	-0.246	-0.180	-0.235	-0.191	-0.246
	(0.305)	(0.307)	(0.309)	(0.310)	(0.271)	(0.277)	(0.273)	(0.278)	(0.271)	(0.277)
Illiquidity	0.290	0.334	0.239	0.281	-0.148	-0.111	-0.188	-0.159	-0.148	-0.111
	(0.911)	(0.934)	(0.914)	(0.936)	(0.809)	(0.826)	(0.804)	(0.822)	(0.809)	(0.826)
Leverage	-1.256	-1.970	-1.235	-1.956	-2.115*	-2.456**	-2.094*	-2.428**	-2.115*	-2.456**
	(1.310)	(1.364)	(1.315)	(1.368)	(1.125)	(1.165)	(1.128)	(1.167)	(1.125)	(1.165)
ROA	0.096	0.047	0.100	0.051	-0.017	-0.058	-0.013	-0.053	-0.017	-0.058
	(0.066)	(0.067)	(0.066)	(0.068)	(0.067)	(0.069)	(0.067)	(0.069)	(0.067)	(0.069)
Size	-0.289	-0.271	-0.289	-0.266	-0.256	-0.265	-0.248	-0.248	-0.256	-0.265
	(0.180)	(0.188)	(0.180)	(0.188)	(0.160)	(0.168)	(0.159)	(0.166)	(0.160)	(0.168)
Tangibility	1.974**	1.277	2.056**	1.328	0.768	-0.325	0.873	-0.252	0.768	-0.325
	(0.821)	(1.018)	(0.818)	(1.019)	(0.671)	(0.965)	(0.682)	(0.968)	(0.671)	(0.965)
Province FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE		YES		YES		YES		YES		YES
Observations	1,039	1,039	1,039	1,039	1,328	1,328	1,328	1,328	841	841
Adj R-squared	0.082	0.094	0.082	0.095	0.063	0.070	0.063	0.070	0.084	0.092

Table 4: Event Study: Industry Subsample

This table reports the regression results of market model–adjusted, cumulative abnormal bond returns around the first SOE default event (April 21, 2015) on dummy variables indicating SOEs and controls. We include all the outstanding bonds. For firms with multiple bonds, we weight each bond return by the number of bonds in the firm to ensure a balanced comparison across firms. In columns (1) through (4), we split the sample into four industry groups per industry classification (see footnote 13), where overcapacity industries include mining, steel, and construction. In column (5), we exclude potential Chengtou bonds. We define province fixed effects using 31 provinces and municipal cities, and industry fixed effects using 17 industries classified by the CSRC. Numbers in parentheses are standard errors corrected for heteroscedasticity and firm-level clustering. ***, **, * denote significance level at 1%, 5%, and 10%, respectively.

	Overcapacity (Steel, Coal Mining, and Construction)	Public services	Manufacturing + Commercial services	Excluding overcapacity	Excluding Chengtou
	(1)	(2)	(3)	(4)	(5)
SOE	-2.386***	1.063	-1.425**	-0.908***	-0.923***
	(1.032)	(1.121)	(0.787)	(0.319)	(0.428)
Controls	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES
Industry FE				YES	YES
Observations	407	185	613	925	891
Adj R-squared	0.147	0.221	0.105	0.077	0.074

Table 5: The Effect of Implicit Guarantee on Investment

This table presents the results from DID regressions of corporate investment of SOEs and non-SOEs around the Tianwei default. The dependent variable is capital expenditures scaled by lagged assets for columns (1) through (3); capital expenditures and investments in intangibles scaled by lagged assets for columns (4) through (6); and capital expenditures, investments in intangibles, and acquisitions scaled by lagged assets for columns (7) through (9) in a semiannual frequency. Columns (3), (6), and (9) use PSM matched sample. Control variables include cash flow and lagged size, ROA, sales growth, leverage, and tangibility. *Post* is a dummy variable that equals 1 for the three semiannual periods after April 21, 2015 (excluding June 30, 2015), and 0 for the three semiannual periods before that. *SOE* is a dummy variable that equals 1 if the firm is an SOE and 0 otherwise. Numbers in parentheses are standard errors corrected for heteroscedasticity and firm-level clustering. ***, **, * denote significance level at 1%, 5%, and 10%, respectively.

	Capex			Capex+Intangible			Capex+Intangible+Acquisition		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SOE*Post	-0.015***	-0.016***	-0.026***	-0.015***	-0.016***	-0.031***	-0.018***	-0.019***	-0.033***
	(0.004)	(0.004)	(0.003)	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)	(0.004)
SOE	-0.013			-0.017*			-0.020*		
	(0.010)			(0.010)			(0.010)		
Firm-level Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Semiannual FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES			YES			YES		
Firm FE		YES	YES		YES	YES		YES	YES
PSM			YES			YES			YES
Observations	22,139	22,139	12,293	22,139	22,139	12,293	22,139	22,139	12,293
Adj R-squared	0.084	0.517	0.519	0.090	0.496	0.509	0.093	0.492	0.506

Table 6: Semiannual Investment Dynamics

This table presents the results from dynamic DID regressions of corporate investments of SOEs and non-SOEs around the Tianwei default. The dependent variable is capital expenditures scaled by lagged assets for columns (1) and (2), capital expenditures and investments in intangibles scaled by lagged assets for columns (3) and (4), and capital expenditures, investments in intangibles, and acquisitions scaled by lagged assets for columns (5) and (6) in a semiannual frequency. Columns (2), (4), and (6) use the PSM matched sample. Control variables include cash flow and lagged size, ROA, sales growth, leverage, and tangibility. *Period(–2), Period(–1), Period(+1), Period(+2)*, and *Period(+3)* are dummy variables that equal 1 for the semiannual period ending June 30, 2014; December 31, 2014; December 31, 2015; June 30, 2016; and December 31, 2016, respectively, and 0 otherwise. *SOE* is a dummy variable that equals 1 if the firm is an SOE and 0 otherwise. Numbers in parentheses are standard errors corrected for heteroscedasticity and firm-level clustering. ***, **, * denote significance level at 1%, 5%, and 10%, respectively.

	Capex		Capex + Intangible investment		Capex + Intangible investment + Acquisitions	
	(1)	(2)	(3)	(4)	(5)	(6)
SOE*Period(-2)	0.005	0.000	0.010*	-0.001	0.009	-0.002
	(0.004)	(0.007)	(0.006)	(0.008)	(0.006)	(0.008)
SOE*Period(-1)	-0.007	-0.002	-0.005	-0.004	-0.006	-0.004
	(0.005)	(0.009)	(0.006)	(0.010)	(0.006)	(0.010)
SOE*Period(+1)	-0.018***	-0.024**	-0.016**	-0.031***	-0.019***	-0.033***
	(0.006)	(0.010)	(0.007)	(0.011)	(0.007)	(0.011)
SOE*Period(+2)	-0.014**	-0.029***	-0.010	-0.032***	-0.014**	-0.036***
	(0.006)	(0.008)	(0.007)	(0.009)	(0.007)	(0.010)
SOE*Period(+3)	-0.018***	-0.029**	-0.017**	-0.035***	-0.021***	-0.038***
	(0.007)	(0.012)	(0.008)	(0.013)	(0.008)	(0.013)
Firm-level Controls	YES	YES	YES	YES	YES	YES
Semiannual FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
PSM		YES		YES		YES
Observations	22,139	12,293	22,139	12,293	22,139	12,293
Adj R-squared	0.518	0.519	0.496	0.509	0.492	0.506

Table 7: The Probability of Over-investment and Under-investment

This table presents the results from DID regressions of corporate investment ranks around the Tianwei default using a multinomial logit model. The dependent variable is based on unexplained investment. Firm-semiannual observations in the bottom tercile of residual investment are classified as underinvesting, observations in the top tercile are classified as overinvesting, and observations in the middle tercile are classified as the benchmark group. Control variables include cash flow and lagged size, ROA, sales growth, leverage, and tangibility. Columns (1) through (3) report the overinvesting results for the three types of investments as in Table 5. Columns (4) through (6) report the underinvesting results for the three types of investments as in Table 5. *Post* is a dummy variable that equals 1 for the three semiannual periods after April 21, 2015 (excluding June 30, 2015), and 0 for the three semiannual periods before that. *SOE* is a dummy variable that equals 1 if the firm is an SOE and 0 otherwise. Numbers in parentheses are standard errors corrected for heteroscedasticity and firm-level clustering. ***, **, * denote significance level at 1%, 5%, and 10%, respectively.

	Overinvesting			Underinvesting		
	(1)	(2)	(3)	(4)	(5)	(6)
SOE*Post	-0.119**	-0.058**	-0.056**	0.099	0.104	0.103
	(0.014)	(0.014)	(0.014)	(0.06)	(0.066)	(0.066)
Firm-level Controls	YES	YES	YES	YES	YES	YES
Semiannual FE	YES	YES	YES	YES	YES	YES
Observations	22,139	22,139	22,139	22,139	22,139	22,139
Pseudo R-squared	0.026	0.026	0.027	0.026	0.025	0.026

Table 8: Asset Turnover

This table presents the results from DID regressions of asset turnover around the Tianwei default. The dependent variable is asset turnover. Column (3) uses the PSM matched sample. Control variables include lagged size, ROA, sales growth, leverage, and tangibility. *Post* is a dummy variable that equals 1 for the period after April 21, 2015, and 0 otherwise. *SOE* is a dummy variable that equals 1 if the firm is an SOE and 0 otherwise. Numbers in parentheses are standard errors corrected for heteroscedasticity and firm-level clustering. ***, **, * denote significance level at 1%, 5%, and 10%, respectively.

	Asset turnover		
	(1)	(2)	(3)
SOE*Post	0.013***	0.015***	0.002***
	(0.004)	(0.004)	(0.0007)
Firm-level Controls	YES	YES	YES
Semiannual FE	YES	YES	YES
Industry FE	YES		
Firm FE		YES	YES
PSM Matching			YES
Observations	22,139	22,139	12,293
Adj R-squared	0.920	0.920	0.912

Table 9: Net Debt Issuance and Cash Holdings

The dependent variable is the net debt issuance amount scaled by lagged assets for columns (1) through (3) and cash holdings scaled by lagged assets for columns (4) through (6) in a semiannual frequency. Columns (3) and (6) use the PSM matched sample. Control variables include lagged size, ROA, sales growth, leverage, and tangibility for columns (1) through (3) and additionally include cash flow for columns (4) through (6). *Post* is a dummy variable that equals 1 for the period after April 21, 2015, and 0 otherwise. *SOE* is a dummy variable that equals 1 if the firm is an SOE and 0 otherwise. Numbers in parentheses are standard errors corrected for heteroscedasticity and firm-level clustering. ***, **, * denote significance level at 1%, 5%, and 10%, respectively.

	Net debt issuance			Cash holdings		
	(1)	(2)	(3)	(4)	(5)	(6)
SOE*Post	-0.003	-0.007***	-0.006***	0.008***	0.008***	0.010**
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
SOE	0.010***			-0.002		
	(0.003)			(0.003)		
Firm-level Controls	YES	YES	YES	YES	YES	YES
Semiannual FE	YES	YES	YES	YES	YES	YES
Industry FE	YES			YES		
Firm FE		YES	YES		YES	YES
PSM			YES			YES
Observations	21,971	21,971	12,228	21,963	21,963	12,293
Adj R-squared	0.333	0.645	0.630	0.095	0.597	0.638

Appendix Table 1: Variable Definitions*

Acquisition: Cash acquisitions scaled by lagged book assets.

Assets: The amount of total book assets.

Asset turnover: Sales divided by lagged book assets.

Bank loan: The amount of total bank loan scaled by lagged book assets.

Capex: Capital expenditures divided by lagged book assets.

Cash flow: Operating cash flow scaled by lagged book assets.

Cash holdings: The sum of cash and marketable securities scaled by lagged book assets.

Central_SOE: A dummy variable that equals one if the controlling shareholder is the central government.

Central_SOE_ownership: percentage of shares owned by the central government

Coupon: Annualized coupon rate.

Credit rating: A variable that equals 1 if the bond-issuing firm has no rating 30 days before the event date; it takes an integer value of 2–18 if the bond-issuing firm has a rating of C, CC, CCC, B–, B, B+, BB–, BB, BB+, BBB, A–, A, A+, AA–, AA, AA+, AAA, respectively.

Duration: Modified duration of the bond that measures the percentage change in bond price for 1% change in bond yield.

Explicit guarantee: A variable that equals one if the bond has a guarantor and zero otherwise. The guarantor can be a corporation with higher credit rating, a third-party independent guarantee company, or an individual who bears unlimited liability of the obligation.

Intangible: Investments in intangible assets scaled by lagged book assets. Intangible assets refer to those assets that cannot be physically touched or seen, and are key assets of today's "knowledge economy". Examples of intangible assets are software, design, market research, R&D, training, and business processes in various aspects.

Issue amount: The amount of bond issuance.

Leverage: Total book debt/(total book debt + book value of equity).

Illiquidity: Bond liquidity is measured as the fraction of zero returns relative to the number of trading days in a financial year, as defined by Schestag et al. (2016).

Local_SOE: A dummy variable that equals one if the controlling shareholder is the local government.

Local_SOE_ownership: Percentage of shares owned by the central government.

Maturity: Years to maturity.

Net debt issuance: Semiannual issuance of debts minus repayments of debts scaled by lagged book assets.

Operating cash flow: Operating cash flow scaled by lagged book assets.

Period (–2/–1/+1/+2/+3): A dummy variable that equals one for the period ending June 30, 2014; December 31, 2014; December 31, 2015; June 30, 2016; December 31, 2016; and zero otherwise.

Post: A dummy variable that equals one for the period after April 21, 2015, and zero otherwise.

Overcapacity industries: Those industries operating at overcapacity, including coal mining, steel, and construction industries.

Overinvesting: A dummy variable that equals one if the firm-semiannual observations in the top tercile of unpredicted investment and zero if the observations are in the middle two quartiles.

ROA: Operating income/total book assets.

R&D: Research and development expenditures scaled by lagged total sales.

Sales: Net revenue.

Sales growth: The average sales growth during the last two semiannual periods.

Size: Log(assets).

SOE: A dummy variable that equals one if the firm is a state-owned enterprise. The classification of SOE is provided by WIND database. A firm is defined as state-owned if the controlling shareholder is the government.

SOE_ownership: The percentage of government share ownership in the firm.

Subsidy: The amount of subsidy granted by government scaled by lagged book assets.

Tangibility: Property, plant, and equipment divided by total book assets.

Underinvesting: A dummy variable that equals one if the firm-semiannual observations in the bottom quartile of unpredicted investment and zero if the observations are in the middle two quartiles.

Unsecured: A dummy variable that equals one if the bond is unsecured, and zero otherwise.

Yield spread: The yield difference between the bond and a government with closest remaining maturity.

*All variables except bond return data are from WIND database.

Appendix Table 2: Abnormal Bond Returns of SOEs vs. non-SOEs: Robustness

This table reports regression results of market model–adjusted, cumulative abnormal bond returns around the first SOE default event (April 21, 2015) on dummy variables indicating SOEs, central SOEs, local SOEs, and controls. In columns (1) and (2), we delete all enterprise bonds from the original sample while in columns (3) and (4), we add MTN bonds issued by the firms in our original sample. We include all the outstanding bonds. For firms with multiple bonds, we weight each bond return by the number of bonds in the firm to ensure a balanced comparison across firms. We define province fixed effects using 31 provinces and municipal cities, and industry fixed effects using 17 industries classified by the CSRC. Numbers in parentheses are standard errors corrected for heteroscedasticity and firm-level clustering. ***, **, * denote significance level at 1%, 5%, and 10%, respectively.

	Corporate bonds only		Corporate+Enterprise+MTN	
	Multiple bonds per firm		Multiple bonds per firm	
	(1)	(2)	(3)	(4)
SOE	-2.094***		-1.280***	
	(0.621)		(0.466)	
Central_SOE		-2.758***		-1.167***
		(0.877)		(0.334)
Local_SOE		-1.847**		-1.319**
		(0.727)		(0.557)
Controls	YES	YES	YES	YES
Province FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Exchange FE			YES	YES
Observations	890	890	1,748	1,748
Adj R-square	0.084	0.089	0.037	0.035

Appendix Table 3: Event Study: Subsample Analysis by Firm Characteristics

This table reports regression results of market model–adjusted, cumulative abnormal bond returns around the first SOE default event (April 21, 2015) on dummy variables indicating SOEs and controls. We include all the outstanding bonds. For firms with multiple bonds, we weight each bond return by the number of bonds in the firm to ensure a balanced comparison across firms. The whole sample is divided into subsamples based on ex-ante leverage, explicit guarantee on the bonds, government subsidy, and loan-to-debt ratio. We define province fixed effects using 31 provinces and municipal cities, and industry fixed effects using 17 industries classified by the CSRC. Numbers in parentheses are standard errors corrected for heteroscedasticity and firm-level clustering. ***, **, * denote significance level at 1%, 5%, and 10%, respectively.

	Leverage		Explicit guarantee		Subsidy		Loan/Debt	
	(1) Low	(2) High	(3) No	(4) Yes	(5) Low	(6) High	(7) Low	(8) High
SOE	-0.192	-1.761***	-1.395***	-0.475	-2.169***	-0.216	-1.426**	-0.545
	(0.484)	(0.359)	(0.438)	(0.323)	(0.700)	(0.291)	(0.470)	(0.405)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	675	653	946	382	700	628	660	668
Adj R-squared	0.084	0.139	0.096	0.141	0.100	0.112	0.125	0.098

Appendix Table 4: Abnormal Bond Returns of Unsecured Bonds vs. Secured bonds

This table reports regression results of market model–adjusted, cumulative abnormal SOE bond returns around the first SOE default event (April 21, 2015) on dummy variables indicating unsecured bonds. In columns (1) and (2), we match each secured SOE bond with either an unsecured SOE bond from the same firm, or a similar unsecured SOE bond. We define province fixed effects using 31 provinces and municipal cities, and industry fixed effects using 17 industries classified by the CSRC. Numbers in parentheses are standard errors corrected for heteroscedasticity and firm-level clustering. ***, **, * denote significance level at 1%, 5%, and 10%, respectively.

	(1)	(2)
Unsecured	-1.852*	-1.899*
	(1.018)	(1.020)
Controls		
Province FE	YES	YES
Industry FE		YES
N	288	288
Adj R-squared	0.096	0.099

Appendix Table 5: Falsification Test Using the First Non-SOE Bond Default

This table provides the results of a regression analysis of the market model–adjusted, cumulative bond abnormal returns for the first default event by a non-SOE (March 7, 2014). *SOE* is a dummy variable that equals 1 if the firm is an SOE firm and 0 otherwise. *Central_SOE* is a dummy variable that equals 1 if the firm is majority-owned by the Chinese central government and 0 otherwise. *Local_SOE* is a dummy variable that equals 1 if the firm is majority-owned by a local government and 0 otherwise. In columns (1)–(4), we select the most actively traded bond for each firm. In columns (5)–(8), we include all bonds outstanding. For a firm with multiple bonds, we weight each bond return by the number of bonds in that firm to ensure a balance of comparison across firms. In columns (9)–(10), we run the regression with a matched sample, as specified earlier. We define province fixed effects using 31 provinces and municipal cities, and industry fixed effects using 17 industries classified by the CSRC. Numbers in parentheses are standard errors corrected for heteroscedasticity and firm-level clustering. ***, **, * denote significance level at 1%, 5%, and 10%, respectively.

	One bond per firm				Multiple bonds per firm				Matched sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SOE	-0.213	-0.379			0.015	-0.143			0.022	-0.195
	(0.633)	(0.590)			(0.515)	(0.528)			(0.530)	(0.555)
Central_SOE			-0.346	-0.387			0.136	0.207		
			(0.736)	(0.767)			(0.900)	(0.911)		
Local_SOE			-0.151	-0.177			-0.016	-0.249		
			(0.664)	(0.609)			(0.514)	(0.536)		
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE		YES		YES		YES		YES		YES
Observations	838	838	838	838	1,079	1,079	1,079	1,079	808	808
Adj R-squared	0.088	0.102	0.088	0.102	0.058	0.068	0.058	0.069	0.070	0.082

Appendix Table 6: State Ownership and Abnormal Bond Returns

This table reports regression results of market model–adjusted, cumulative abnormal bond returns around the first SOE default event (April 21, 2015) on continuous variables indicating SOE government ownership, central SOE government ownership, local SOE government ownership, and controls. *SOE_ownership* stands for the percentage of equity owned by both central and local governments. *Central_SOE_ownership and Local_SOE_ownership* stand for the percentage of equity owned by the central government and local government, respectively. We include all bonds outstanding at the SOE default event. For a firm with multiple bonds, we weight each bond return by the number of bonds in that firm to ensure a balance of comparison across firms. We define province fixed effects using 31 provinces and municipal cities, and industry fixed effects using 17 industries classified by the CSRC. Numbers in parentheses are standard errors corrected for heteroscedasticity and firm-level clustering. ***, **, * denote significance level at 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)
SOE_ownership	-0.011***	-0.011**		
	(0.004)	(0.004)		
Central_SOE_ownership			-0.022***	-0.021***
			(0.007)	(0.007)
Local_SOE_ownership			-0.011**	-0.011**
			(0.004)	(0.005)
Controls				
Province FE	YES	YES	YES	YES
Industry FE		YES		YES
Observations	1,328	1,328	1,328	1,328
Adj R-squared	0.071	0.074	0.071	0.076

Appendix Table 7: Propensity-score Matching Regression

This table provides Logit estimation for the following equation:

$$NonSOE_{i,t} = a \times Controls_{i,t} + I_i + +\varepsilon_{i,t}$$

We use the firm information on December 31, 2014. The dependent variable y is a dummy variable that equals 1 if the firm is NOT an SOE firm and 0 otherwise. Numbers in parentheses are standard errors corrected for heteroscedasticity and firm-level clustering. ***, **, * denote significance level at 1%, 5%, and 10%, respectively.

Size	-0.081***
	(0.006)
Leverage	0.536***
	(0.045)
ROA	0.052***
	(0.004)
Cash flow	0.305***
	(0.059)
Tangibility	-0.023
	(0.050)
Constant	1.755***
	(0.134)
	(0.134)
Industry FE	YES
Observations	2,423
Adj. R-squared	0.367

Appendix Table 8: The Effects of Implicit Guarantee on Investment: Excluding Overcapacity Industries

This table presents the results from DID regressions of corporate investment of SOEs and non-SOEs around the Tianwei default, excluding overcapacity industries (mining, steel, and construction). The dependent variable is capital expenditures scaled by lagged assets for columns (1) through (3), capital expenditures and investments in intangibles scaled by lagged assets for columns (4) through (6), and capital expenditures, investments in intangibles, and acquisitions scaled by lagged assets for columns (7) through (9) in a semiannual frequency. Columns (3), (6), and (9) use PSM matched sample. Control variables include cash flow and lagged size, ROA, sales growth, leverage, and tangibility. *Post* is a dummy variable that equals 1 for the three semiannual periods after April 21, 2015 (excluding June 30, 2015), and 0 for the three semiannual periods before that. *SOE* is a dummy variable that equals 1 if the firm is an SOE and 0 otherwise. Numbers in parentheses are standard errors corrected for heteroscedasticity and firm-level clustering. ***, **, * denote significance level at 1%, 5%, and 10%, respectively.

	Capex			Capex+Intangible			Capex+Intangible+Acquisition		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SOE*Post	-0.017***	-0.019***	-0.029***	-0.018***	-0.020***	-0.033***	-0.021***	-0.023***	-0.035***
	(0.005)	(0.005)	(0.004)	(0.005)	(0.006)	(0.004)	(0.005)	(0.006)	(0.005)
SOE	-0.008*			-0.010**			-0.012**		
	(0.004)			(0.005)			(0.005)		
Firm-level Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Semiannual FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES			YES			YES		
Firm FE		YES	YES		YES	YES		YES	YES
PSM Matching			YES			YES			YES
Observations	15338	15338	10858	15347	15347	10868	15348	15348	10868
Adj R-square	0.067	0.521	0.515	0.075	0.502	0.508	0.078	0.496	0.505

Appendix Figure 1: Cumulative Stock Returns during 2015 Market Crash