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Institutions, ownership structures, and distress resolution in China ☆

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ABSTRACT

We investigate how institutional factors influence the behavior of distressed firms in emerging markets, where bankruptcy laws are often weak and debtors have greater bargaining power in distress. By studying two comprehensive samples of distressed firms in China, we find that local government quality and corporate ownership structure matter considerably to firm performance during distress. Distressed companies facing stronger institutional discipline and with greater private ownership have relatively better operating performance and are more likely to recover. Our results remain robust when we control for the endogeneity of entering distress, use different institutional proxies, and implement various definitions for distress.

1. Introduction

Bankruptcy is arguably the most important outlet for resolving distress in developed markets. During the past decade, over 30,000 bankruptcy cases were filed each year with the U.S. Bankruptcy Court (American Bankruptcy Institute), and thousands of cases were filed in the United Kingdom and continental Europe (Davydenko and Franks, 2008). Given its importance, scholars have devoted numerous studies to understanding bankruptcy and to designing the optimal approach to resolve distress.[1] Despite the recent debate on the pros and cons of the liquidation-based and the reorganization-based approaches,[2] it is widely accepted that bankruptcy is very important in disciplining the behavior of distressed firms in developed economies.[3]

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[1] For example, Baird et al. (2007), Brealey and Myers (1996), Bris et al. (2005, 2006), Franks and Torous (1989), Khal (2002), Modigliani and Miller (1958), Stromberg (2000), Thorburn (2000), Weiss (1990), Welch (1997), White (1984), and Wruck (1990), among others.
[2] Dahiya et al. (2003), Pulvino (1999), Shleifer and Vishny (1992), Weiss and Wruck (1998).
[3] Eckbo and Thorburn (2003), Gilson (1997), Hotchkiss (1995), Maksimovic and Phillips (1998).

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The situation is different in emerging markets. The prevalence of 'soft lending' practices in these markets (Allen et al., 2005; Dinc, 2005; La Porta et al., 2000) means that easy and cheap capital is readily available, which induces irresponsible budgeting and consequently distress (Lin et al., 2009). Once companies become distressed, the weak legal enforcement and loose corporate governance environment make resolving such distress a complex process (Claessens and Klapper, 2005; Claessens et al., 2003; Dahiya and Klapper, 2007; Djankov et al., 2008). As a result, debtors in emerging markets typically have greater bargaining power than their counterparts in developed markets (Degryse and Ongena, 2005; Dinc, 2005; Petersen and Rajan, 1994).

In this study, we examine how corporate management in Chinese firms adjusts their corporate decisions in reaction to financial distress, and we identify other forces that shape distressed companies' behavior when bankruptcy law alone fails to help creditors exert effective control over distressed companies. We address these issues using comprehensive data from the Annual Industrial Companies Database (Chinese National Bureau of Statistics, NBS), which covers the universe of China's state-owned enterprises (SOEs) and all of the large- and medium-sized non-SOE firms in the manufacturing sector, as well as from a separate hand-collected dataset covering loan defaults in Chinese publicly listed companies. As the combination of soft lending, weak legal system, and government intervention in China is representative of many other emerging markets (Allen et al., 2005; Khawaja and Mian, 2005; Lin et al., 2009; Luo et al., 2011), our analysis may shed light on other emerging markets.

Our empirical approach is to perform the regression of firm behavior on institutional factors. We first use panel data for the distressed and non-distressed firm-years to examine whether the interactions of institutional and distress variables exert a significant effect on firm performance during periods of financial distress. We use time-serial changes in firm performance variables as dependent variables in our regression analysis, rather than absolute levels to mitigate the effects of firm heterogeneity. Further, we explore, for companies in distress, how institutional background may influence the possibility of recovery and the time that it takes firms to recover from financial distress.

Our findings are summarized below. First, government quality strongly affects both firms' performance in their distress periods and how their financial distress is resolved. Using various bureaucratic quality indicators for different provinces in China, we find that distressed firms' performance (measured by several change variables including return on sales (ROS), total factor productivity, earnings, operating cash flow, and financial leverage), recovery likelihood, and the length of time needed to emerge from distress are all significantly related to local government quality. For a distressed firm on the margin, a one-day per year increase in the time an entrepreneur must spend dealing with government regulation (a proxy for lower government quality) results in a 0.1% lower ROS growth, a 0.2% higher leverage increase, a 2.71% lower probability of recovery, and a 2.61% increase in the amount of time (about 10 extra days) needed to emerge from distress. These findings highlight the importance of bureaucrat quality when the resolution of firm distress depends on government arbitration rather than bankruptcy law enforcement.

Second, the ownership structure of a firm is important in explaining the behavior in financial distress. Firms controlled by private parties adjust their policies much faster when dealing with financial distress. Distressed private firms display significantly better performance than their SOE counterparts after the onset of distress. For example, a one standard deviation increase in private ownership can enhance ROS growth by 0.3% for companies on the margin of distress. As a result, private firms, on average, emerge from financial distress sooner than SOEs and are significantly more likely to emerge from financial distress eventually. Further, even a small increase in the percentage of private ownership in a state-controlled firm can lead to a significant improvement in the firm's performance when distressed.

Our main findings persist through a host of robustness tests. We conduct tests by examining both inferred distress (the Altman Z-value, leverage, and interest coverage), and loan default events. We also employ a large number of proxies for institutional factors. We implement different econometric specifications (pooled ordinary least squared (OLS) regressions and firm fixed-effect panel regressions). We perform a Heckman two-stage procedure to control for the endogeneity of companies entering distress, and split the data into various sub-samples. Our main results remain unchanged in all of these tests.

Our study makes several contributions to the literature. First, we are among the first to examine how institutional factors shape distressed firms' decisions. Previous studies show that a stronger institutional environment is generally beneficial to financial markets and corporate financing (Demirguc-Kunt and Maksimovic, 1998, 1999; La Porta et al., 1998, 2002). However, under strong creditor protection, distressed companies with promise might be liquidated prematurely and their going-concern value destroyed (Bris et al., 2006). Although the poorer protection of creditor rights may result in delays in distress resolution, it may at times be favorable, as it provides alternative institutional forces that effectively discipline the behavior of distressed firms.

In addition, we find that institutions influence firm behavior in periods of distress. These findings complement previous studies on the relationship between institutions and finance (Acharya et al., 2011; Claessens and Klapper, 2005; Claessens et al., 2003; Dahiya and Klapper, 2007; Djankov et al., 2008). Further, by documenting that government quality and ownership structure strongly affect the performance and recovery of distressed firms, our study depicts specific mechanisms through which legal and other institutions affect regional capital accessibility and corporate financing.

Finally, the study provides new evidence for distressed-firm behavior in emerging markets, where the institutional environments are vastly different from those of developed economies. Consistent with the prediction of Jensen's theory on the disciplinary role of financial distress (Jensen, 1986), this study finds that distressed firms indeed adjust their behavior to recover, despite the lack of liquidation practices. In addition to existing findings that firm factors such as capital structure (Booth et al., 2001; Ofek, 1993) affect the speed at which firms respond to distress, we show that institutional factors also determine firms' sensitivity to distress and how they modify their decisions when in distress.

Our study is closely related to the paper by Davydenko and Franks (2008) that investigates how bankruptcy law influences lending and borrowing practices in a number of European countries. Although we provide general support for their study, we focus more on the practice of the law rather than the written law, because in many emerging markets law enforcement practices

are more important than written law. Related to this difference, our study focuses more on how a less formal institutional environment (Allen et al., 2005; Ayyagari et al., 2010) helps to discipline distressed companies and facilitates distress resolution. Finally, we study both default events and inferred distress, which is more suitable for the study of the practice in emerging markets and also enables us to investigate different aspects of distressed firms' behavior.

The rest of the paper proceeds as follows. Section 2 discusses the practice of bankruptcy in emerging markets, particularly in China, and develops our testable hypotheses; Section 3 describes the data and outlines the empirical methodology; Section 4 presents our findings and discusses the results before we conclude in Section 5.

2. Distress and bankruptcy in emerging markets

2.1. Corporate bankruptcy in emerging markets

In addition to the drastic differences in economic prosperity between emerging and developed markets, their institutional environments differ fundamentally. On the legal front, La Porta et al. (1997, 1998) show that emerging markets typically have weak protection of creditor rights and ineffective law enforcement. On the administrative side, governments in emerging markets tend to exert a greater influence on markets and firms, and the quality of bureaucrats cannot be assumed to be high (Shleifer and Vishny, 1994). The prevalence of crony bank lending (Charumilind et al., 2006; Johnson and Mitton, 2003; Khawaja and Mian, 2005; Sapienza, 2004) and weak corporate governance mechanisms at the micro level creates an unfriendly financing environment for entrepreneurs (Durnev et al., 2004).

In a comprehensive summary of global bankruptcy practices, Claessens and Klapper (2005) show that differences in institutional background lead to distinct bankruptcy laws across countries. For example, out-of-court bargaining (Asquith et al., 1994; Gilson et al., 1990) is the main method of default and distress resolution in emerging markets. As debtors normally enjoy an information advantage regarding company prospects and have control over company assets, they command a greater level of bargaining power in distress than their counterparts in developed markets.

2.2. Corporate bankruptcy in China

The Chinese bankruptcy law (trial implementation) was enacted in 1986 and lags considerably behind the reality of distressed firms (The Law Year Book of China, 1993–2001). As in many other emerging markets, the judicial system on bankruptcy is obsolete and law enforcement is weak in China (Allen et al., 2005, 2008). Judges and attorneys alike are often unable to find the appropriate clauses to cite in the law, and law enforcement is unable to carry out what the court rules. As a result, the court system has been very conservative with bankruptcy-related petitions. Before hearing a bankruptcy case, the court normally requires distressed firms to first obtain consent for their bankruptcy decisions from the local government and to have a satisfactory plan to place their existing employees. As a result, only a small fraction of filed bankruptcy cases are handled by the court system and even fewer are judged. Appendix I reports the statistics on filed and accepted bankruptcy cases in China. On average, only about 7% of all bankruptcy petitions are handled by the court. For example, 315 out of 7233 filed bankruptcy cases were accepted by the court in 2001, and even fewer cases reached the judges (The Law Year Book of China, 1993–2001).

Further, although the law indeed includes bankruptcy as one possible solution to resolve distress, liquidation and asset possession rarely happen in China. Instead, courts tend to be protective of SOEs and encourage workouts and restructuring that keep defaulted firms as going concerns. Our analysis in Appendix II shows that not a single company was liquidated in the bankruptcy filings and most distressed firms went through some kind of restructuring to work out their distress.

As in other markets, the practice of soft lending is common in China, especially between state-owned banks and SOEs. Such easy access to bank capital and the lack of effective monitoring leave the borrower unchecked and induce distress.[4] It is worth noting that, since the end of our sample period, the securitization of several major state-owned banks has required them to be more vigilant with their new lending and outstanding loan recovery. Recently, these banks have become more discerning with their loans and more watchful of debtors' defaulting. In addition, these banks are now putting greater pressure on distressed companies to come up with satisfactory plans for their defaulted debts. However, the effects of the new development remain to be seen.

2.3. Hypotheses

Based on the above discussion, we focus on the effects of ownership structure and government quality on the policies and performance of distressed firms in China. Relative to private firm managers, SOE executives lack the motivation to improve firm performance in response to financial distress. We expect that the existing incentives and disciplines provided to SOE managers are less robust than those provided to managers of private firms. Firms under private ownership are expected to adjust their strategies more effectively to repay debts (reflected in better firm performance) and to be more likely to emerge from financial distress.

[4] We later perform empirical analyses that explicitly control for the fact that SOEs are more likely to enter distress; the results are consistent with our main findings.

Because of heavy government interventions, the efficiency of firm distress resolution in China depends critically on the quality of government. We expect that firms subject to higher quality public governance will respond more quickly to financial distress (reflected in relatively better operating performance and a higher possibility of recovering from distress).

3. Empirical design

3.1. Data

This study uses two distinct data sources. First, we use the Annual Industrial Companies Database of the Chinese National Bureau of Statistics (NBS). This database covers financial, ownership, and operating information for 1) all of the SOEs regardless of their annual sales, and 2) all of the non-SOE firms (including domestic private firms, joint ventures, and foreign firms) with annual sales of at least RMB5 million (almost US$600,000, according to the exchange rate on Dec. 31, 2005). The data source covers the period of 1998 to 2005, with the number of firms ranging from 162,033 to 271,835 across the sample years. The database encompasses firms in all of the provinces in mainland China.[5] All (about 700) of the publicly-listed industrial firms are included in the database. The database has increasingly been used for academic research and has been found to have reasonable quality and to be a good representation of the national economy (Chow, 1993; Chuang and Hsu, 2004; Li et al., 2009). In our sample, we use those firms that have data for each year from 1998 to 2005.

In addition, we collect loan default information from the annual reports of publicly listed companies in China for the 2000–2005 period.[6] The sample of loan default complements the NBS sample and the findings that are based on inferred distress. More detailed descriptions of these data are provided below.

3.2. Measuring distress

We hope to know how firm performance changes after firms enter financial distress. As in our main empirical analysis we will include all firm-year observations and compare firm performance changes in distressed firm-years with those in non-distressed firm-years, we need variables to measure firm financial health in a given year or to classify whether a firm in a given year is in financial distress. We adopt two approaches to measure firm financial health and to classify financial distress. The first approach is by inference, whereas the second is based on actual default events.

3.2.1. Inferred distress

To be thorough, we use several variables to measure firm financial health and to classify distressed companies. Our primary variable is the widely-used Z-score, modified for emerging market companies (Altman, 2000; Altman et al., 1995). Appendix III explains in detail how we estimate the Z-score. The lower a firm's Z score, the more severe is the firm's financial health problem and the more likely it is that the firm is in financial distress. Following the literature, we define a company in financial distress if its Z score is below the cut-off value of zero for two continuous years.

To account for differences between the Chinese economy and those of other emerging markets, we experiment with several alternative definitions for distress. For example, we use different sets of cut-off Z-values to define distressed companies. In addition, we experiment with focusing on only 'slightly distressed' firms, specifically those firms whose Z-values are slightly below the cut-off value and that are very likely to recover from distress. This allows us to gain a sharper focus on companies potentially sensitive to our classification criteria. We obtain similar results using these alternative definitions and, to conserve space, did not tabulate the results.

In addition to the Z-score measure, we use two other criteria to infer distress: leverage and interest coverage. The higher the leverage or the lower the interest coverage of a firm, the more severe is the firm's financial problem. With leverage, we consider a firm to be in distress if the leverage of a firm is greater than one for two continuous years (that is, a firm's total outstanding debts are greater than its total assets). With the interest coverage measure, we classify a firm as in distress if its interest coverage is less than one for two continuous years (that is, a firm's operating incomes are not enough to cover its interest payment obligations). The details of these measurements are given in Appendix III.

3.2.2. Default event

Even with the above robustness checks, there still might be a concern that the methods of inferred distress do not identify firms that are actually distressed. To address this potential limitation, we investigate default events. We begin with all of the companies listed in the Shanghai and Shenzhen Stock Exchanges from 2000 to 2005. We exclude 34 firms with missing loan default information, 21 firms that do not have financial information for the full period due to delisting, and 274 firms listed before 1995 (because of changes in the IPO process since that time). The selection results in a total sample of 1056 listed companies.

We go through the annual reports of these listed companies to identify whether they defaulted on their short-term or long-term loans at any time between 2000 and 2005. We identify 141 such companies. However, some companies have unpaid

[5] Some firms may change their identification numbers because of exiting from and re-entering into the NBS dataset (Jefferson et al., 2003). We only use observations with consistent identification numbers.

[6] According to the legislation "The Standard on the Content and Format of Annual Reports of Listed Companies" (1999), since 2000 the China Securities Regulatory Commission (CSRC) requires listed companies to disclose information about defaulted loans in the annual reports.

loans not because of their inability to pay but due to lack of payment pressure from state lenders. In this case, the loans are de facto government subsidies. To mitigate this problem and to make sure that we include only companies that are truly financially distressed, we define a company to be in distress if it not only defaulted on its debts, but also reported negative net income in the same period. By these criteria, we identify 67 distressed firms in the sample.

The two samples and the various distress measures complement each other in the following ways: 1) the listed-company sample documents *real* default events, whereas we observe *inferred* distress in the NBS sample, 2) the listed-company sample includes only large companies, whereas the NBS sample includes both large and smaller companies, and 3) the listed-company sample encompasses a wide range of industries, whereas the NBS sample includes only manufacturing industries.

3.3. Regression methodology

Our main empirical approach is to regress firm behavior on the institutional factors. We use firm-year observations from the 1998–2005 sample period to investigate whether the interactions of the institutional background and the Z score (in the case of the NBS firm sample) or the default variable (in the case of the listed company sample) exert a significant effect on firm performance (the dependent variable). Following Hoshi et al. (1990), the first two years of data for any distressed firm are not included in the regressions, but the subsequent years are. This approach helps to mitigate the effects of the extreme observations that are prone to occur in initial distress years, and thus facilitates the comparison of firm post-distress performance relative to a benchmark formed by non-distress firm-year observations.[7]

The dependent variables in the regressions are defined as time-serial changes in, rather than absolute levels of, firm performance. We include both state ownership and government quality as separate independent variables in the regression. Significant coefficients on the interaction terms between distress and institutional variables, in the expected sign, will provide evidence for our hypothesis that institutional background is important in shaping the firm performance when in distress.

In addition to the above main regressions, we examine a sub-sample including only distressed firms and run the firm-level probit or tobit regressions to address how institutional background influences the possibility of distress recovery and the length of time that it takes for a typical distressed firm to emerge from distress.

3.4. Variables

3.4.1. Dependent variables

We are interested in the performance and recovery outcome of distressed firms. Appendix IV provides detailed descriptions of the variables.

Performance is measured by several change variables: ROS growth, total factor productivity (TFP) growth, earnings growth, operating cash flow (CFO) growth and leverage growth. For the detail, see Appendix IV. All of the variables are adjusted by subtracting the median value for the same industry and the same year.

We adopt two variables to track the recovery outcome for financially distressed firms. First, we trace each distressed firm's performance throughout the rest of the sample period. We create a dummy variable equal to one if the distressed firm is no longer distressed, according to our definition, at the end of the sample period.[8] We then estimate the hazard rate model to examine which types of firms are more likely to emerge from distress at the end of our sample period. The hazard rate model specification addresses the fact that we have a limited observation window for recovery and our observation of the ultimate recovery is therefore truncated.

Separately, we count the number of years that a distressed company remains in distress from the beginning to the end of the investigation period. For firms going repeatedly in and out of distress, we calculate the time by looking at the last recovery. We adopt the tobit regression approach to account for the fact that the data may be truncated due to the length of our sample period.

Table 1 provides the summary statistics of key variables for both the NBS (in Panel A) and the publicly listed (in Panel B) samples. All of the statistics are based on firm-year observations except for the recovery dummy and recovery time variables, which are based on firm-level observations, and the government quality variable, which is based on province-level observations. Panel A does not present the statistics of CFO growth because the data are not available for the NBS database. On average, the publicly listed companies have poorer performance change than the companies from the NBS database. Once in default, listed companies take less time to recover than distressed firms in the NBS sample. This difference is expected, given the listing requirements and potential government support for the publicly traded companies.

Panels C and D of Table 1 contrast the performance of distressed versus non-distressed companies. Unsurprisingly, distressed companies report considerably worse operating performance changes than non-distressed companies. Some differences in company size, tangible assets, and age are also evident. For example, the distressed firms are relatively smaller and older, with fewer tangible assets.

[7] Our results remain robust if we do not exclude these first two-year observations of distressed firms.

[8] We experiment with alternative definitions that define a distressed company as having achieved 'recovery from distress' if it remains 'healthy' for at least two continuous years or at least three continuous years after recovery, and our results remain the same.

Table 1
Summary statistics. This table presents the descriptive statistics of the dependent and independent variables based on the NBS and listed company samples. The NBS sample comes from the Annual Industrial Companies Database (Chinese National Bureau of Statistics) that covers the universe of China's SOEs and all of the large- and medium-sized non-SOE firms in the manufacturing sector. The listed company sample includes publicly listed firms in China's stock market. The statistics are based on firm-year observations from 1998 to 2005 unless otherwise specified. Firms are classified as distressed or non-distressed based on the Z score of Altman et al. (1995) for the NBS sample, or on whether there is an actual loan default event for the publicly listed sample. The sample sizes of distressed and non-distressed firms are 3649 and 36,352 for the NBS sample, and 67 and 989 for the listed company sample, respectively. Appendix IV provides the definitions of the variables. ROS growth is annual change of return on assets. TFP growth is annual change of total factor productivity. Earnings growth is annual growth rate of net earnings. CFO growth is annual change of operating cash flow over total sales. Leverage growth is annual change of total liabilities over total assets. Recovery dummy is a dummy variable that equals one if a distressed firm goes out of distress by the end of sample period, and zero otherwise. Recovery time is the number of years that a distressed firm stays in distress. The statistics for the recovery dummy and recovery time are based on firm-level observations. State ownership is the fraction of firm ownership held by the state. Government quality is the percentage of days in a year in a region that firms spend dealing with government regulators. The statistics of government quality are based on principle-level observations. Z score is annually estimated following the model of Altman et al. (1995) as described in Appendix III. Default is a dummy variable equal to one if a firm has a loan default in a given year, and zero otherwise. List is a dummy variable equal to one if a firm is publicly listed, and zero otherwise. Size is the natural logarithm of firm assets at the beginning of year. Leverage is the ratio of liabilities to total assets at the beginning of year. Tangible is the ratio of tangible assets to total assets at the beginning of year. Age is the number of years that a firm has been in existence for the NBS sample or listed for the listed company sample at the beginning of year.

Variables	Observation	Mean	Median	Std. Dev.
Panel A: The NBS sample				
Dependent variables				
ROS growth	267,034	−0.0028	0.0000	0.1745
TFP growth	265,794	−0.0525	−0.0500	0.5334
Earnings growth	260,530	0.2269	0.1111	9.8009
Leverage growth	267,034	−0.0017	0.0010	0.2154
Recovery dummy	3649	0.3771	0.0000	0.4847
Recovery time	3649	3.4590	3.0000	2.2047
Independent variables				
State ownership	267,034	0.4120	0.0901	0.4522
Government quality	31	0.0440	0.0417	0.0111
Z score	267,034	6.1337	5.2010	5.1667
List	267,034	0.0050	0.0000	0.0709
Size	267,034	17.2545	17.1021	1.5002
Leverage	267,034	0.5920	0.5963	0.3009
Tangible	267,034	0.9337	0.9794	0.1052
Age	267,034	16.7812	11.0000	14.4441
Panel B: The listed company sample				
Dependent variables				
ROS growth	4713	−0.0394	−0.0114	0.2710
TFP growth	4623	−0.0186	−0.0147	0.5148
Earnings growth	4713	−0.1931	0.0227	1.2570
CFO growth	4713	−0.0028	−0.0022	0.2998
Leverage growth	4713	0.0354	0.0231	0.2245
Recovery dummy	67	0.3433	0.0000	0.4784
Recovery time	67	1.5224	1.0000	1.0351
Independent variables				
State ownership	4713	0.3525	0.3974	0.2695
Default	4713	0.0189	0.0000	0.1361
Size	4713	21.0392	20.9421	0.8917
Leverage	4713	0.4311	0.4263	0.1751
Tangible	4713	0.9621	0.9787	0.0505
Age	4713	4.5466	4.0000	2.2953

Panel C: Distressed firms versus non-distressed firms of the NBS sample

Variables	Mean			Median		
	Distressed	Non-distressed	Difference	Distressed	Non-distressed	Difference
ROS growth	−0.0085	−0.0025	−0.0060***	0.0001	0.0000	0.0001
TFP growth	−0.0749	−0.0511	−0.0238***	−0.0658	−0.0491	−0.0167***
Earnings growth	−0.3210	0.4955	−0.8165***	0.0905	0.1114	−0.0209***
Leverage growth	0.0040	−0.0020	0.0060***	0.0124	0.0004	0.0120***
State ownership	0.5818	0.4012	0.1806***	1.0000	0.0327	0.9673***
Z score	1.1749	6.4499	−5.2750***	0.9970	5.3753	−4.3783***
List	0.0021	0.0052	−0.0031***	0.0000	0.0000	−0.0000***
Size	17.1202	17.2630	−0.1428***	17.0647	17.1043	−0.0396***
Leverage	0.9749	0.5676	0.4073***	0.8995	0.5827	0.3168***
Tangible	0.9226	0.9345	−0.0119***	0.9783	0.9794	−0.0011***
Age	21.8583	16.4574	5.4009***	16.0000	11.0000	5.0000***

Table 1 (*continued*)

Panel D: Defaulted firms versus non-defaulted firms of the listed company sample						
Variables	Mean			Median		
	Default	Non-default	Difference	Default	Non-default	Difference
ROS growth	−0.1371	−0.0338	−0.1033***	−0.0265	−0.0111	−0.0154*
TFP growth	−0.0657	−0.0159	−0.0498	−0.0198	−0.0146	−0.0052
Earnings growth	−0.6333	−0.1672	−0.4661***	−0.1489	0.0266	−0.1755***
CFO growth	−0.0274	−0.0014	−0.0260	−0.0011	−0.0022	0.0011
Leverage growth	0.1195	0.0306	0.0889***	0.0437	0.0221	0.0216***
State ownership	0.2718	0.3571	−0.0853***	0.2646	0.4052	−0.1406***
Size	20.4412	21.0737	−0.6325***	20.5072	20.9689	−0.4617***
Leverage	0.5992	0.4214	0.1778***	0.5991	0.4192	0.1799***
Tangible	0.9361	0.9636	−0.0275***	0.9690	0.9791	−0.0101***
Age	5.6459	4.4832	1.1627***	6.0000	4.0000	2.0000***

* Significant at 10%.
*** Significant at 1%.

3.4.2. Independent variables

For ownership structure, we measure state ownership as the fraction of a firm's equity owned by the state and state agencies. We perform additional analyses (unreported) by adopting a dummy variable that equals one if state equity ownership in a company is no less than 50%, and zero otherwise. All of our main results remain the same. Next, the government quality measure, constructed by the World Bank (2006) and widely used in previous studies (Cai et al., 2011; Fan et al., 2009; Xin and Xu, 2007), is defined as the percentage of days in a year that companies spend dealing with government regulators, including tax, public security, environmental protection, labor, and social security administrations.[9] This measure reflects the amount of time businesses have to spend on dealing with government intervention. A high number indicates a poor government quality. We also use several other measures of governmental quality, including a corruption variable based on local firm expenditures on eating, drinking, and entertainment (World Bank, 2006) and the bureaucrat quality index of the Annual Report of Urban Competitiveness in China (Chinese Academy of Social Sciences, 2003).[10] The results of the alternative government quality measures are similar and, therefore, are not separately tabulated in the paper.

We include the following firm-level control variables in most of the regressions: 1) the Z score for the NBS sample or the default variable for the listed company sample, 2) list—a dummy variable equal to one if a firm is publicly traded, and zero otherwise, 3) firm size—the logarithm of book assets, 4) firm leverage—total liabilities divided by total assets, 5) tangible assets—the fraction of total tangible assets to total assets, and 6) firm age—the number of years that a firm has been in existence for the NBS sample or listed for the listed company sample. We use the value of control variables at the beginning of year in the regression. In most analyses, we include year fixed effects and cluster regressions at the firm level.

4. Regression results

4.1. Operating performance

Table 2 reports the performance regression results for the NBS sample. For easier interpretation, we employ the negative value of the Z score in the regression. In addition to the reported specifications, for which we include all of the institutional variables in the same regression, we also test specifications in which we include only one institutional variable at a time in the regression, and we obtain consistent and slightly stronger results.

As for the regressions of the growth in ROS, TFP and earnings, consistent with previous studies, higher ownership by the state and poorer government quality indeed relate to poorer performance, reflected in the significantly negative coefficients on these two variables. More to the focus of the current paper, the coefficients on the interaction between the Z score and state ownership, and on the interaction between the Z score and government quality, also are significantly negative. These results are economically significant. For a company on the margin of distress (Z score equal to zero), a one standard deviation increase in private ownership can increase ROS growth by about 0.3%, and a one standard deviation improvement in government quality also leads to the same magnitude of ROS growth.

The results of leverage growth show that companies with higher state ownership and those facing poorer government quality take on more debts. Further, the coefficients on the interaction term between state ownership and the Z score and on the

[9] The measure is at the city level; we use the average value for all of the cities within a province as the province-level measure.
[10] The Chinese Academy of Social Sciences surveys the level of bureaucratization, the frequency of government expropriation, and the level of citizen satisfaction for 200 cities in China and employs a principal component analysis to arrive at a city-level index of government service quality. We use the mean value of the index for all of the cities within a province as the proxy for the province-level government quality measure.

Table 2
Regression results of firm performance (the NBS sample). This table presents the ordinary least squared regression results of firm performance using firm-year observations from 1998 to 2005 for the NBS sample. State ownership is the fraction of firm ownership held by the state. Government quality is the percentage of days in a year in a region that firms spend dealing with government regulators. Z score is annually estimated following the model of Altman et al. (1995) as described in Appendix III. Other variables are defined in Appendix IV. Data are winsorized at the top and bottom 1%. Standard errors are clustered at the firm level. P-values are in parentheses.

	ROS growth	TFP growth	Earnings growth	Leverage growth
State ownership	−0.0063***	−0.0044	−0.2192***	0.0195***
	(0.000)	(0.138)	(0.000)	(0.000)
State ownership × Z score	−0.0006***	−0.0012***	−0.0149***	0.0044***
	(0.000)	(0.001)	(0.000)	(0.000)
Government quality	−0.2292***	−0.4633***	−4.9067***	0.6470***
	(0.000)	(0.000)	(0.000)	(0.000)
Government quality × Z score	−0.0086*	−0.0750***	−0.1492*	0.0377*
	(0.056)	(0.000)	(0.074)	(0.056)
Z score	−0.0013***	0.0007	−0.0357***	0.0190***
	(0.000)	(0.316)	(0.000)	(0.000)
List	−0.0120***	−0.0240***	−0.1543***	0.0019
	(0.000)	(0.005)	(0.000)	(0.822)
Size	0.0008***	0.0011**	0.0085***	−0.0040***
	(0.000)	(0.037)	(0.001)	(0.000)
Leverage	0.0470***	0.0356***	0.8834***	−0.4497***
	(0.000)	(0.000)	(0.000)	(0.000)
Tangible	−0.0531***	−0.1593***	−0.8677***	0.1480***
	(0.000)	(0.000)	(0.000)	(0.000)
Age	−0.0001***	−0.0011***	−0.0034***	0.0002***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.0095*	0.1273***	0.6356***	0.2880***
	(0.066)	(0.000)	(0.000)	(0.000)
Year	Yes	Yes	Yes	Yes
Cluster	Yes	Yes	Yes	Yes
Observation	267,034	265,794	260,530	267,034
R-squared	0.012	0.002	0.014	0.221

* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

interaction term between government quality and the Z score are both significantly positive, suggesting that higher state ownership and poorer government quality are associated with abnormally higher financial leverage growth for firms during financial distress. The evidence is again consistent with the argument that distressed firms under better institutional environments face more disciplines and have better performance.

We next report the results using information on defaults in the sample of listed companies in Table 3. The results are similar to those based on the NBS data. Further, the result of operating cash flow (CFO) growth shows that the coefficients on the interactions between the default and institutional background variables remain significantly negative. Overall, the results confirm that state ownership and government quality strongly affect firm performance during distress.

The above findings lend strong support to our hypothesis that post-distressed firm performance is strongly affected by institutional factors when bankruptcy law is weak, and distressed companies perform relatively better after the onset of distress when they have a higher percentage of private ownership and are in a better government quality environment.

4.2. Recovery from distress

To estimate how institutional factors affect distress recovery, we focus on the sub-sample of distressed firms in the NBS sample and default firms in the listed company sample. Within each sample, we perform two types of firm-level regressions. First, we perform a probit regression to determine whether a firm recovers from distress (default) by the end of our sample period. Second, we perform a tobit regression to examine the length of time that it takes a distressed company to recover from distress. As we expect, a better institutional background helps distressed companies recover from distress through better operational efficiency.

The results in Table 4 suggest that, other things being constant, state ownership and poor government quality significantly reduce the likelihood that a firm will have emerged from distress by the end of our sample period. These results are economically meaningful. Taking the results of the NBS firms as an example, we see that a one standard deviation change in state ownership and government quality can lead to a 27 and 11% change in firms' recovery probability, respectively. Similar to our results on recovery probability, lower state ownership (or more private ownership) reduces the length of time it takes a firm to emerge from distress, and a firm located in an area with a better quality of government takes less time to emerge from distress. Our analyses using default events of listed companies reveal that the coefficient on state ownership is significantly negative in the regression of recovery possibility and the coefficient on government quality is significantly positive in the regression of recovery time. These results provide further support for the hypothesis that state ownership and government quality significantly influence

Table 3
Regression results of firm performance (the listed company sample). This table presents the ordinary least squared regression results of firm performance using firm-year observations from 2000 to 2005 for the listed company sample. State ownership is the fraction of firm ownership held by the state. Government quality is the percentage of days in a year in a region that firms spend dealing with government regulators. Default is a dummy variable equal to one if a firm has loan default in a given year, and zero otherwise. Other variables are defined in Appendix IV. Data are winsorized at the top and bottom 1%. Standard errors are clustered at the firm level. P-values are in parentheses.

	ROS growth	TFP growth	Earnings growth	CFO growth	Leverage growth
State ownership	−0.0143	0.1396**	0.3728*	0.0063	0.0022
	(0.803)	(0.024)	(0.050)	(0.881)	(0.933)
State ownership × Default	−1.8296***	−0.9780*	−3.1934*	−2.3223***	1.4800***
	(0.001)	(0.080)	(0.066)	(0.000)	(0.000)
Government quality	−0.0435	0.5160	−3.2489	0.3276	0.0363
	(0.950)	(0.490)	(0.159)	(0.524)	(0.909)
Government quality × Default	−25.9222***	−9.9141	−55.8318***	−12.0273***	13.3841***
	(0.000)	(0.113)	(0.004)	(0.006)	(0.000)
Default	−1.3771***	−0.6858***	−3.3547***	−0.2117***	0.4035***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size	−0.0143*	−0.0340***	0.0131	0.0014	−0.0017
	(0.082)	(0.000)	(0.631)	(0.817)	(0.658)
Leverage	0.1950***	0.2090***	0.2316	0.0846***	−0.0838***
	(0.000)	(0.000)	(0.105)	(0.008)	(0.000)
Tangible	0.0623	−0.0815	0.9604**	0.2531**	−0.2502***
	(0.663)	(0.596)	(0.043)	(0.017)	(0.000)
Age	−0.0015	0.0089**	−0.0438***	−0.0042	−0.0029*
	(0.667)	(0.019)	(0.000)	(0.112)	(0.076)
Constant	0.1533	0.6708***	−1.2681*	−0.2854*	0.3194***
	(0.444)	(0.002)	(0.056)	(0.054)	(0.000)
Year	Yes	Yes	Yes	Yes	Yes
Cluster	Yes	Yes	Yes	Yes	Yes
Observation	4713	4623	4713	4713	4713
R-squared	0.135	0.036	0.094	0.018	0.077

* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

Table 4
Regression results of distress recovery. This table presents the regression results of distress recovery using distressed firm-level observations from the NBS and listed company samples. A probit model is used when the recovery dummy is the dependent variable. A tobit model is used when the recovery time is the dependent variable. All of the variables are defined in Appendix IV. In particular, state ownership is the fraction of firm ownership held by the state. Government quality is the percentage of days in a year in a region that firms spend dealing with government regulators. The values of all of the independent variables are measured at the beginning of distress. Data are winsorized at the top and bottom 1%. Standard errors are clustered at the region level. P-values are in parentheses.

	The NBS sample		The listed company sample	
	Recovery dummy	Recovery time	Recovery dummy	Recovery time
State ownership	−0.5915***	0.6121***	−4.6336**	−0.2029
	(0.000)	(0.000)	(0.018)	(0.860)
Government quality	−9.9002***	9.5146**	54.6808	33.4580**
	(0.009)	(0.020)	(0.171)	(0.033)
List	0.8649	−1.3226		
	(0.102)	(0.140)		
Size	−0.0815***	−0.0056	0.0315	−0.2132
	(0.000)	(0.855)	(0.958)	(0.187)
Leverage	−0.2797***	0.6924***	0.1808	0.3231**
	(0.000)	(0.000)	(0.764)	(0.028)
Tangible	0.1744	1.0214	−3.3264	−2.6240**
	(0.645)	(0.128)	(0.390)	(0.040)
Age	0.0001	0.0005*	−0.2585	−0.1107
	(0.166)	(0.068)	(0.350)	(0.328)
Constant		0.5126		6.2019*
		(0.583)		(0.092)
Industry	Yes	Yes	Yes	Yes
Cluster	Yes	No	Yes	No
Observation	3649	3649	67	67
Log likelihood	−10,570	−7808	−69.43	−65.56

* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

Table 5
Firm fixed-effect regression results. This table presents the firm fixed-effect regression results of firm performance using firm-year observations from 1998 to 2005 for the NBS sample. All of the regression variables are defined in Appendix IV. In particular, state ownership is the fraction of firm ownership held by the state. Government quality is the percentage of days in a year in a region that firms spend dealing with government regulators. Z score is annually estimated following the model of Altman et al. (1995) as described in Appendix III. Data are winsorized at the top and bottom 1%. P-values are in parentheses.

	ROS growth	TFP growth	Earnings growth	Leverage growth
State ownership	−0.0067***	0.0038	−0.0712***	0.0233***
	(0.000)	(0.511)	(0.004)	(0.000)
State ownership × Z score	−0.0012***	0.0005	−0.0108***	0.0044***
	(0.000)	(0.390)	(0.000)	(0.000)
Government quality	1.1681	−11.5215	−3.0047	−0.7788
	(0.459)	(0.137)	(0.925)	(0.773)
Government quality × Z score	−0.0275***	−0.0559*	−0.4495***	0.0822***
	(0.000)	(0.082)	(0.001)	(0.000)
Z score	−0.0011***	−0.0016	−0.0371***	0.0247***
	(0.000)	(0.202)	(0.000)	(0.000)
Size	−0.0133***	−0.0306***	−0.4554***	0.0172***
	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	0.0848***	0.0444***	1.5325***	−0.8597***
	(0.000)	(0.000)	(0.000)	(0.000)
Tangible	−0.0591***	−0.1171***	−0.9873***	0.0575***
	(0.000)	(0.000)	(0.000)	(0.000)
Age	−0.0000	−0.0002	−0.0012	0.0001
	(0.993)	(0.292)	(0.132)	(0.249)
Constant	0.1794*	1.0553*	8.0302***	0.3504***
	(0.071)	(0.089)	(0.000)	(0.001)
Year	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes
Observation	267,034	265,794	260,530	267,034
R-squared	0.107	0.092	0.155	0.437

* Significant at 10%.
*** Significant at 1%.

distressed companies' recovery, although the results are not as strong as in the NBS sample results, and in some cases insignificant. This may be due to the relatively small number of defaulted firms in the listed company sample.

The above evidence suggests that firms under stringent public governance and with private incentives are more likely to and will take less time to emerge from distress in China's weak bankruptcy environment. The results, taken together with our previous results on firm performance, indicate that a good institutional background provides firms with greater incentives to adopt the proper turn-around strategy and makes it more likely that they will achieve the objectives of improving business and successful restructuring.

We acknowledge that there may be latent variables that could potentially influence the inferences in our panel regression context. To mitigate such influences, we repeat our panel regression analysis with firm-level fixed effects. We only do this for the NBS sample as the listed company sample provides insufficient variance among the few distressed firms. The results, shown in Table 5, confirm that all of the prior main findings hold in the firm fixed-effect regressions. Therefore potentially omitted variables are unlikely to affect our conclusions.

4.3. Further analyses

We next perform a host of additional analyses to verify the robustness of our results and to gain a deeper understanding of them.

4.3.1. Self-selection effects

Previous studies (Bris et al., 2005; Stromberg, 2000; Thorburn, 2000) note that firm characteristics have non-negligible influences on firms' decisions to get into distress/bankruptcy and their choices of bankruptcy outlets. Given the variable business environments in different provinces in China, it is conceivable that companies in different regions may adopt different strategies. Further, SOEs and private firms may have different tendencies to fall into distress, because they have varying access to 'soft budget' loans. Hence, it is possible that the likelihood of companies entering distress is endogenous and affects our inferences about institutional factors' marginal effects on distressed firm behavior.

To address this issue, we employ a two-stage Heckman test to explicitly control for such a selection problem. First, we perform the first-stage regression to control for the likelihood of different companies' entering into distress, as defined above. Panel A of Table 6 shows that state ownership and poor government quality positively contribute to the likelihood of firms' entering distress, whereas company size reduces firms' likelihood of distress. Finally, leveraged and older firms are more likely to become distressed.

Table 6
Heckman regression results. This table presents the Heckman regression results of firm performance using firm-year observations for the NBS and listed company samples. Panel A presents the first-stage results. The dependent variable is a dummy variable equal to one if a firm falls in distress in a given year for the NBS sample or has loan default in a given year for the listed company sample, and zero otherwise. Panels B and C report the second-stage results. All of the variables are defined in Appendix IV. In particular, state ownership is the fraction of firm ownership held by the state. Government quality is the percentage of days in a year in a region that firms spend dealing with government regulators. Z score is annually estimated following the model of Altman et al. (1995) as described in Appendix III. Default is a dummy variable equal to one if a firm has loan default in a given year, and zero otherwise. Mill's ratio is calculated from the first-stage regression. Data are winsorized at the top and bottom 1%. Standard errors are clustered at the firm level. P-values are in parentheses.

Panel A: The first-stage regression

	The NBS sample	The listed company sample
State ownership	0.2090***	−0.6696
	(0.000)	(0.109)
Government quality	2.6978***	11.7223*
	(0.000)	(0.064)
List	−0.0156	
	(0.922)	
Size	−0.0488***	−0.5074***
	(0.000)	(0.000)
Leverage	2.8554***	3.1952***
	(0.000)	(0.000)
Age	0.0021***	0.1167***
	(0.000)	(0.000)
Industry	Yes	Yes
Year	Yes	Yes
Observations	267,034	4713
R-squared	0.326	0.467

Panel B: The second-stage regression (the NBS sample)

	ROS growth	TFP growth	Earnings growth	Leverage growth
State ownership	−0.0065***	−0.0055*	−0.2184***	0.0293***
	(0.000)	(0.082)	(0.000)	(0.000)
State ownership × Z score	−0.0006***	−0.0012***	−0.0149***	0.0043***
	(0.000)	(0.001)	(0.000)	(0.000)
Government quality	−0.2314***	−0.4751***	−4.8988***	0.7539***
	(0.000)	(0.000)	(0.000)	(0.000)
Government quality × Z score	−0.0086*	−0.0749***	−0.1492*	0.0372*
	(0.056)	(0.000)	(0.074)	(0.059)
Z score	−0.0013***	0.0007	−0.0357***	0.0192***
	(0.000)	(0.333)	(0.000)	(0.000)
Mill's ratio	−0.0011	−0.0058	0.0040	0.0528***
	(0.379)	(0.286)	(0.892)	(0.000)
List	−0.0119***	−0.0237***	−0.1545***	−0.0006
	(0.000)	(0.005)	(0.000)	(0.941)
Size	0.0009***	0.0013**	0.0083***	−0.0066***
	(0.000)	(0.021)	(0.005)	(0.000)
Leverage	0.0443***	0.0210	0.8934***	−0.3180***
	(0.000)	(0.142)	(0.000)	(0.000)
Tangible	−0.0531***	−0.1594***	−0.8677***	0.1487***
	(0.000)	(0.000)	(0.000)	(0.000)
Age	−0.0001***	−0.0011***	−0.0034***	0.0003***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.0088	0.1540***	0.5245***	0.1139***
	(0.171)	(0.000)	(0.000)	(0.000)
Year	Yes	Yes	Yes	Yes
Cluster	Yes	Yes	Yes	Yes
Observation	267,034	265,794	260,530	267,034
R-squared	0.012	0.002	0.014	0.222

Panel C: The second-stage regression (the listed company sample)

	ROS growth	TFP growth	Earnings growth	CFO growth	Leverage growth
State ownership	−0.0320	0.1379**	0.3104	0.0079	0.0145
	(0.583)	(0.028)	(0.108)	(0.854)	(0.583)
State ownership × Default	−1.8164***	−0.9810*	−3.1402*	−2.3239***	1.4716***
	(0.001)	(0.081)	(0.072)	(0.000)	(0.000)
Government quality	0.2228	0.6141	−2.1342	0.2352	−0.1688
	(0.755)	(0.422)	(0.366)	(0.654)	(0.602)
Government quality × Default	−26.0903***	−9.9753	−56.6162***	−11.9352***	13.4926***
	(0.000)	(0.113)	(0.004)	(0.006)	(0.000)

(continued on next page)

Table 6 (*continued*)

Panel C: The second-stage regression (the listed company sample)

	ROS growth	TFP growth	Earnings growth	CFO growth	Leverage growth
Default	−1.3680***	−0.6838***	−3.3206***	−0.2130***	0.3944***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Mill's ratio	0.0120**	0.0035	0.0453***	−0.0008	−0.0113***
	(0.022)	(0.528)	(0.009)	(0.833)	(0.000)
Size	−0.0217**	−0.0372***	−0.0162	0.0017	0.0051
	(0.016)	(0.000)	(0.586)	(0.802)	(0.214)
Leverage	0.2361***	0.2202***	0.3828**	0.0807**	−0.1189***
	(0.000)	(0.000)	(0.013)	(0.019)	(0.000)
Tangible	0.0864	−0.0754	1.0830**	0.2479**	−0.2681***
	(0.555)	(0.631)	(0.025)	(0.021)	(0.000)
Age	−0.0001	0.0093**	−0.0372***	−0.0040	−0.0043***
	(0.988)	(0.017)	(0.002)	(0.142)	(0.009)
Constant	0.1617	0.6950***	−1.2512*	−0.2723*	0.3112***
	(0.427)	(0.001)	(0.063)	(0.069)	(0.001)
Year	Yes	Yes	Yes	Yes	Yes
Cluster	Yes	Yes	Yes	Yes	Yes
Observation	4632	4545	4632	4632	4632
R-squared	0.136	0.037	0.095	0.018	0.081

* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

Once we consider the selection bias in the second-stage regression, we find that all of our original results hold, namely, the interaction terms between distress and institutional background that remain in the expected signs and are highly significant (Panels B and C of Table 6). The evidence again provides strong support for our argument that institutional background has a significant effect on distressed firms' performance and outcomes during distress.

4.3.2. Alternative definitions for distress

As mentioned in Section 3, to alleviate concerns that our results are reliant on the specific parameters that we use in the Altman Z-score methodology, we adopt two alternative measures (leverage and interest coverage) of financial distress. Leverage has the advantage of reflecting the indebtedness of a firm, which is related to the likelihood that a company will default. Interest coverage, on the other hand, better captures the cash flow side of a company's financial soundness.

The results in Table 7 suggest that our main findings hold when we use alternative definitions of distress. This confirms the robustness of our original analyses, which use the Altman Z-score approach to define distress.

4.3.3. Ownership change and firm behavior

We perform additional analyses to understand how different ownership structures influence distressed firm behavior. If distorted incentives and loose monitoring are responsible for the differences in the behavior and performances of distressed SOEs and private firms, we would expect that a change in ownership structure in a financially distressed firm should lead to changes in firm performance and recovery possibility. Thus, we construct a dummy variable “increase”, which equals one if a firm experiences an increase in private ownership, and zero otherwise. The results in Table 8 show that an increase in private ownership results in significantly better performance to companies in distress. Further, we find that an increase in private ownership can also lead to a greater likelihood of recovery and shorter recovery times for distressed companies, providing further support for our main findings.[11]

4.3.4. The role of financial development

We focus on ownership structure and government quality because we hypothesize that they are fundamental to the performance and recovery of distressed firms in China. In addition, we test a host of other institutional factors, in particular the extent of local financial development. Maskin and Xu (2001) and Sapienza (2004) report that banks play an important role in allocating resources and in monitoring debtors. Ayyagari et al. (2010) find that, despite China's weak financial system, banks play an important role in firm finance. Cull and Xu (2000) document that financial development aligns firm actions with market mechanisms by screening debtors and by making market-driven, instead of policy-driven, loans.

We adopt several variables to capture local financial market development, such as the short-term loans made to the non-state sector (including agricultural loans, loans to village/township enterprises, loans to private enterprises, and loans to

[11] We do not conduct the ownership change analysis for the listed company sample because there are too few cases of an increase in private ownership among the defaulted companies.

Table 7
Regression results based on alternative distress definitions. This table presents the regression results of alternative distress definitions for the NBS sample. The regressions of firm performance are based on firm-year observations from 1998 to 2005. The regressions of recovery possibility and recovery time are based on firm-level observations of distressed firms. Ordinary least squared, probit and tobit models are used when the firm performance, the recovery dummy, and the recovery time are the dependent variables, respectively. All of the variables are defined in Appendix IV. In particular, state ownership is the fraction of firm ownership held by the state. Government quality is the percentage of days in a year in a region that firms spend in dealing with government regulators. Distress is a dummy variable equal to one if a firm is classified as in distress in a given year as described in Appendix III, and zero otherwise. The values of Size, Leverage, Tangible, and Age are measured at the beginning of the year for the performance regressions, and at the beginning of distress for the recovery regression. Data are winsorized at the top and bottom 1%. Standard errors are clustered at the firm or region level. P-values are in parentheses.

	ROS growth	TFP growth	Earnings growth	Leverage growth	Recovery dummy	Recovery time
Panel A: Leverage as firm distress criterion						
State ownership	−0.0042***	0.0007	−0.1512***	0.0026***	−0.6275***	0.9453***
	(0.000)	(0.710)	(0.000)	(0.000)	(0.000)	(0.000)
State ownership × Distress	−0.0083*	−0.0227*	−0.0351	0.0509***		
	(0.055)	(0.084)	(0.567)	(0.000)		
Government quality	−0.1680***	0.1216	−3.6087***	0.2421***	−14.1291**	13.2017***
	(0.000)	(0.108)	(0.000)	(0.000)	(0.018)	(0.003)
Government quality × Distress	−0.4459*	−2.0230***	−4.3501*	0.9171***		
	(0.083)	(0.002)	(0.068)	(0.003)		
Distress	0.0151	0.1043***	−0.2435**	0.0209		
	(0.145)	(0.000)	(0.020)	(0.124)		
List	−0.0107***	−0.0211**	−0.0849**	−0.0206***	−0.2712	−1.0619
	(0.000)	(0.012)	(0.026)	(0.000)	(0.762)	(0.325)
Size	0.0005***	0.0008	−0.0033	−0.0001	−0.0900***	−0.0325
	(0.000)	(0.124)	(0.202)	(0.631)	(0.002)	(0.336)
Leverage	0.0268***	−0.0018	0.4067***	−0.1775***	−0.1605	0.6868***
	(0.000)	(0.594)	(0.000)	(0.000)	(0.231)	(0.000)
Tangible	−0.0435***	−0.1317***	−0.5120***	−0.0178***	−0.0987	1.5690*
	(0.000)	(0.000)	(0.000)	(0.003)	(0.860)	(0.081)
Age	−0.0001***	−0.0011***	−0.0041***	0.0005***	−0.0001	0.0009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.728)	(0.009)
Constant	0.0341***	0.1181***	0.9594***	0.1015***		0.0299
	(0.000)	(0.000)	(0.000)	(0.000)		(0.980)
Year	Yes	Yes	Yes	Yes	No	No
Cluster	By firm	By firm	By firm	By firm	By region	No
Observation	267,775	266,552	261,242	267,775	3391	3391
R-squared/log likelihood	0.006	0.002	0.006	0.088	−8812	−7223
Panel B: Interest coverage as firm distress criterion						
State ownership	−0.0023***	0.0055***	−0.0949***	0.0052***	−0.4208***	1.0274***
	(0.002)	(0.007)	(0.000)	(0.000)	(0.000)	(0.000)
State ownership × Distress	−0.0370***	−0.0090	−0.2725***	0.0324***		
	(0.000)	(0.176)	(0.000)	(0.000)		
Government quality	−0.3748***	0.0917	−3.6696***	0.2304***	−9.6608***	13.3395***
	(0.000)	(0.288)	(0.000)	(0.000)	(0.005)	(0.000)
Government quality × Distress	−0.5896**	−0.6494**	−4.7282**	0.8764***		
	(0.031)	(0.046)	(0.049)	(0.000)		
Distress	0.0119	−0.0084	−1.1953***	−0.0108		
	(0.269)	(0.524)	(0.000)	(0.152)		
List	−0.0133***	−0.0245***	−0.3935***	−0.0097	0.5730***	−1.2998**
	(0.002)	(0.006)	(0.000)	(0.430)	(0.002)	(0.030)
Size	0.0012***	0.0014***	0.0342***	−0.0005	0.0178	−0.0180
	(0.000)	(0.009)	(0.000)	(0.315)	(0.228)	(0.319)
Leverage	0.0266***	0.0133***	0.6105***	−0.1763***	−0.3140***	0.9648***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Tangible	−0.0384***	−0.1284***	−1.1141***	−0.0108	0.4264	−0.3200
	(0.000)	(0.000)	(0.000)	(0.184)	(0.118)	(0.488)
Age	−0.0001***	−0.0010***	−0.0038***	0.0006***	−0.0072***	0.0003
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.866)
Constant	0.0228**	0.1067***	1.1994***	0.0988***		2.3069***
	(0.041)	(0.000)	(0.000)	(0.000)		(0.000)
Year	Yes	Yes	Yes	Yes	No	No
Cluster	By firm	By firm	By firm	By firm	By region	No
Observation	240,742	239,559	234,332	240,742	12,107	12,107
R-squared/log likelihood	0.006	0.002	0.019	0.043	−51,853	−25,106

* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

foreign-owned enterprises) divided by total short-term loans in a region (Fan and Wang, 2003), and the fraction of deposits held by non-state-owned financial institutions (The Almanac of China Finance and Banking, 1998–2005). In an unreported regression analysis, we find that local financial development affects distressed firms' performance as we expect. However, these effects

Table 8
Regression results of ownership change. This table presents the regression results of ownership change for the NBS sample. The regressions of firm performance are based on firm-year observations from 1998 to 2005. The regressions of recovery possibility and time are based on firm-level observations of distressed firms. Ordinary least squared, probit, and tobit models are used when the firm performance, the recovery dummy, and the recovery time are the dependent variables, respectively. All of the variables are defined in Appendix IV. Increase is a dummy variable equal to one if the firm experiences an increase in private ownership, and zero otherwise. Z score is annually estimated following the model of Altman et al. (1995) as described in Appendix III. The values of Size, Leverage, Tangible, and Age are measured at the beginning of the year for the performance regressions, and at the beginning of distress for the recovery regression. Data are winsorized at the top and bottom 1%. Standard errors are clustered at the firm or region level. P-values are in parentheses.

	ROS growth	TFP growth	Earnings growth	Leverage growth	Recovery dummy	Recovery time
Increase	0.0024**	0.0077	0.0368*	−0.0068**	0.3546***	−0.3624***
	(0.027)	(0.134)	(0.095)	(0.021)	(0.000)	(0.007)
Increase × Z score	0.0003**	0.0011	0.0118***	−0.0012***		
	(0.035)	(0.100)	(0.000)	(0.004)		
Z score	−0.0021***	−0.0037***	−0.0581***	0.0229***		
	(0.000)	(0.000)	(0.000)	(0.000)		
List	−0.0118***	−0.0223***	−0.1607***	0.0008	1.3082***	−3.1321***
	(0.000)	(0.009)	(0.000)	(0.929)	(0.000)	(0.005)
Size	0.0007***	0.0010*	0.0047*	−0.0044***	−0.0889***	0.0941**
	(0.000)	(0.059)	(0.070)	(0.000)	(0.000)	(0.011)
Leverage	0.0462***	0.0328***	0.8710***	−0.4383***	−0.6302***	1.3445***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Tangible	−0.0552***	−0.1570***	−0.9454***	0.1463***	0.3161	−0.7289
	(0.000)	(0.000)	(0.000)	(0.000)	(0.391)	(0.387)
Age	−0.0001***	−0.0011***	−0.0053***	0.0002***	−0.0008	0.0016***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.252)	(0.002)
Constant	0.0074	0.1021***	0.4741***	0.3171***		1.4458
	(0.140)	(0.000)	(0.000)	(0.000)		(0.205)
Year	Yes	Yes	Yes	Yes	No	No
Cluster	By firm	By firm	By firm	By firm	By region	No
Observation	266,255	265,060	259,816	266,255	2608	2608
R-squared/Log likelihood	0.011	0.002	0.013	0.237	−9279	−5364

* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

become significantly weaker after we include the local government quality, partly because these financial development variables tend to correlate with the quality of government. Nevertheless, the government quality variable remains significant in the regression after we account for the effects of financial development.

4.3.5. SOEs versus private firms

An alternative and probably more straightforward way of comparing how institutional background influences firms with different ownership structures is by splitting the sample into sub-samples of SOEs and private firms and investigating how firms respond in distress. Our unreported results show that the results of government quality are retained in both the sub-samples. Further, in cross-equation F tests we find that the effect of government quality is significantly stronger for distressed private firms than for distressed SOEs, which is again consistent with our hypothesis that distressed private companies are more sensitive to discipline and adjust their operations accordingly.

5. Conclusions

We provide new evidence that the behavior of financially distressed firms are related to external institutional factors in China, the largest emerging market in which bankruptcy law is loosely enforced. We find that features of the institutional environment, such as ownership structure and government quality, heavily influence the decisions of firms in distress. Companies with higher state ownership and firms from areas with relatively poorer government effectiveness exhibit worse operating performance during periods of financial distress, and are less likely to eventually emerge from financial distress. These findings highlight the importance of institutional factors on behavior of firms in distress, which in turn may influence the availability of credit, interest rates, and firm capital structures. The Chinese example may shed light on our understanding of the policies of distressed firms in other emerging markets where weak institutions and lax contract enforcement are also prevalent.

There are several areas for future research. One natural extension of this study is to examine the effect of institutional background in different emerging markets. As in the work of Davydenko and Franks (2008), this line of research will take advantage of the cross-border variation in institutional environments and can extend the existing understanding about firm behavior across emerging markets. Second, our results show that local institutional background greatly modifies firm behavior, as firms adapt their decisions to make the best out of the existing legal system. These results suggest that future studies should concentrate on the details of various institutional backgrounds and how they shape corporate behavior. Finally, as laws and regulations constantly go through overhauls and revisions, our current study provides inspiration for future researches that investigate how banks and firms adapt to changes in institutional background.

Appendix I

Number of annual filed and accepted bankruptcy cases in China

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001
Number of cases filed	478	1156	1938	4400	5697	6206	5313	5255	7233
Number of cases accepted	69	98	142	370	400	n.a.	267	217	315

Source: The Law Year Book of China (1993–2001).

Appendix II. Introduction to distress resolution and outcomes in China

The following is a description of the 67 default cases from the listed company sample.

1. Bankruptcy
   Eleven defaulted firms filed for bankruptcy in court. Most bankruptcy cases were filed by creditors, and only one case was filed by the company itself. Because the Chinese government and court system favor reorganization as a distress resolution, not a single one of the eleven cases was liquidated by the end of our sample period.
2. Acquisition
   Examining the ownership information of the 67 default cases, we find that 49 firms (73.1%) changed their largest shareholders after defaulting. However, we lack the information required to identify whether these changes were the result of hostile acquisitions.
3. Distress resolution
   The defaulted companies use various restructuring methods to recover from distress, including selling assets, having creditors forgive the principal and/or interest, changing operating industry, converting debt to equity, using assets to pay off debts, payments by the largest shareholder, or payments by the government. Further, a single company may use multiple resolution methods. The following table gives the summary statistics for the distress resolution methods of the 67 defaulted firms.

Method	Number	Percentage
Sell assets	36	53.7%
Creditors forgive principal and interest	26	38.8%
Change industry	24	35.8%
Convert debt to equity	16	23.9%
Use assets to pay off debts	13	19.4%
Payment from the largest shareholder	10	14.9%
Payment from the government	2	3.0%

For the cases of forgiven debt, we collect the data and calculate the forgiving rate, equal to the amount of forgiven principal and interest divided by total debts. The summary statistics for the forgiving rate is presented in the following table. It shows that the average forgiving rate is 45.6% and the median value is 35%. Some firms get strong support from creditors who forgive almost all of the debts.

Variable	Obs.	Mean	Median	Std. Dev.	Min.	Max.
Forgiving rate	20	0.4562	0.3496	0.3198	0.0471	0.9783

Note: The number of observations is reduced because some companies do not disclose the data on forgiven loans.

Appendix III. The method for classifying distressed versus non-distressed firms

We use three different methods to define distressed and non-distressed firms in this study: 1) the Z-score for emerging market companies (Altman et al., 1995), 2) leverage, and 3) interest coverage.

1) With the Z-score approach, we follow Altman et al. (1995) in predicting the probability of a company going into distress. We use the following formula to calculate the Z score for a company in a year:

$$\text{Z score} = A \times 6.56 + B \times 3.26 + C \times 6.72 + D \times 1.05 + 3.25,$$

where A stands for working capital/total assets; B stands for retained earnings/total assets; C stands for operating income/total assets; and D stands for book value equity/total liabilities.

Following Altman et al. (1995), we define a company to be 'distressed' if its predicted Z score is below zero for two continuous years.

2) With the leverage approach, we define a company as 'distressed' if a company's leverage ratio (defined as the ratio of total liabilities to total assets) is greater than one for two continuous years.
3) With the interest coverage approach, we define a company as 'distressed' if a company's earnings before interest and tax payment (EBIT) are lower than its interest payment for two continuous years.

The following table compares distressed firm samples derived from three measures. The sample derived from the Z score is similar to that derived from the leverage method, accounting for about 10% of the total sample firms. The number of distressed firms classified by the interest coverage is relatively larger, equal to 30% of the total sample firms. Further, we check the overlap of the three methods for determining distressed firms. The number of distressed firms appearing in both the Z score and leverage distress samples is 2377, accounting for 65% of the Z score distress sample and 70% of the leverage distress sample, respectively. The number of distressed firms appearing in both the Z score and interest coverage distress samples is 2865. The number of distressed firms appearing in both the leverage and interest coverage distress samples is 2621. The statistics suggest that there is a significant overlap among the three distress samples.

	Z score	Leverage	Interest coverage
Number of distressed firms	3649	3391	12,107
Proportion of distressed firms	9.12%	8.48%	30.27%

Appendix IV

Variable description

Variable	Definition
Dependent variables	
ROS growth	The change of ROS, defined as $ROS_t - ROS_{t-1}$. ROS equals the net earnings divided by total sales.
TFP growth	The change of total factor productivity (TFP), defined as $TFP_t - TFP_{t-1}$. TFP is the estimated residual of a log-linear Cobb–Douglas production function for each industry and year. The output is the firm sales, and two input factors, labor and capital, are measured as the employee number and total fixed assets, respectively.
Earnings growth	The change of net earnings, defined as $(Earning_t - Earning_{t-1})$ / absolute value of $Earning_{t-1}$.
CFO growth	The change in operating cash flow (CFO), defined as $CFO_t - CFO_{t-1}$. CFO equals the operating cash flow divided by total sales.
Leverage growth	The change of leverage, defined as $Leverage_t - Leverage_{t-1}$. Leverage equals the total liabilities divided by total assets.
Recovery dummy	A dummy variable that equals one if a distressed firm emerges from financial distress by the end of the sample period, and zero otherwise.
Recovery time	The number of years from the time when a firm falls into distress to the time when a firm emerges from distress. For a firm that does not emerge from distress, it is the number of years between the year of falling in distress and the end of the sample period. For firms going in and out of distress repeatedly, we look at the last recovery.
Independent variables	
State ownership	The percentage of ownership by the state and state agencies.
Government quality	The percentage of days in a year that firms spend dealing with government regulators, including tax, public security, environmental protection, labor, and social security administrations (World Bank, 2006).
Increase	A dummy variable equal to one if a firm experiences an increase in private ownership, and zero otherwise.
Z score	The Z score annually estimated following the model of Altman et al. (1995) as described in Appendix III.
Default	A dummy variable equal to one if a firm has loan default in a given year, and zero otherwise.
Control variables	
List	A dummy variable equal to one if a firm is publicly listed, and zero otherwise.
Size	The natural logarithm of total assets.
Leverage	The ratio of liabilities to total assets.
Tangible	The ratio of tangible assets to total assets.
Age	The number of years that a firm has been in existence for the NBS sample, or the number of years that a firm has been listed for the listed company sample.
Industry	Industry dummy variables.
Year	Year dummy variables.

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