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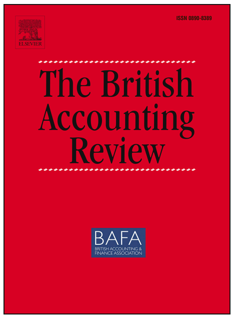

Institutional preferences, demand shocks and the distress anomaly

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Institutional preferences, demand shocks and the distress anomaly

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Abstract

Our paper examines the distress anomaly on the Chinese stock markets. We show that the anomaly disappears after controlling for institutional ownership. We propose two hypotheses. The growing scale of institutional investors and changes in institutional preferences can generate greater demand shocks for stocks with low distress risk than those with high distress risk, causing the former to outperform the latter. Consistent with our hypotheses, the growth of institutions explains the anomaly when the institutional market share increases rapidly. We also show that institutional preferences for stocks with low distress risk have significantly increased over time and changes in preferences also explain the anomaly. Finally, momentum trading and gradual incorporation of distress information cannot account for the anomaly.

Key words: institutional investors, institutional preferences, distress, the Chinese stock markets

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Abstract

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Key words: institutional investors, institutional preferences, distress, the Chinese equity markets

1. Introduction

Financial distress means the probability that firms fail to fulfill their financial obligations. If financial distress represents undiversifiable risk, investors should command high expected returns for bearing distress risk (e.g. Chan and Chen, 1991; Fama and French, 1996). The distress anomaly arises as distressed (i.e. high distress risk) stocks have lower future returns than safe (i.e. low distress risk) stocks (e.g. Dichev, 1998; Griffin and Lemmon, 2002; Campbell *et al.*, 2008). If individual investors like stocks with lottery-like payoffs that distressed stocks have, individual investors' preferences could give rise to the price of distressed stocks, resulting in low future returns (e.g. Markowitz, 1952; Tversky and Kahneman, 1992; Kumar, 2009; Barberis and Huang, 2008).[1] However, Conrad et *al.*, (2014) find that preferences for lottery-like stocks cannot fully explain away the distress anomaly on the U.S. markets. Instead, Campbell et *al.*, (2008) propose that when institutions generally prefer safe stocks and tend to purchase more safe stocks than distressed stocks in the institutional growth process, safe stocks will have higher valuations than distressed stocks. This paper investigates the conjecture of Campbell et al. (2008) whether institutional investors play a role in explaining the distress anomaly in the Chinese stock markets.

Institutions are fiduciaries to make investment decisions on behalf of other investors. Institutional investments are constrained by regulations (e.g. Prudent Man rules in the U.S. and the Institutional Fund Regulations in China[2]) aimed at preventing institutions from speculating other investors' money in highly risky stocks (e.g. Badrinath et al., 1996; Del Guercio, 1996). Large, liquid and fundamentally strong stocks are, therefore, attractive to institutions (e.g. Nofsinger and Sias, 1999; Gompers and Metrick, 2001; Griffin et al., 2003; Kumar, 2009; Choi and Sias, 2012). These institutionally preferred characteristics are shown to have negative correlations with the probability of default (e.g. Falkenstein, 1996; Campbell *et al.*, 2008), suggesting that institutions have a preference for low distress risk.

Campbell *et al.*, (2008) propose that the rising scale of institutional ownership on the market can raise the price (hence the contemporaneous returns) of institutionally preferred stocks. Specifically, institutions sell professionally managed funds to individual investors. When

[1] Chava and Purnandam (2010), George and Hwang (2010) and Garlappi and Yan (2011) argue that small-sample effects, the costs of financial distress and differences in shareholder recovery, respectively, cause the low returns for distressed stocks.

[2] www.gov.cn

institutions attract more funds from individuals, the market share of institutions will grow. The growth of the institutional share causes the overall market demand to shift towards the stocks preferred by institutions, thereby raising these stocks' prices. Consistent with the shift of the overall market demand, Gompers and Metrick (2001) find that growing institutional ownership associated with institutional preferences for large stocks in the U.S. forms demand shocks to increase returns for large stocks relative to small stocks, therefore eliminating the size premium. A similar institutional force can drive the distress anomaly. When institutions are growing fast, safe stocks that are preferred by institutions will have greater demand shocks than distressed stocks that are less preferred by institutions. These demand shocks could cause safe stocks to have higher contemporaneous returns than distressed stocks. We call this pricing mechanism the institutional growth hypothesis. In line with this institution-based explanation, Campbell *et al*., (2008) point out that the U.S. distress anomaly is concentrated in periods such as the late 1980s, when aggregate institutional ownership was growing rapidly.

The institutional growth hypothesis is based upon institutional preferences for stocks with low distress risk (i.e. the negative correlation between distress risk and institutional ownership). However, prior studies show that institutions' preferences may change over time. For instance, Bennett *et al*. (2003) find that institutional preferences in the U.S. have shifted from large stocks towards small stocks as institutions search for "greener pastures". If safe stocks have better past performance than distressed stocks, relative performance-chasing will also lead institutional holdings to tilt more towards safe stocks (e.g. Nofsinger and Sias, 1999; Chen et al., 2000; Barberis and Shleifer, 2003). In addition, when expected economic growth is negative, institutional investors may change their style investing by selling more distressed stocks than they do in normal times, representing an increasing aversion to distress risk (e.g. Shiller, 1984; 1989; Barberis and Shleifer, 2003; Froot and Teo, 2008). Changes in institutional preferences for safe stocks indicate that the negative relationship between institutional ownership and distress risk could exhibit different magnitudes over time.

We propose that *changes* in institutional distress-based preferences can also be a potential force to cause the anomaly. Specifically, when institutions gradually develop an increase (decrease) in their preferences for low (high) distress risk over time, stocks with low (high) distress risk would have positive (negative) demand shocks.[3] Safe stocks will have an upward price pressure raised by institutions relative to distressed stocks, generating positive differences in contemporaneous returns between safe and distressed stocks. We call this explanation the preference-change hypothesis. This hypothesis indicates that changes in distress-based preferences can be translated into increasing institutional demand for safe stocks and/or decreasing the demand for distressed stocks and it also predicts that institutional ownership (i.e. the fraction held by all institutions) in safe stocks over distressed stocks will increase in the future. That is, the relationship between distress risk and institutional ownership will be changing over time. Consistent with this changing relationship, Conrad et al., (2014) find that the U.S. institutional ownership in high distressed stocks increases slower than that of the median stock over the period of the strong growth of institutional investors, implying that U.S. institutions may have developed an increasing aversion to distressed stocks and/or an increasing preference for safe stocks. In this study, we examine two new explanations for the distress anomaly, namely the preference-change hypothesis and the institutional growth hypothesis. The two hypotheses are different on the channel through which institutional demand shocks are generated: from the growing market share or from changes in distress-based preferences.

The Chinese stock markets are an ideal case to study the role of institutions played in the distress anomaly. Firstly, Campbell *et al*., (2008) conjecture that the distress anomaly may be caused by the divergence between expected and realized returns for safe and distressed stocks due to specific events that occurred in the U.S.[4] Thus, an empirical test for the presence of the anomaly outside the U.S. is much needed. Secondly, the Chinese stock markets have a weaker legal environment than the U.S. markets (e.g. Allen *et al*., 2005; La Porta *et al.,* 1997; 2000). The lack of law enforcement can threaten shareholders' claims on bankrupted firms' residual assets, inducing institutions in China to have a stronger aversion to distress than those in the U.S.. Thirdly, the composition of market participants in China is different from that in the U.S.. Institutional investors hold more than 50% of total U.S. equity ownership, while institutional investors hold less than 30% of equity ownership in China (Benette *et al*.,

[3] Demand shocks can also be caused by different institutions "herding" into the same stocks at the same time (e.g. Nofsinger and Sias, 1999). However, the demand shocks here are fundamentally different, as they are identified by changes in preferences of aggregate institutions over time rather than the cross-sectional bunching of these changes.

[4] Chava and Purnanandam (2010) argue that the relationship between distress risk and expected returns is actually positive. However, the observed negative relationship between distress risk and realized returns is due to low realized returns on distressed stocks in the U.S. in the 1980s that were not anticipated by investors.

2003; Chen *et al*. 2007; Tang *et al*., 2012). Although the overall scale of institutional holdings in China is smaller than the U.S., the growth of the former is much faster than the latter. U.S. Institutional holdings increase from 28% to 51% during 1970 to 2004. In contrast, Chinese institutional holdings only take seven years (2000-2007) to grow from just over zero to more than 20%. The fast growth of institutional holdings is more likely to generate unexpected demand for the stocks that Chinese institutions prefer. Furthermore, institutions in China are younger and less experienced than U.S. peers in selecting stocks. When institutional investors improve their skills, their preferences for stock characteristics may incur changes over time. This contrasting backdrop raises the question whether institutions in emerging countries have similar preferences to those in developed markets. It is also interesting to know how the evolution of institutional preferences impacts stock prices.

Based on distress events in China,[5] we use dynamic panel logit models to estimate probabilities of distress as a proxy for distress risk. In our whole sample period from 2003 to 2012, we find that the distress anomaly is present in the Chinese equity markets, suggesting that the distress anomaly is not exclusive to the U.S. markets. We also find that the distress anomaly disappears after double sorting distress risk against the contemporaneous level of institutional ownership. This important evidence leads us to analyze the role of institutions played in the anomaly. We first examine whether institutions exhibit the growth in scale or incur changes in preferences. Our results support both. The market share of institutions has dramatically increased from 2003 to 2007, supporting the growth of institutions. But, the institutional share has declined from 2008 to 2012. We also find that the level of distress risk is negatively related to institutional ownership, consistent with our prior that institutional investors indeed prefer stocks with low distress risk. More importantly, the results show that institutional preferences have incurred significant changes over the whole sample period. Although institutional investors generally prefer growth and large stocks, institutions have increased their holdings of small and value stocks over time. As investing in small and value stocks can also stimulate institutions' intentions to reduce the exposure to distress risk, institutions increase their preferences for safe stocks (as well as liquid and less volatile stocks). Consistent with this, we find that distress risk can negatively predict future institutional demand, suggesting that institutions have gradually increased their holdings of safe stocks relative to distressed stocks over time.

[5] Section 2.2 provides more details.

Next, we decompose the level of institutional ownership into two components, namely lagged ownership to proxy for the demand shocks arising from growing institutional investors and changes in the ownership to proxy for the demand shocks generated by changes in preferences, in order to test which demand shocks are able to explain the distress anomaly. In portfolio analysis, the distress anomaly largely remains after controlling for lagged institutional ownership, while the anomaly has been completely eliminated after controlling for changes in institutional ownership in the whole sample period. Since institutions in China only experienced the strong growth over the period of 2003 to 2007, we further test the two hypotheses in two sub-periods (2003-2007 and 2008-2012). After controlling for lagged institutional ownership, the anomaly disappears in the earlier sub-period but remains in the later sub-period, consistent with the prediction of the institutional growth hypothesis. We also find that the outperformance of safe stocks over distress stocks becomes insignificant in both sub-periods after controlling for changes in institutional ownership, suggesting that the distress anomaly can be attributable to changes in institutional preferences. Our regression analysis renders very similar results to the portfolio analysis. In the whole sample period, changes in institutional ownership can subsume the predictive power of distress risk to returns, but lagged institutional ownership cannot. Furthermore, only in the earlier sub-period is lagged institutional ownership significantly positive and is able to subsume the predictive power of distress risk to returns. In contrast, changes in institutional ownership can subsume the negative relationship between distress risk and returns in both sub-periods. We also find that no distress anomaly is present in the stocks fully owned by individual investors. This finding is consistent with the U.S. evidence that individual investors and their preferences cannot completely explain away the distress anomaly (Conrad *et al*, 2014). Our further analysis shows that the magnitude of the distress anomaly is dependent on the degree of changes in distress-based preferences of institutions. The outperformance of safe stocks over distressed stocks is significantly positive only in quarters with a large increase in institutional preferences for stocks with low distress risk. In summary, our results suggest that changes in distress-based preferences and the growth of institutions are both responsible for the distress anomaly, while the former has a stronger impact on returns than the latter in our sample.

Finally, we test two alternative interpretations of our results. Specifically, we test whether changes in institutional ownership can be explained by institutional momentum trading or by institutional gradual incorporation of distress information (e.g. Choi and Sias, 2012). Firstly, we find that institutional investors do not increase their holdings of safe stocks relative to distressed stocks *following* the quarters in which safe stocks had the best performance. In contrast, an increase in the holding of safe stocks relative to distressed stocks occurs within the same quarters when safe stocks outperform the most. This provides less support for institutional momentum trading to explain the distress anomaly. Secondly, we find that the relationship between distress risk and institutional ownership is insignificantly different between the beginning and the end of each information period, inconsistent with the gradual incorporation of distress information. This evidence suggests that institutional investors have not significantly changed their holdings of safe and distressed stocks over the information period.

This study contributes to the literature in several ways. First, previous studies have documented the distress anomaly in the U.S., while this study is the first one, to the best of our knowledge, to report the anomaly in one of important emerging markets. Second, previous research reveals that institutions prefer large, liquid and fundamentally strong stocks. We discover another important institutional preference: institutions prefer stocks with low distress risk. Moreover, our evidence is consistent with the style investing model in which institutional preferences for one style over another affect asset prices (Chan et al., 2002; Barberis and Shleifer, 2003). Third, our study provides new insights into the causes of the distress anomaly. Although Campbell et al., (2008) propose that institutional preferences may play an important role in the distress anomaly, the relevant empirical test is scarce. We hypothesize demand shocks generated through two channels to explain the distress anomaly, namely the growth of institutions and changes in institutional distress-based preferences. Our empirical results support the above institutional forces to drive the distress anomaly and validate the conjecture of Campbell et al., (2008). Despite of using sample stocks from an emerging market, our study has important implications for the distress anomaly in developed markets (e.g., the U.S.). Specifically, the disappearance of the size premium in the U.S. is due to demand shocks arising from growing institutions with their preferences for large stocks (Gompers and Metrick, 2001). The same institutional force is also likely to drive the distress anomaly if institutions have a preference for safe stocks. In addition, changes in institutional preferences in emerging markets, which are documented in this study, are very likely to occur in developed markets. Barberis and Shleifer (2003) model investment style to follow a specific life cycle, suggesting that styles based on distress risk can also change over time.

Bennett *et al*. (2003) discover that U.S. institutional investors shifted their investing preferences from large and growth stocks to small and value stocks from 1980s to 1990s. This changing pattern of institutional preferences may lead U.S. institutions to have a greater need to reduce distress risk if small and value stocks are perceived to be risky. Thus, institutional forces can change the price of safe and distressed stocks in developed markets as well as in our sample. Finally, in previous studies on the distress anomaly, a low level of institutional ownership is used as a proxy for high market frictions, which prevent the anomaly from being arbitraged away by sophisticated investors (e.g., Nagel, 2005; Campbell *et al*., 2008; Conrad *et al*., 2014). Our findings of no distress anomaly in stocks fully owned by individuals are inconsistent with this limit-to-arbitrage based explanation. Our findings suggest that the demand pressure associated with preferences of sophisticated investors and changes in their preferences drives the distress anomaly. In this respect, we provide new explanations why the anomaly cannot be arbitraged away.

The paper is organized as follows. The next section presents data and estimating distress risk. The empirical results are provided in section three and section four presents the conclusions.

2. Data and distress risk estimation

Our sample stocks include non-financial firms that have A-shares listed on the main boards of the Shanghai and the Shenzhen stock exchanges. Market and accounting information for the sample stocks is downloaded from the China Stock Market & Accounting Research (CSMAR) database provided by the GTA Information Technology. The sample period covers years from 1998 to 2012. We extract quarterly information on institutional ownership available for all sample stocks from *CSMAR* for the period from Q1: 2003 to Q4: 2012. As the frequency of the filings of institutional ownership is quarterly, we assume that the ownership in stocks stays constant during the months of a quarter in our monthly-based analysis. There are eight types of institutional investors on the Chinese stock markets, namely mutual funds, securities firms, qualified foreign institutional investors (*QFII*), insurance firms, trusts, pension funds, private equities, and others (including firm annuities, finance companies, banks and non-finance companies). In empirical analysis, we use institutional ownership (*IO*) on stock level, which is the percentage of a firm's tradable A-shares owned by all institutional investors to the firm's total tradable A-shares.[6] Thus, we assume that a giant fund including all institutional investors has ownerships in the stock.

The Chinese stock markets operate the special treatment program (ST) for firms near distress. In general, a listed firm will have an "ST" tag in front of its trading name assigned by the Shanghai and Shenzhen exchanges if the firm meets one of three conditions: (i) continuous financial losses in last two fiscal years; (ii) the firm's total market capitalization lower than its registered capital (i.e. the par value of shares); (iii) terminated business operations that cannot be restored in three months due to natural disasters, serious production accidents, or filed lawsuits (or arbitration) with amounts more than 50% of the firm's net asset value. The three categories generalize distress circumstances that are consistent with the findings of Altman (2006).[7]

In the sample period, we have a total of 545 ST cases.[8] Most of them are triggered by corporate events leading to weak financial conditions including significant losses in two consecutive years and negative book equity values (467 cases), extraordinary losses in the prior year and operational suspensions (15 cases), bankruptcy filings (6 cases), significant losses occurred in financial investments and loan guarantees (5 cases), and lawsuits against loan obligations or loan guarantees (10 cases). The remaining cases (42) are caused by delays in publishing financial reports, failures to rectify material accounting errors or false accounting records before mandatory dates, and auditors' disclaimer of opinion or auditors' negative opinions on firms with material misstatement. Overall, the 545 ST cases indicate that ST tagged firms are in distress. Since ST tags assigned by the exchanges are also public

[6] In addition to tradable A-shares, many stocks also have non-tradable A-shares during our sample period. Prior to 2005, non-tradable shares which were mostly held by the state and legal persons cannot be traded freely in the stock markets (e.g. Li *et al*. 2011). Since 2005, the Split Share Structure Reform in China started to gradually convert these restricted shares to tradable shares, resulting in an increase in the total tradable shares on the market. As non-tradable shares cannot be traded by institutions, they cannot generate the demand shock that changes the price of stocks with different levels of distress risk. Therefore, in this paper, we measure IO by the institutional holdings of tradable A-shares over the number of total tradable A-shares outstanding rather than the number of total A-shares outstanding, which include the non-tradable shares. All of our conclusions remain unchanged when we use the number of total A-shares outstanding to scale institutionally owned shares.

[7] Altman (2006, pp.4-8) argues that unsuccessful and distressed business enterprises can result in various states including failure, insolvency, default and bankruptcy, while bankruptcy is the worst consequence of corporate distress. Default businesses in most cases are able to avoid formal bankruptcy filing by negotiating with creditors (Gilson *et al*., 1990; Gilson, 1997).

[8] Appendix 1 provides a summary on all ST cases in our sample period.

warning signals for investors before making investment decisions on distressed stocks, the probability of ST is a good proxy for distress risk in the context of the Chinese stock markets.

Following Ohlsen (1980), Shumway (2001) and Campbell *et al*. (2008), we adopt a dynamic panel logit model to estimate the probability of distress (*PD*). Specifically, the dependent variable is a dummy that equals one in year *t* when a firm is tagged with ST, and zero otherwise. As ST events in year *t* are based on the released annual report of year *t-1*, we lag accounting variables (i.e. the independent variables) by one more year (i.e., year *t-2*) to predict ST events in year *t*. We specify distress prediction models in the following procedures. First, we use the accounting variables proposed by Ohlson (1980), namely total assets (*TA*), total liabilities to total assets (*TLTA*), working capital to total assets (*WCTA*), current liabilities to total assets (*CLCA*), net income to total assets (*NITA*), funds from operations to total liabilities (*FUTL*) and changes in net income (*CHIN*).[9] Preliminary results indicate that the size variable *TA* and the liquidity variables *WCTA* and *CLCA* are not statistically significant in predicting the distress events. Therefore, we exclude *TA*, *WCTA* and *CLCA* in the logit regression. Second, we find that cash and short-term assets to the total assets (*CASHTA*) suggested by Campbell *et al*. (2008) and sales to total assets (*SALETA*) used by Altman (1968) are statistically significant in the distress prediction model. We include these two additional variables, resulting in a total of six variables (i.e. *TLTA*, *NITA, FUTL*, *CHIN*, *SALETA*, and *CASHTA*) in the prediction model. Table 1 reports the results.

[Insert Table 1 about here]

Table 1 provides four specifications for the distress prediction models as the availability of accounting information is different across the sample years. For example, the information on *FUTL* is available from 1998 onwards while *CASHTA* is available from 1998 until 2007. In the four specifications all the variables are significant with the expected signs. Specifically, the significantly negative signs on *FUTL* and *CASHTA* indicate that firms with more funds from operations and short-term assets are less likely to be ST firms. The leverage variable (*TLTA*) shows that a high level of debts leads to high distress risk. Operational performance variables including *NITA*, *CHIN* and *SALETA* have significantly negative relationships with

[9]See Ohlsen (1980) for details on these variables' definitions. We exclude two dummy variables used by Ohlson (1980). The two dummy variables are OENEG, which equals to one if the net worth of the firm is negative, and INTWO, which equals to one if net incomes are negative in the last two years. These two financial conditions have already been specified in the ST criteria.

distress risk, indicating that firms with better operational performance have low distress risk. In Panel B, we report each model's sensitivity and specificity ratios related to the power of prediction. The sensitivity ratio indicates the probability that the model can correctly predict an ST case, while the specificity ratio measures the probability that the model can correctly predict a non-ST case. The results show that our models can achieve more than 80% rate to predict ST and non-ST cases. For each year from 1998 to 2012, we calculate the probability of ST (i.e., *PD*) for each stock by using one of the models dependent on the availability of historical accounting information.[10]

3. Empirical results

3.1 Indentifying the distress anomaly

We use estimated *PD* to construct distress-based portfolios. At the beginning of each year, we sort all sample stocks into decile portfolios according to a firm's *PD*. The decile portfolios are rebalanced each year from 2003 to 2012 and we calculate monthly returns to each decile portfolio between January and December of the year.[11] Differences in returns between the bottom and the top decile portfolios are defined as the distress premium. The time-series returns then are regressed on the Fama-French-Carhart (Fama and French, 1993; 1996; Carhart, 1997) four-factor model (FF-4F) to obtain risk-adjusted returns. Table 2 shows the results with Panel A for value-weighted returns and Panel B for equally weighted returns.[12] Panel C reports characteristics for each distress decile portfolio.

[Insert Table 2 about here]

[10]For example, we use model 2 to estimate PD in 1998 and 1999 as FUTL is not available before 1998. Similarly, we use model 4 to estimate PD in post-2009 as CASHTA is only available until 2007. In other sample years, the ST probabilities are estimated using model 3, which include all six accounting variables. For every year, the ST risk prediction use only available historically available data to eliminate look-ahead bias.

[11]The analysis of the distress puzzle starts from 2003 in which the data of institutional ownership is available. The results based on the early sample years are available upon request.

[12]In untabulated results, we find that there is abnormal market performance in the calendar months of the Chinese New Year in China. During the ten-year period (2003 to 2012), the Chinese New Year falls in January four times and in February six times. The value-weighted market return in the months of the Chinese New Year is 7.54% while the return outside the months of the Chinese New Year is only 0.48%. Furthermore, the market return in months of the Chinese New Year is 4.02% higher than the market return in January and 1.92% higher than the market return in February, suggesting that abnormally high returns in months of the Chinese New Year are neither January nor February effect. To control for these abnormally high returns, we exclude the months of the Chinese New Year in our monthly return calculation. However, our conclusions do not change when we include all calendar months.

The first row in Panel A shows that, for the value-weighted returns, the bottom and the top distress decile portfolios have monthly returns of 1.04% and -0.37%, respectively. The distress premium is 1.41% per month with *t*-statistics 2.37. In terms of risk-adjusted returns, the least and the most distressed portfolios have monthly returns of 0.76% and -1.06%, respectively, resulting in a return of 1.82% per month for the distress premium. Panel B shows equally weighted returns for the decile portfolios. The raw and risk-adjusted distress premiums are both significantly positive, suggesting that FF-4F risk adjustments are unable to explain the distress premium.[13]

In Panel C, we show each distress portfolio's characteristics. These characteristics are calculated from the time-series averages of cross-sectional means for each portfolio (Appendix A2 provides details on characteristic variables). By construction, *PD* increases monotonically across the portfolios. The bottom portfolio has the contemporaneous level of *IO* of 16.41%, while the level of *IO* is only 2.87% for the top portfolio. In addition, the level of *IO* decreases across the decile portfolios, implying the negative relationship between *IO* and *PD*. This evidence also suggests that institutional investors may have preferences to hold low distressed stocks. In the second row, the results show that on average the most distressed stocks are nearly three times smaller than the least distressed stocks in terms of market capitalization (i.e., 2.21 against 7.00). In addition, the least distressed stocks tend to be growth stocks with the lowest book to market ratios (*BTM*) of 0.41. But the top decile portfolio's *BTM* is 0.47 very similar to other portfolios. This is inconsistent with the notion that *BTM* is a proxy for distress risk (e.g. Fama and French, 1993; 1996).[14] In following rows, we report each portfolio's volatility, return skewness and past performance. We find that returns to the most distressed stocks are generally more volatile than the least distressed stocks (i.e. 3.41% against 2.95%). In addition, returns to the least distressed stocks are more skewed than the most distressed stocks (i.e. 0.24 against 0.16). This evidence contrasts with the U.S. finding that distressed stocks are more positively skewed than safe stocks (e.g. Campbell *et al*., 2008; Conrad *et al*., 2014), implying that distressed stocks are less likely to have a lottery-like feature in the Chinese stock markets. In terms of past returns, the most distressed stocks are recent losers. However, the rest of the portfolios have similar past

[13] The distress premium is also robust to transaction costs.

[14] Griffin and Lemmon (2002) disagree with BTM as a proxy for distress risk and they show that there is a non-linear relationship between distress and BTM. Our results here seem to be consistent with Griffin and Lemmon (2002).

12-month returns. The last two rows reveal two aspects of liquidity, namely the price impact (Amihud, 2002) and trading speed measured by a share's turnover ratio in the past 12 months. The least distressed stocks are more liquid than the most distressed stocks in terms of the liquidity measure of price impact. In contrast, the most distressed stocks have a higher share turnover ratio than the least distressed stocks (i.e. 2.67% against 1.95%), consistent with the findings of Da and Gao (2010). Overall, the results show the presence of the distress anomaly in China and also imply that institutional ownership has a close relationship with distress risk.

3.2 Resolving the distress anomaly

To investigate the relation between distress anomaly and institutional ownership, we independently sort the sample stocks into quintile portfolios based on *IO* and *PD*. This double-sorting procedure generates 25 *IO-PD* based portfolios. Since each stock's *IO* is reported on a quarterly basis, the 25 portfolios are rebalanced quarterly. The results are reported in Table 3.

[Insert Table 3 about here]

Panel A reports the number of stocks in each portfolio. In the fifth *IO* quintile only 16 stocks belong to the most distressed portfolio while 84 stocks belong to the least distressed portfolio. In contrast, in the first *IO* quintile 100 stocks fall in the category of the highest *PD* and 41 stocks fall in the category of the lowest *PD*. Panel B shows the percentage of *PD* for each portfolio. The highest *PD* (19.79%) appears in the first IO quintile. These results indicate a negative relationship between *IO* and *PD*, consistent with our prior that institutional investors have a strong aversion to distressed stocks.

For each given *IO* category, we calculate the distress premium as differences in returns between the lowest and the highest *PD* quintile portfolios. Each column in Panel C and D displays the equally weighted and value-weighted distress premiums within each *IO* group. In the last row, we report the *p*-value of the *GRS* test (Gibbons *et al*., 1989) with the null hypothesis that the five risk-adjusted premiums across *IO* quintiles are jointly equal to zero. In Panel C, the results show that distressed stocks have significantly higher returns than safe stocks in the third, the fourth and the fifth *IO* quintiles, suggesting that distress risk is priced in these portfolios. With the *p*-value of the *GRS* test near to zero, we can reject the null hypothesis that the five risk-adjusted distress premiums are jointly equal to zero. In Panel D, the five value-weighted distress premiums are all insignificantly different from zero across the five *IO* quintiles. The *GRS* test fails to reject the null hypothesis that the five risk-adjusted premiums are jointly equal to zero. Collectively, these results indicate that the distress anomaly disappears after controlling for the contemporaneous level of *IO*, suggesting that institutional investors play an important role in explaining the distress anomaly.

3.3 Institutional growth and institutional preferences

In this section, we examine whether institutions exhibit the growth in scale or incur changes in preferences, which are two key characteristics underlying the institutional growth hypothesis and the preference-change hypothesis.

3.3.1 The growth of institutional investors

[Insert Table 4 about here]

Table 4 reports averaged *IO* across the first quarter to the last quarter in each sample year from 2003 to 2012. Panel A and B show the percentage of *IO* and the percentage of market capitalization held by eight groups of institutional investors, respectively. Institutional investors begin to hold only 1.88% of tradable shares in 2003. Since then, the overall institutional ownership experiences the strong growth and reaches the peak of 11.46% in 2007. In following years, the institutional ownership gradually declines, ending up with 7.88% of total tradable shares in 2012. Panel A also shows that mutual funds' holdings represent the largest share on the markets compared with the other seven groups of institutional investors. Panel B shows the proportion of market value owned by institutions. The percentage numbers are larger than those reported in Panel A, suggesting that institutional holdings tilt towards large stocks (i.e., preferences for large stocks). Panel B also shows that the market value of the institutional share dramatically increases from 2003 (4.63%) to 2007 (22.36%). Since 2008, institutions have incurred a decline of the market share. The results in Panel A and B suggest that the institutional growth may play a role in the distress anomaly only in the earlier sub-period (2003-2007). When institutions have preferences for stocks with low distress, the fast growth of institutions over that period may generate demand shocks to shift the overall market demand to safe stocks. These demand shocks can drive safe stocks' valuations higher than distressed stocks (e.g. Gompers and Metrick, 2001; Campbell et al., 2008).

3.3.2 Institutional preferences

Next, we turn our attention to the issue whether institutions experience any change in distress-based preferences. This change suggests that the negative relationship between distress risk and *IO* may exhibit different magnitudes over time. To test this, we regress *IO* on the level of distress risk (*PD*) and other stock characteristics including size, book-to-market, turnover, illiquidity, price, momentum, skewness and volatility, which are well-known determinants for *IO* (e.g. Grinblatt and Titman, 1989; Gompers and Metrick, 2001; Yan and Zhang, 2009) (see Appendix 2 for details). Following Bennett et al., (2003), we estimate quarterly cross-sectional Fama-MacBeth (1973) regressions with standardized variables to eliminate the impact of scale changes in variables (e.g. changes in the overall share of institutional investors over time) on estimated coefficients. Specifically, each firm's characteristic is subtracted by the cross-sectional mean and divided by the cross-sectional standard deviation in each quarter. Coefficients estimated by standardized regressions are scale free and allow us to compare coefficients on each variable across different sub-periods. Panel A in Table 5 reports the results.

[Insert Table 5 about here]

The first row in Panel A reports the results over the entire sample period. We find that *IO* is significantly and negatively related to *PD*. This result confirms our prior that investors have preferences for stocks with low distress risk[15]. We also find that large, high price, and growth stocks are attractive to institutional investors, consistent with institutional preferences documented in the U.S. markets (e.g. Gompers and Metrick, 2001; Bennett *et al*., 2003; Kumar, 2009; Conrad *et al*., 2014). The negative coefficient on turnover implies that institutions have a strong aversion to stocks with high turnover. The positive coefficient on momentum suggests that institutions are positive feedback traders.

To examine whether institutional preferences have changed over time, in rows (2) to (5) we partition the analysis into four 2.5-year (i.e. 10 quarters) sub-periods. Our main interest is of the coefficient on PD across the four sub-periods. The coefficient on PD is significantly positive in the first sub-period and becomes significantly negative in following three

[15] In addition, these preferences are present across almost all types of institutional investors in our sample and are not driven by any particular dominating investors (e.g. mutual funds). These results are available upon request.

sub-periods. Across the four sub-periods, the coefficients monotonically decrease. We also find that differences in the coefficient on PD between the first, the second and the third sub-periods are statistically significant (in the untabulated results). Changes in the sign and the magnitude of the coefficient indicate that institutions have changed their distress-based preferences by increasing their holdings of safe stocks relative to distressed stocks. This finding is consistent with our hypothesis that institutional preferences for stocks with low distress risk are increasing over time[16]. This result is also consistent with the US evidence documented in Conrad et al., (2014). They find that institutional ownership in the median firm increases (due to the strong growth of institutions in the U.S.) faster than that of high distressed stocks, implying that institutions increase their aversion to distress risk.

The following columns provide the results for other institutional preferences across the four sub-periods. The coefficient on BTM is negative in the first two sub-periods and is positive in the last two sub-periods, suggesting that institutions have shifted their preferences from growth stocks to value stocks. The variable of size has a positive coefficient, while the magnitude of this coefficient declines sharply from 0.410 in the first sub-period to 0.105 in the last sub-period (and the difference of 0.305 is highly significant in the untabulated results). This evidence implies that institutions exhibit a weaker preference for large stocks in the most recent sub-period than in the first sub-period. The results also show that institutions have changed their liquidity-based preferences for holding more stocks with low turnover, high liquidity, and high-price from the first sub-period to the third sub-period. However, the preference for positive feedback trading does not incur any change as the coefficient on momentum is positive across the four sub-periods. The variable of skewness has a significant negative coefficient in the first sub-period and the coefficient turns to be significantly positive in the third sub-period, implying that institutions incur a weak change in preferences for skewness. The significant and negative relationship between IO and volatility in the last two sub-periods suggests that institutions increase their preferences for stocks with low volatility.

Finally, in row (6) we compare coefficients on each variable between the first two sub-periods and the last two sub-periods to test changes in institutional preferences over the

[16] We also find that changes in institutional distress-based preferences are a pervasive phenomenon across different types of institutional investors and are not confined to any one particular group of institutional investors over time. These results are available upon request.

whole sample period. Similar to previous results, institutional preferences have shifted to low distress, high liquid and low volatility stocks, while institutional holdings move away from large and growth stocks. These changes in institutional preferences might not be a coincidence. Although institutions have historical preferences for large and growth stocks, their preferences have shifted to small and value stocks to exploit informational advantages (e.g. Bennett *et al*., 2003). As small and value stocks are perceived to be risky, institutions have significantly increased their preferences for stocks with low risk including low distress risk, low liquidity risk and low total risk.

3.3.3 Distress risk and institutional demand

Consistent with changes in distress-based preferences, the relationship between *PD* and *IO* becomes more negative over time. This evidence indicates that institutions have raised their holdings of safe stocks relative to distressed stocks. This reallocation of institutional funds implies that the level of distress risk can negatively predict subsequent change of institutional holding.[17] Alternatively, as the level of *IO* represents institutional preferences, changes in levels of *IO* can indicate a change in preferences. Increasing preferences for low distress risk over time suggests that distress risk would have a negative relationship with future changes in levels of *IO* (i.e., subsequent institutional demand).

We use two measures for subsequent institutional demand, which are derived from a raw measure of changes in institutional ownership, to control for market-wide influences. The raw measure of *ΔIO* takes the difference of institutional ownership on a stock *i* from quarter *q-1* to quarter *q* (i.e., $\Delta IO_{i,q} = IO_{i,q} - IO_{i,q-1}$). Firstly, when institutional investors have attracted more funds from individuals, institutions have to buy more stocks for investment. Hence, the institutional demand measured by *ΔIO* is likely to represent the mixed effect of the rising scale of institutions on the market and changes in institutions' own preferences. To control for the impact of growing institutions on institutional holding[18], we use changes in standardized institutional ownership (i.e., *ΔSIO*) to proxy for changes in institutional preferences. We define *ΔSIO* as follows.

[17] Since institutional investors' change of holdings can also be motivated by reasons other than changes in preferences. In section 3.5, we explore whether change of holdings motivated by other reasons can explain the distress anomaly.
[18] Our conclusions remain if we use ΔIO instead of *ΔSIO* to measure institutional demand.

$$\Delta SIO_{i,q} = \frac{IO_{i,q} - \overline{IO_q}}{\sigma IO_q} - \frac{IO_{i,q-1} - \overline{IO_{q-1}}}{\sigma IO_{q-1}} \quad (1)$$

$\overline{IO_q}$ and $\overline{IO_{q-1}}$ are the average of institutional ownership for all sample stocks in quarters q and $q-1$, respectively. σIO_q and σIO_{q-1} are standard deviations of institutional ownership for all sample stocks in quarters q and $q-1$, respectively.

Secondly, the raw measure of *ΔIO* can be positively correlated with market capitalization and initial institutional ownership. Sias (2007) and Choi and Sias (2012) find that institutions are more likely to hold large stocks, suggesting a positive relationship between the level of *IO* and firm size. We have similar findings shown in Table 4. Following Sias (2007) and Choi and Sias (2012), we compute our second measure of institutional demand: the adjusted *ΔIO* (i.e., *Adj_ΔIO*). The adjusted *ΔIO* is the change in the fraction of tradable shares held by institutions for stock i in quarter q less the average quarter q change for stocks within the same capitalization quintile (Q) divided by the cross-sectional mean fraction of tradable shares held by institutions in that quarter for stocks within the same capitalization quintile as specified in Equation (2). *Adj_ΔIO* measures the abnormal change in institutional ownership compared to similar-sized stocks.

$$Adj\_\Delta IO_{i,q} = \frac{\Delta IO_{i,q} - \overline{\Delta IO_{i\in Q,q}}}{\overline{IO_{i\in Q,q}}} \quad (2)$$

We regress *ΔSIO* and *Adj_ΔIO*, on firm characteristics, respectively. Panel B in Table 5 report results. The first two rows in Panel B show that the level of distress risk (*PD*) negatively and significantly predicts subsequent institutional demand in the next quarter.[19] This evidence suggests that institutions tend to reduce (increase) their holdings of a stock that has a high (low) level of distress risk during our sample period. This is consistent with the hypothesis that the institutional investors have increased (decreased) their preferences for stocks with low (high) distress risk. Furthermore, changes in distress-based preferences can cause demand shocks which may occur over many quarters, suggesting that the predictive power of *PD* to future institutional demand should go beyond one quarter. Consistent with

[19] The level of distress risk is a prediction variable and is of our main interest in this study. We do not test how institutional investors will react to *changes* in distress risk, which has already documented in previous studies (e.g. Conrad et al., 2014)

this, the results in rows (3)-(5) show that *PD* also predicts subsequent institutional demand in the next two, four, and eight quarters. The coefficient on *PD* is larger (in absolute value) when a prediction horizon becomes longer, implying that changes in distress-based preferences of institutions are persistent over time.[20]

3.4 Testing the institutional growth hypothesis and the preference-change hypothesis

Our previous results show that the growth of institutions and changes in institutional preferences are both present on the Chinese equity markets. In this section, we decompose the level of *IO* into two components including lagged *IO* and changes of *IO* to examine whether the institutional growth hypothesis or the preference-change hypothesis can explain the distress anomaly. The two hypotheses are the key for us to understand the distress anomaly.

Under the institutional growth hypothesis, the growth of the institutional market share generates demand shocks for institutionally preferred stocks giving rise to their prices. Specifically, when the institutional market share increases, the size of demand shocks should be dependent on the degree of institutional preferences. That is, stocks with high levels of *IO* in quarter *t-1* would have greater demand shocks in quarter *t*. Thus, the level of *IO* in quarter *t-1* can be a proxy for demand shocks in quarter *t*. If the institutional growth hypothesis holds, we expect that lagged *IO* proxied for demand shocks induced by growing institutions explains away the distress anomaly. In contrast, if institutional preferences change, cross-sectional *IO* levels in quarter *t-1* will be less informative about institutions' new preferences. Instead, cross-sectional *IO* levels in quarter *t* should reflect the new preferences. In this case, changes in *IO* levels from quarter *t-1* to quarter *t* can be a proxy for changes in preferences. Under the preference-change hypothesis, we expect the distress anomaly to disappear after controlling for *ΔSIO* or *Adj_ΔIO*.[21]As we discussed before, our measures of *ΔSIO* and *Adj_ΔIO* have advantages over the raw measure of changes in *IO* (i.e. *ΔIO*).

3.4.1. Portfolio analysis

[Insert Table 6 and 7 about here]

[20] Please note that the coefficients on momentum in Panel B of Table 5 are not significantly positive suggesting that it is not the past performance of the stock returns that has caused the demand shock.
[21]The results remain if the raw *ΔIO* is used in this double sorting portfolio analysis. These results are available upon request.

We undertake the portfolio approach to double sorting lagged *IO*, *ΔSIO* and *Adj_ΔIO* against *PD*, respectively, for the whole sample period (2003-2012). The sorting procedure is the same as in the section 3.2. Table 6 reports the results. Panel A, B and C are for the lagged *IO*, *ΔSIO* and *Adj_ΔIO* respectively. Panel A-1 shows that the distress premium is significantly positive in the first, the fourth and the fifth lagged *IO* quintiles. The three distress premiums remain significantly positive after adjusting risk factors. In Panel A-2, two out of the five premiums are significantly positive in both raw and risk-adjusted returns. The two *p*-values of the *GRS* test in Panel A-1 and A-2 are near to zero, suggesting that we can reject the null hypothesis that the distress premiums across lagged *IO* quintiles are jointly equal to zero. These results imply that the distress premium is still present after controlling for lagged IO. Panel B report the results based on double sorting *ΔSIO* and *PD*. For each level of distress risk, portfolio returns monotonically increase across *ΔSIO* quintiles. In the highest *ΔSIO* quintile, the five portfolios across different levels of distress all have high returns above 3% per month. This result suggests that *ΔSIO* may have a large impact on stock prices. More importantly, Panel B-1 shows that none of the distress premiums is significantly different from zero across *ΔSIO* quintiles. The *p*-value of the *GRS* test is 0.35, suggesting that we cannot reject the hypothesis that the five premiums are jointly equal to zero. In Panel B-2, on a value-weighted basis, the five distress premiums in raw and risk-adjusted returns are all insignificant. Consistent with this, Panel C-1 and Panel C-2 show that raw and risk-adjusted distress premiums are insignificant across each *Adj_ΔIO* quintile. Our primary results reveal that changes in *IO* rather than lagged *IO* are able to explain the negative relationship between *PD* and returns in the whole sample period, consistent with our preference-change hypothesis.

However, institutions in China experienced the strong growth from 2003 to 2007. Can this growth be responsible for the distress anomaly over that particular sub-period? To answer this question, we repeat the analysis by separating the whole sample period into the earlier (2003-2007) and the later (2008-2012) sub-periods. Table 7 provides the results. To save space, we only report the distress premium across lagged *IO*, *ΔSIO* and *Adj_ΔIO* quintiles, respectively. In the earlier sub-period, the five distress premiums across lagged *IO* quintiles are insignificantly different from zero in terms of equally weighted returns. The *p*-value for the *GRS* test is 0.25, suggesting that we cannot reject the null hypothesis of the risk-adjusted premiums being jointly equal to zero. In terms of raw value-weighted returns, the premium within the first lagged *IO* quintile is significant but becomes insignificant after risk adjustments. The *p*-value of 0.28 for the *GRS* test suggests that these risk-adjusted premiums are jointly indifferent from zero. In the later sub-period, the two distress premiums in equally weighted risk-adjusted returns and the three premiums in value-weighted risk returns are significantly positive. The low *p*-values of the *GRS* test (i.e. 0.05 and 0.03) suggest that we can reject the null hypothesis of the five distress premiums being jointly equal to zero. These contrasting results imply that lagged *IO* can explain the distress anomaly only in the earlier sub-period, consistent with the institutional growth hypothesis. In following rows, we report the distress premium conditional on *ΔSIO* and *Adj_ΔIO*. The results show that the distress premiums are individually and jointly insignificant across *ΔSIO* and *Adj_ΔIO* quintiles in the earlier and the later sub-periods. The evidence suggests that changes in *IO* explain the distress anomaly in both sub-periods. Overall, the institutional growth hypothesis and the preference-change hypothesis both explain the distress anomaly in the earlier sub-period, while the latter has stronger explanatory power for returns than the former in the whole sample period.

Our results contrast sharply with the findings of Campbell *et al*., (2008). They find that the distress premium is present only in stocks with a low level of *IO*, consistent with the limit-to-arbitrage explanation. Stocks with no (or less) institutional ownership have great market frictions, which make institutions difficult and costly to arbitrage away the distress anomaly (e.g. Nagel, 2005). Inconsistent with the limit-to-arbitrage explanation, we show that the distress anomaly is no longer present after controlling for the contemporaneous level of *IO*, implying that institutions play a key role in the anomaly. Our findings suggest that demand shocks associated with institutional investors' preferences and changes in their preferences cause the distress anomaly.

3.4.2 Cross-sectional analysis

This section examines the relationship between distress risk and monthly returns by controlling for other variables, which influence stock returns, in Fama-MacBeth (1973) cross-sectional regressions. Our control variables include turnover in the past 12 months, BTM in the last month, the Amihud (2002) illiquidity measure over the past 12 months, market capitalization in the last month in the nature logarithm form, skewness of daily returns over the past 12 months, the last month's return, cumulative past 12 months' returns and volatility of daily returns over the past 12 months. Firstly, we undertake sub-sample analysis by classifying the sample stocks with and without *IO* (defined as no institutional holdings in quarters *q* and *q-1*). If the distress anomaly is related to institutions, we expect that the anomaly is concentrated in stocks with *IO*. Secondly, if demand shocks are generated through growing institutions, we expect that lagged *IO* not only can predict returns but also can subsume the negative relationship between distress risk and returns. Alternatively, if demand shocks are generated through changing institutional distress-based preferences, *ΔSIO* and *Adj_ΔIO* should be able to account for the anomaly. We report time-series averaged coefficients for each variable and associated Newey-West *t*-statistics in Table 8.

[Insert Table 8 about here]

The first column shows that *PD* has a significantly negative relationship with returns in all sample stocks, consistent with the presence of the distress anomaly. Column (2) shows that the coefficient on *PD* is -0.0016 insignificantly different from zero in the sub-sample of stocks without *IO*. However, in column (3) *PD* exhibits a negative relationship with returns and the coefficient on *PD* is -0.0147 significant less than 5% level (*t*-statistics= -2.24). The contrasting evidence implies that institutional investors have a much closer relation with the anomaly than the individual investors in China. In columns (4) to (6), we use the sub-sample of stocks with IO and include lagged *IO*, *ΔSIO* and *Adj_ΔIO* individually in the regressions in the whole sample period. Column (4) shows that *PD* can still predict stock returns after controlling for lagged *IO*, implying that the institutional growth cannot fully explain the distress anomaly. In contrast, with the inclusion of *ΔSIO* or *Adj_ΔIO* in the regressions, *PD* is insignificantly positive in column (5) and is insignificantly negative in column (6) (i.e.0.0063 and -0.0078, respectively). In following columns from (7) to (14), we repeat previous analysis by separating the whole sample period into two sub-periods (2003-2007 and 2008-2012). In column (7) and (8), we show that the distress anomaly is significant in both sub-periods. However, PD becomes insignificant in the earlier sub-period after controlling for lagged IO in column (9). In addition, lagged IO is significantly positive and is able to predict returns. These findings suggest that demand shocks arising from the growth of institutions drives the anomaly in the earlier sub-period. In sharp contrast, column (10) shows that PD is significantly negative and lagged IO is insignificant. This evidence implies that the institutional growth hypothesis cannot explain the anomaly in the later sub-period. This makes sense because the institutional market share incurred a decline over that period. In columns (11) to (14), we show that PD has no predicative power for returns after controlling for *ΔSIO* and *Adj_ΔIO* in both sub-periods. This evidence is consistent with the institutional preference-change hypothesis that institutions shift their preferences toward safe stocks to generate demand shocks, causing higher returns to safe stocks than distressed stocks. Taken together, our results indicate that institutional growth and changes in preferences are both responsible for the distress anomaly in the first sub-period, while the latter also drives the anomaly in the second sub-period.

The results from control variables are generally consistent with the literature. The two liquidity variables (i.e. *Turnover* and *Illiquidity*) significantly influence stock returns. Size has a negative relationship with stock returns in the whole sample period. We also find that *Lagged Return* has a negative relationship with returns, consistent with month-by-month return reversals (e.g. Jegadeesh, 1990; Lehmann, 1990). In addition, *Momentum* and *BTM* have significant relationships with returns in the earlier sample period. However, volatility and *Skewness* have no significant power to predict returns on the Chinese stock markets.

3.4.3 Time-series analysis for changes in distress-based preferences

If changes in institutional distress-based preferences cause the distress anomaly, we would expect that the size of the distress premium should be dependent on the degree of these changes. To test this hypothesis, we develop a proxy for changes in institutional distress-based preferences. As *IO* levels represent institutional preferences, changes in *IO* levels can be proxied for changes in preferences. We aggregate each stock's *ΔSIO* (*Adj_ΔIO*) within the bottom and the top distress deciles to define ΔSIO^L ($Adj\_\Delta IO^L$) and ΔSIO^H ($Adj\_\Delta IO^H$), respectively. Since institutions may exhibit an increase in preferences for safe stocks and a decrease in preferences for distressed stocks within a same quarter, we take differences on *ΔSIO (Adj_ΔIO)* between the two decile portfolios[22], i.e., ΔSIO^L-ΔSIO^H and $Adj\_\Delta IO^L$ - $Adj\_\Delta IO^H$, to measure the overall effect of changes in distress-based preferences. We rank and separate the sample quarters by ΔSIO^L-ΔSIO^H or $Adj\_\Delta IO^L$ - $Adj\_\Delta IO^H$ into two groups by a 50% cut-off rate. When institutions have a strong change in distress-based preferences, for example, large differences on ΔSIO^L-ΔSIO^H, we expect the distress

[22] As a robustness test, we also use differences in *ΔSIO (Adj_ΔIO)* between the bottom and the top quintile distress-based portfolios to proxy for changes in distress-based preferences. We find similar results. These results are available upon request.

premium[23] to be significantly positive. However, in quarters with a weak change in the distressed based preference, for example, small differences on ΔSIO^L-ΔSIO^H, we expect the premium to be insignificant. Table 9 reports the results.

[Insert Table 9 about here]

Panel A shows that the equally and value-weighted distress premiums are both significantly positive in quarters with a strong change in distress-based preferences. However, in quarters with a weak change in distress-based preferences, the premiums are insignificantly different from zero. Moreover, the distress premiums are significantly different between the two groups of quarters. In addition to this non-parametric test, we also undertake a time-series approach to regressing the distress premiums on (ΔSIO^L –ΔSIO^H) and ($Adj\_\Delta IO^L$ - $Adj\_\Delta IO^H$), respectively. The results in Panel B show that the coefficients on (ΔSIO^L –ΔSIO^H) and ($Adj\_\Delta IO^L$ - $Adj\_\Delta IO^H$) are both significantly positive, suggesting that the distress premium is larger in quarters with a stronger change in distress-based preferences. The overall evidence suggests that changes in the distress-based preference of institutions drive the distress anomaly, consistent with our institutional preference-change hypothesis.

3.5 Alternative interpretations of our results

Our primary results show that our proxies for changes in preferences, *ΔSIO* and *Adj_ΔIO* can explain the distress anomaly. However, one may argue that changes in institutional ownership also capture institutional demand that is resulted from reasons other than changes in preferences. For example, when safe stocks have better past performance than distressed stocks, an increase in the holding of the former relative to the latter can be attributable to momentum trading taken by institutions (e.g. Sias, 2007; Badrinath and Wahal, 2001). In addition, Choi and Sias (2012) find that institutional investors gradually incorporate public financial information into stock prices, leading to the positive relation between financial strength and stock returns. To the extent that distress risk is negatively correlated to firms' financial strength, institutional investors may gradually increase their demand for fundamentally strong (hence safe) stocks. In this case, changes in institutional ownership can be the result of institutional investors' gradual incorporation of firm distress information into stock prices. In this section, we test momentum trading and gradual incorporation of distress information as alternative explanations for our findings.

[23] Quarterly distress premium is calculated as the average of monthly distress premium within a quarter.

3.5.1 Momentum trading

In terms of momentum trading, the outperformance of safe stocks over distressed stocks in the previous quarter leads institutions to increase the holding of safe stocks relative to distressed stocks in this quarter. Therefore, the predictive power of distress risk (i.e., *PD*) to *ΔSIO (Adj_ΔIO)* should be stronger (weaker) in quarters *following* larger (smaller) differences in returns between safe and distressed stocks. In contrast, in our preference-change hypothesis, the predictive power of distress risk to institutional demand should be stronger (weaker) in *same* quarters when the distress premium is larger (smaller). That is, a larger increase in institutional demand simultaneously causes the greater outperformance of safe over distressed stocks. To test two explanations, the distress premiums across the sample quarters are separated into a high and low group (i.e. a 50% cut-off rate). Panel A in Table 10 reports the results that we regress changes in institutional ownership (*ΔSIO)* on distress risk and other controlling variables in quarters *following* low and high distress premiums. Panel B reports the determinants of changes in institutional ownership *in* the quarters with low and high distress premiums.

[Insert Table 10 about here]

Panel A shows that the coefficient on distress risk (i.e., *PD*) is insignificantly negative after safe and distressed stocks experienced large differences on returns. In contrast, *PD* is significantly negative in quarters following small differences on returns between safe and distressed stocks. This evidence is inconsistent with the argument that changes in institutional ownership represent institutional momentum trading. Panel B shows that *PD* is significantly related to institutional demand in the quarters with high distress premiums, while the coefficient on *PD* is insignificant in the quarters with low distress premiums. This result implies that institutional demand co-moves with the distress premium, consistent with the preference-change hypothesis.

3.5.2 Gradual incorporation of distress information

The co-movement between institutional demand and the distress premium can also be consistent with gradual incorporation of distress information. This explanation depicts that institutions slowly revise their expectations and gradually increase their holdings of financially strong stocks relative to distressed stocks after firm financial information becomes publicly available. Similar to the preference-change hypothesis, this gradually increased institutional demand derived from slow reactions to information can also lead to the outperformance of safe stocks over distressed stocks, while a key difference between the two explanations is the time period over which institutions need to adjust their holdings. Changes in preferences may occur over many quarters and the process of adjustments on institutional holdings can span a long time. Consistent with this, our previous results in Table 5 show that the relationship between distress risk and *IO* is significantly different across the earlier and the later sub-periods, implying that institutions may need a long time to adjust their holdings. However, gradual incorporation of information suggests that the process of adjustments on institutional holdings in response to public information will span an information period from the time when information is first available until the time just before new information is released. Thus, gradual incorporation of information implies that the relationship between distress risk and cross-sectional *IO* levels should be stronger at the end of the information period than at the beginning the information period. Since firms listed on the Chinese equity markets have financial year end of 31 December and most of firm annual reports are available by the end of the first quarter, we define Q2 in year *t* and Q1 in year *t+1* to be the beginning and the end of the information period, respectively. In addition, we define Q2 and Q3 in year *t* to be the first half of the information period and Q4 in year *t* and Q1 in year *t+1* to be the second half of the information period. We regress *IO* on *PD* and control variables based on quarters in the information period. Similar to the analysis in Table 5, *IO* and control variables are all standardized. As the scale changes on *IO* and *PD* over time will not influence coefficients in the regressions, we can examine whether the relationship between *PD* and *IO* will be significantly different across the beginning (the first half) and the end (the second half) of the information period. Table 11 report results.

[Insert Table 11 about here]

The results show that the coefficients on *PD* are not significantly different between the beginning and the end of the information period. The results also show that the coefficients on *PD* are not significantly different between the first half and the second half of the information period. The evidence suggests that newly available information released on a yearly basis does not attract institutional investors to adjust their holdings of safe stocks relative to distressed stocks, inconsistent with gradual incorporation of distress information.

4. Conclusions

The outperformance of safe stocks over distressed stocks is one of most important asset pricing anomalies first discovered in the U.S. The literature lacks evidence of and explanations for the anomaly in emerging markets. This study is the first, to the best of our knowledge, to investigate the causes of the distress anomaly in the Chinese stock markets as one of most important emerging economies. We find that the distress anomaly is present in the Chinese stock markets. Our results show that the anomaly disappears after controlling for institutional ownership. We propose institutional demand shocks based explanations for the distress anomaly: the institutional growth hypothesis and the preference-change hypothesis. We find that the market share of institutions in China has dramatically increased from 2003 to 2007, consistent with the growth of institutions. We also find that institutions have changed their preferences over the whole sample period. Specifically, institutions have increased their preferences for small and value stocks, while institutions become more averse to distressed, illiquid and volatile stocks. Our results reveal that the distress anomaly can be explained away by lagged institutional ownership in the earlier sub-period (2003-2007) but not in the later sub-period (2008-2012). In contrast, the anomaly disappears after controlling for changes in institutional ownership in the whole sample period. These key findings are also confirmed in cross-sectional regression analysis. Further time-series analysis shows that when institutions experience a stronger change in distress-based preferences, the distress anomaly becomes greater. Overall, our results suggest that demand shocks arising from the growth of institutions and from changes in institutional distress-based preferences drive the distress anomaly.

The evidence from our analysis of alternatively interpretation renders no support for gradual incorporation of distress information to explain the distress anomaly. In addition, we exclude the momentum trading of institutional investors as the explanation of distress anomaly. We showed that, the institutional demand of safe stocks relative to risky stocks did not occur after periods with high distress anomaly. Hence this rules out the potential endogenous relationship between institutional demand and returns (i.e. past returns driving the demand).

Our study supports the importance of institutional preferences for understanding the distress anomaly (e.g. Campbell et al., 2008). Our results imply that the distress anomaly can be transient mispricing if institutional investors encounter constraints to grow. For example, further fast growth would be limited when institutions have already held a larger scale of shares than individuals. Also, our results imply that an increasing institutional aversion to distress risk may be related to changing style investing from large and growth stocks to small and value stocks which are perceived to be risky. If future competition among institutions diminishes information advantages to be exploited in small and value stocks (e.g. Bennett *et al*., 2003), institutions will not have any need to change their distress-based preferences and nor will the anomaly survive. Although the distress anomaly is of focus in this study, our evidence implies that the demand pressure associated with institutional preferences may also play roles in other asset pricing anomalies. We leave this issue for future research.

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Table 1 Dynamic panel logit regressions on ST events prediction

Panel A: The ST prediction models	Model 1	Model 2	Model 3	Model 4
	1998-2012	1998-2009	2000-2009	2000-2012
FUTL			-1.629	-1.583
			(-3.15)***	(-3.50)***
CASHTA		-3.285	-2.730	
		(-4.13)***	(-3.30)***	
CHIN	-1.439	-1.385	-1.668	-1.675
	(-8.34)***	(-7.19)***	(-7.50)***	(-8.67)***
SALETA	-1.420	-1.338	-1.162	-1.220
	(-7.23)***	(-5.52)***	(-4.56)***	(-5.99)***
TLTA	2.169	1.881	1.565	1.868
	(6.28)***	(4.62)***	(3.55)***	(5.04)***
NITA	-20.059	-18.718	-16.963	-18.576
	(-13.02)***	(-10.81)***	(-8.91)***	(-11.19)***
Constant	-4.125	-3.385	-3.491	-4.173
	(-18.54)***	(-12.19)***	(-11.38)***	(-17.16)***
Observations	13,513	8,839	8,044	12,718
Pseudo-R^2	0.365	0.363	0.380	0.381
Panel B:The performance of the ST prediction models				
Sensitivity	81.78%	80.27%	81.62%	82.79%
Specificity	87.84%	87.27%	88.02%	88.37%

This table reports results from logit regressions of the ST events on predictor variables. We use the following variables: funds from operations to total liabilities (*FUTL*), the ratio of a company's cash and short-term assets to the total assets (*CASHTA*), change in net income (*CHIN*), sales to total assets (*SALETA*), total liabilities to total assets (*TLTA*), and net income to total assets (*NITA*). The sensitivity ratio indicates the probability that the model can correctly predict a ST case, while the specificity ratio measures the probability that the model can correctly predict a non-ST case. *t*-statistics are reported in parentheses. *, **, and *** represent significance levels at 10%, 5% and 1%, respectively.

Table 2 Identifying the distress puzzle

PD deciles	1 (low)	2	3	4	5	6	7	8	9	10 (high)	1-10
Panel A: Value-weighted portfolio returns											
Monthly return	1.04	0.61	0.68	0.19	0.51	0.29	0.29	0.37	0.18	-0.37	1.41
t-statistics	(1.18)	(0.64)	(0.71)	(0.19)	(0.50)	(0.30)	(0.28)	(0.35)	(0.17)	(-0.33)	(2.37)**
FF-4F Alpha	0.76	0.12	0.16	-0.29	-0.04	-0.29	-0.27	-0.32	-0.50	-1.06	1.82
t-statistics	(3.51)***	(0.53)	(0.73)	(-1.32)	(-0.01)	(-1.35)	(-1.14)	(-1.50)	(-2.18)**	(-4.19)***	(5.84)***
Panel B: Equally weighted portfolio returns											
Monthly return	1.05	0.71	0.88	0.69	0.66	0.48	0.63	0.76	0.61	0.04	0.99
t-statistics	(1.08)	(0.72)	(0.87)	(0.68)	(0.64)	(0.46)	(0.59)	(0.69)	(0.56)	(0.04)	(2.01)**
FF-4F Alpha	0.56	0.13	0.29	0.09	0.04	-0.18	-0.05	0.00	-0.08	-0.66	1.21
t-statistics	(2.72)***	(0.70)	(1.55)	(0.51)	(0.22)	(-1.05)	(-0.25)	(0.00)	(-0.41)	(-2.86)***	(4.34)***
# of stocks	116	116	116	116	116	116	116	116	116	116	
Panel C: Characteristics of portfolios											
PD (%)	0.08	0.21	0.37	0.57	0.82	1.14	1.64	2.54	5.20	27.74	
IO (%)	16.41	12.39	10.05	9.18	7.85	7.32	6.41	5.62	4.55	2.87	
Size ($\times 10^9$)	7.00	6.50	5.17	4.25	3.03	3.44	3.23	3.20	3.10	2.21	
BTM	0.41	0.44	0.44	0.46	0.45	0.47	0.48	0.48	0.51	0.47	
Volatility (%)	2.95	3.02	3.09	3.11	3.15	3.16	3.24	3.20	3.24	3.41	
Skewness	0.24	0.16	0.16	0.15	0.15	0.12	0.15	0.13	0.15	0.16	
Momentum	0.19	0.18	0.19	0.18	0.17	0.17	0.18	0.19	0.17	0.14	
Illiqudity ($\times 10^9$)	0.19	0.25	0.25	0.26	0.28	0.27	0.30	0.45	0.34	0.37	
Turnover (%)	1.95	2.12	2.31	2.30	2.39	2.34	2.41	2.44	2.51	2.67	

Panel A and Panel B report value-weighted and equally weighted monthly returns on probability of distress (*PD*) portfolios from 2003 to 2012. The *PD* is estimated from the distress prediction model. The return difference between the bottom and the top decile portfolio is defined as the distress premium. The time-series returns are regressed on the Fama-French-Carhart four-factor model to obtain risk-adjusted returns. *t*-statistics are reported in parentheses. Panel C reports characteristics for *PD* decile portfolios. All characteristics variables are time-series averages of cross-sectional means across stocks in each portfolio. For each stock, institutional ownership (*IO*) is defined as the percentage of a firm's tradable shares held by all institutional investors to the total tradable A-shares. *Size* and *BTM* are market capitalization and book-to-market ratio, respectively. *Volatility* is the daily return standard deviation in the past 12 months. *Skewness* is the average daily return skewness in the past 12 months. *Momentum* is the past 12-month returns. *Illiquidity* is the absolute values of monthly returns divided by the total number of shares traded averaged over the past 12 months. *Turnover* is the number of shares traded divided by the number of tradable shares outstanding averaged over the past 12 months. *, **, and *** represent significance levels at 10%, 5% and 1%, respectively.

Table 3 Double-sorting of institutional ownership and distress probability

Panel A: Number of stocks

		IO				
		1(low)	2	3	4	5(high)
	1	41	19	36	55	84
	2	59	30	43	50	53
PD	3	63	34	47	49	41
	4	75	38	49	41	30
	5	100	41	44	32	16

Panel B: PD (%)

		IO				
		1(low)	2	3	4	5(high)
	1	0.21	0.12	0.13	0.12	0.12
	2	0.56	0.37	0.40	0.42	0.43
PD	3	1.14	0.81	0.85	0.87	0.88
	4	2.35	1.84	1.89	1.81	1.81
	5	19.79	13.76	13.75	12.09	10.85

Panel C: Equally weighted monthly returns

		IO				
		1(low)	2	3	4	5(high)
	1	0.43	0.28	0.00	0.56	2.54
		(0.40)	(0.21)	(0.07)	(0.52)	(2.71)***
	2	0.44	0.29	0.38	0.96	2.62
		(0.38)	(0.21)	(0.32)	(0.86)	(2.68)***
PD	3	0.01	0.35	0.36	0.90	2.78
		(0.06)	(0.25)	(0.31)	(0.80)	(2.82)***
	4	0.56	0.70	0.60	1.44	3.07
		(0.52)	(0.51)	(0.50)	(1.16)	(2.98)***
	5	0.32	0.48	0.60	1.16	3.39
		(0.30)	(0.33)	(0.97)	(0.97)	(3.12)***
Diff 1-5		0.12	-0.20	-0.60	-0.60	-0.86
		(0.32)	(-0.53)	(-2.80)***	(-1.73)*	(-1.82)*
FF-4F alpha		0.11	0.02	-0.64	-0.60	-0.92
		(0.53)	(0.08)	(-2.67)***	(-1.83)*	(-2.14)**
GRS *p*-value				0.00		

Panel D: Value-weighted monthly returns

		IO				
		1(low)	2	3	4	5(high)
	1	-0.06	-0.27	-0.50	0.14	2.06
		(-0.15)	(-0.22)	(-0.44)	(0.13)	(2.23)**
	2	0.03	-0.37	-0.44	0.31	1.91
		(0.02)	(-0.42)	(-0.39)	(0.29)	(2.09)**
PD	3	-0.20	-0.14	-0.40	0.31	2.25
		(-0.26)	(-0.32)	(-0.35)	(0.28)	(2.39)**
	4	0.00	-0.01	-0.09	0.11	2.27
		(0.04)	(-0.01)	(-0.08)	(0.09)	(2.32)**
	5	-0.30	-0.18	-0.14	0.50	2.82
		(-0.83)	(-0.20)	(-0.11)	(0.44)	(2.62)**
Diff 1-5		0.24	-0.10	-0.36	-0.37	-0.76
		(1.32)	(-0.56)	(-0.94)	(-0.76)	(-1.40)
FF-4F alpha		0.30	0.00	-0.21	-0.29	-0.44
		(1.10)	(0.23)	(-0.59)	(-0.62)	(-0.89)
GRS *p*-value				0.22		

This table reports the results of independently sorting portfolios based on institutional ownership (*IO)* and distress probability (*PD)*. Panel A and B reports 25 portfolios' equally weighted returns and value-weighted returns, respectively. The time-series returns of each portfolio are regressed on the Fama-French-Carhart four factors model to obtain risk-adjusted returns (FF-4F Alpha). *t*-statistics associated with each return and alpha value are reported in parentheses. The last row in Panel C and Panel D reports the *p*-value of the GRS test (Gibbons *et al*., 1989) with the null hypothesis that the five risk-adjusted distress premiums are jointly equal to zero. *, **, and *** represent significance levels at 10%, 5% and 1%, respectively.

Table 4 Institutional ownership in the Chinese markets

Year	Mutual funds	Securities firms	QFII	Insurance	Trusts	Pension	Private equities	Others	All
Panel A: Percentage ownership of tradable shares									
2003	1.463	0.313	0.006	0.000	0.044	0.019	0.000	0.033	1.879
2004	3.897	0.753	0.053	0.000	0.101	0.171	0.000	0.078	5.054
2005	5.292	0.743	0.269	0.053	0.104	0.354	0.004	0.088	6.907
2006	6.176	0.735	0.542	0.314	0.098	0.655	0.019	0.109	8.650
2007	9.223	0.616	0.418	0.300	0.149	0.357	0.035	0.358	11.456
2008	8.301	0.394	0.217	0.348	0.217	0.233	0.036	0.644	10.393
2009	7.037	0.381	0.189	0.335	0.196	0.263	0.052	0.909	9.363
2010	7.519	0.525	0.160	0.490	0.172	0.306	0.151	1.087	10.411
2011	5.998	0.571	0.105	0.677	0.182	0.311	0.215	1.092	9.153
2012	4.919	0.451	0.086	0.652	0.170	0.337	0.197	1.064	7.877
Panel B: Percentage ownership of market value									
2003	4.077	0.416	0.014	0.000	0.055	0.031	0.000	0.047	4.639
2004	9.918	1.233	0.174	0.000	0.119	0.234	0.000	0.107	11.784
2005	14.705	1.324	0.691	0.137	0.124	0.645	0.005	0.113	17.746
2006	14.068	1.356	1.319	1.008	0.110	1.224	0.017	0.247	19.349
2007	19.111	0.827	0.628	0.609	0.147	0.553	0.016	0.470	22.360
2008	17.576	0.499	0.357	0.619	0.179	0.237	0.017	0.756	20.240
2009	12.027	0.401	0.229	0.556	0.211	0.284	0.036	0.896	14.641
2010	9.486	0.422	0.232	0.522	0.192	0.286	0.084	0.996	12.220
2011	6.968	0.421	0.148	0.617	0.119	0.263	0.078	0.823	9.437
2012	6.063	0.374	0.169	0.677	0.117	0.353	0.083	0.899	8.735

This table provides information on the overall institutional ownership in the Chinese equity markets from 2003 to 2012. Institutional ownership (*IO*) is the percentage of a firm's tradable A-shares owned by all institutional investors to the firm's total tradable A-shares. The institutional ownership is averaged across each quarter from the first quarter to the last quarter in a given year for each type of institutional investor. Panel A shows the percentage of institutional ownership in terms of numbers of tradable shares and Panel B is for the percentage of institutional ownership in terms of market capitalization.

Table 5 Institutional preferences and determinants of future institutional demand

		PD	BTM	Size	Turnover	Illiquidity	Price	Momentum	Skewness	Volatility
Panel A: Relationship between institutional ownership and share characteristics										
(1)	The whole period	-0.026	-0.044	0.236	-0.103	0.001	0.392	0.033	-0.002	-0.011
	2003-2012	(-4.01)***	(-2.84)***	(10.95)***	(-5.61)***	(0.16)	(24.70)***	(3.53)***	(-0.24)	(-1.04)
(2)	Sub-period1	0.027	-0.103	0.410	0.033	0.069	0.287	0.038	-0.027	-0.008
	2003:Q1-2005:Q2	(5.34)***	(-4.85)***	(18.75)***	(1.63)	(6.66)***	(7.39)***	(2.15)**	(-2.45)**	(-0.52)
(3)	Sub-period2	-0.023	-0.104	0.245	-0.197	-0.036	0.445	0.026	0.005	0.031
	2005:Q3-2007:Q4	(-2.51)**	(-3.30)***	(11.96)***	(-5.14)***	(-3.33)***	(23.01)***	(1.17)	(0.38)	(1.22)
(4)	Sub-period3	-0.052	0.017	0.171	-0.151	-0.026	0.447	0.039	0.026	-0.034
	2008:Q1-2010:Q2	(-7.38)***	(0.61)	(12.30)***	(-15.10)***	(-3.22)***	(34.64)***	(1.86)*	(2.26)**	(-1.85)*
(5)	Sub-period4	-0.061	0.023	0.105	-0.094	-0.002	0.390	0.029	-0.012	-0.035
	2010:Q3-2012:Q4	(-9.33)***	(2.93)***	(9.56)***	(-5.89)***	(-0.16)	(22.57)***	(1.87)*	(-0.70)	(-1.77)*
(6)	Diff: Sub-periods(1-2)	0.058	-0.124	0.188	0.042	0.030	-0.054	-0.002	-0.019	0.036
	-sub-period(3-4)	(6.32)***	(-5.20)***	(6.08)***	(1.16)	(1.90)*	(-1.74)*	(-0.12)	(-1.29)	(2.33)**
Panel B: Relationship between future institutional demand and share characteristics										
(1)	$\Delta SIO_{q,q+1}$	-0.008	-0.004	-0.007	0.010	0.000	-0.023	0.008	-0.002	-0.012
		(-2.63)***	(-1.01)	(-0.66)	(1.99)**	(0.07)	(-2.51)**	(1.14)	(-0.44)	(-1.71)*
(2)	$Adj\_\Delta IO_{q,q+1}$	-0.014	-0.014	0.005	0.022	0.011	-0.026	0.009	0.001	-0.014
		(-2.00)**	(-1.73)*	(0.29)	(1.46)	(1.11)	(-0.74)	(0.78）	(0.16)	(-0.99)
(3)	$\Delta SIO_{q,q+2}$	-0.013	-0.005	-0.023	0.026	0.004	-0.044	0.007	0.008	-0.026
		(-4.63)***	(-0.98)	(-2.09)**	(3.97)***	(0.56)	(-6.33)***	(1.12)	(1.82)*	(-3.25)***
(4)	$\Delta SIO_{q,q+4}$	-0.016	0.000	-0.056	0.044	-0.002	-0.077	0.000	0.008	-0.044
		(-4.28)***	(-0.04)	(-3.62)***	(4.56)***	(-0.15)	(-7.91)***	(-0.00)	(1.35)	(-4.10)***
(5)	$\Delta SIO_{q,q+8}$	-0.022	0.016	-0.125	0.053	-0.020	-0.120	-0.009	0.010	-0.041
		(-4.41)***	(1.31)	(-7.00)***	(3.64)***	(-1.36)	(-8.53)***	(-0.85)	(1.28)	(-3.37)***

This table reports quarterly Fama-MacBeth (1973) regression results on *IO*, *ΔSIO*, and *Adj_ΔIO* from 2003 to 2012. In Panel A, the dependent variable is *IO*, the institutional ownership, in quarter *q*. *PD* is the predicted probability of ST in quarter *q*. *Size* is the natural log of the market capitalization for a firm's tradable shares at the end of quarter *q*. *BTM* is the book value of equity in the previous financial year divided by total market capitalization at the end of quarter *q*; *Turnover* is the average daily turnover during the past 12 months, ending in quarter *q*. *Price* is the closing price at the end of quarter *q*. *Illiquidity* is the ratio of absolute values of monthly returns divided by the total number of shares traded averaged over the past 12 months, ending in quarter *q*. *Momentum* is the averaged past 12-month returns, ending in quarter *q*. *Volatility* is the averaged daily return standard deviation in the past 12 months, ending in quarter *q*. *Skewness* is the averaged daily return skewness in the past 12 months, ending in quarter *q*. Each variable is standardized by subtracting the cross-sectional mean value and dividing by the cross-sectional standard deviation. In Panel B, dependent variables are $\Delta SIO_{q,q+t}$ and $Adj\_\Delta IO_{q,q+t}$ which are changes in standardized institutional ownership and adjusted changes of institutional ownership between quarter q and quarter $q+t$. t-statistics associated with each coefficient are reported in parentheses. *, **, and *** represent significance levels at 10%, 5% and 1%, respectively.

Table 6 Double-sorting between lagged institutional ownership, changes in institutional ownership and distress probability

Panel A-1: Equally weighted monthly returns

		Lagged IO				
		1(low)	2	3	4	5(high)
PD	1	1.10	0.93	1.15	1.55	1.64
		(0.99)	(0.67)	(1.01)	(1.65)*	(1.96)**
	2	0.78	1.25	1.40	1.67	1.39
		(0.75)	(0.90)	(1.16)	(1.45)	(1.43)
	3	0.51	1.04	1.34	1.35	1.30
		(0.45)	(0.71)	(1.11)	(1.16)	(1.37)
	4	0.76	1.49	1.56	1.41	1.84
		(0.65)	(0.98)	(1.24)	(1.16)	(1.80)*
	5	0.59	0.80	1.25	0.99	1.00
		(0.51)	(0.55)	(0.99)	(1.02)	(1.52)
Diff 1-5		0.51	0.13	-0.15	0.56	0.65
		(1.80)*	(0.36)	(-0.42)	(1.70)*	(1.94)*
FF-4F alpha		0.50	0.28	0.02	0.60	0.75
		(1.81)*	(0.71)	(0.35)	(1.80)*	(2.00)**
GRS *p*-value				0.00		

Panel A-2: Value-weighted monthly returns

		Lagged IO				
		1(low)	2	3	4	5(high)
PD	1	0.79	1.01	0.57	1.27	1.20
		(0.71)	(0.70)	(0.48)	(1.14)	(1.45)
	2	0.48	0.47	0.66	1.30	1.13
		(0.43)	(0.35)	(0.58)	(1.16)	(1.17)
	3	0.18	0.64	0.93	0.78	1.32
		(0.16)	(0.44)	(0.78)	(0.66)	(1.38)
	4	0.55	1.18	0.80	0.76	1.22
		(0.47)	(0.75)	(0.66)	(0.63)	(1.31)
	5	0.23	0.22	0.75	0.86	0.93
		(0.21)	(0.15)	(0.60)	(0.74)	(0.85)
Diff 1-5		0.56	0.80	-0.18	0.42	0.27
		(1.72)*	(1.98)**	(-0.42)	(1.03)	(0.41)
FF-4F alpha		0.52	1.09	-0.03	0.60	0.52
		(1.73)*	(2.53)***	(-0.01)	(1.60)	(0.87)
GRS *p*-value				0.00		

Panel B-1: Equally weighted monthly returns

		ΔSIO				
		1(low)	2	3	4	5(high)
PD	1	-0.63	0.44	0.35	0.60	3.79
		(-0.67)	(0.37)	(0.29)	(0.54)	(3.84)***
	2	-0.47	0.74	0.35	0.40	3.65
		(-0.47)	(0.64)	(0.29)	(0.35)	(3.48)***
	3	-0.70	0.46	0.24	0.52	3.58
		(-0.70)	(0.39)	(0.20)	(0.46)	(3.42)***
	4	-0.31	0.64	0.27	0.94	3.89
		(-0.30)	(0.53)	(0.23)	(0.76)	(3.42)***
	5	-0.60	0.28	0.54	0.75	4.09
		(-0.55)	(0.76)	(0.44)	(0.61)	(3.53)***
Diff 1-5		-0.02	0.16	-0.20	-0.16	-0.30
		(-0.05)	(0.97)	(-0.55)	(-0.49)	(-0.48)
FF-4F alpha		0.09	0.25	-0.11	0.00	-0.04
		(0.30)	(1.03)	(-0.30)	(0.02)	(-0.11)
GRS *p*-value				0.35		

Panel B-2: Value-weighted monthly returns

		ΔSIO				
		1(low)	2	3	4	5(high)
PD	1	-0.46	-0.17	0.12	0.61	3.65
		(-0.50)	(-0.15)	(0.10)	(0.58)	(3.85)***
	2	-0.99	0.35	-0.37	0.36	3.30
		(-1.00)	(0.31)	(-0.32)	(0.34)	(3.19)***
	3	-1.06	0.32	-0.25	0.00	3.34
		(-1.03)	(0.27)	(-0.21)	(0.06)	(3.26)***
	4	-1.10	-0.00	-0.23	0.59	3.62
		(-1.09)	(-0.03)	(-0.20)	(0.50)	(3.30)***
	5	-0.99	-0.49	0.00	0.38	3.47
		(-0.96)	(-0.42)	(0.04)	(0.30)	(3.05)***
Diff 1-5		0.52	0.30	0.13	0.23	0.27
		(0.99)	(0.99)	(0.35)	(0.48)	(0.53)
FF-4F alpha		0.58	0.42	0.36	0.48	0.54
		(1.43)	(1.38)	(0.81)	(1.12)	(1.18)
GRS *p*-value				0.18		

Table 6 continued

Panel C-1: Equally weighted monthly returns

		Adj_ΔIO				
		1(low)	2	3	4	5(high)
PD	1	-0.48	0.30	0.35	1.59	4.54
		(-0.49)	(0.29)	(0.36)	(1.55)	(4.16)***
	2	-0.53	0.41	0.43	1.57	4.18
		(-0.52)	(0.38)	(0.42)	(1.54)	(3.89)***
	3	-0.15	0.04	0.56	1.35	4.31
		(-0.15)	(0.04)	(0.53)	(1.29)	(3.98)***
	4	0.04	0.36	0.73	1.67	4.31
		(0.04)	(0.32)	(0.65)	(1.43)	(3.98)***
	5	-0.62	0.38	0.51	1.84	4.23
		(-0.56)	(0.31)	(0.43)	(1.49)	(3.71)***
Diff 1-5		0.13	-0.04	-0.12	-0.31	0.30
		(0.07)	(-0.10)	(-0.26)	(-0.68)	(0.54)
FF-4F alpha		-0.00	0.16	0.13	-0.11	0.39
		(-0.01)	(0.43)	(0.29)	(-0.27)	(0.72)
GRS p-value				0.67		

Panel C-2: Value-weighted monthly returns

		Adj_ΔIO				
		1(low)	2	3	4	5(high)
PD	1	-0.98	0.19	0.47	1.57	4.23
		(-1.05)	(0.19)	(0.47)	(1.64)*	(4.16)***
	2	-0.88	-0.13	0.12	1.79	3.88
		(-0.87)	(-0.13)	(0.12)	(1.70)*	(3.64)***
	3	-0.71	-0.31	0.42	1.35	4.16
		(-0.66)	(-0.29)	(0.39)	(1.35)	(3.78)***
	4	-0.53	-0.20	0.34	1.46	3.96
		(-0.49)	(-0.18)	(0.31)	(1.33)	(3.49)***
	5	-0.81	-0.09	0.33	1.47	4.03
		(-0.84)	(-0.07)	(0.29)	(1.16)	(3.35)***
Diff 1-5		-0.17	0.30	0.11	0.10	0.23
		(-0.26)	(0.50)	(0.29)	(0.17)	(0.70)
FF-4F alpha		-0.01	0.46	0.56	0.36	0.60
		(-0.03)	(0.47)	(1.09)	(0.73)	(0.99)
GRS p-value				0.40		

This table reports three double-sorting results between *PD*, lagged *IO*, *ΔSIO* and *Adj_ΔIO*. Lagged *IO* is institutional ownership in the past three months. *ΔSIO* is the contemporaneous change in standardized *IO*. *Adj_ΔIO* is the change in the fraction of tradable shares held by all institutions for a stock in quarter *q*, less the average change in quarter *q* for stocks within the same capitalization quintile, divided by the cross-sectional mean fraction of tradable shares held by all institutions in that quarter for stocks within the same capitalization quintile. We form quintile portfolios for each of *PD*, lagged *IO*, *ΔSIO* and *Adj_ΔIO*. Panel A1 and A2 report equally and value-weighted monthly returns of 25 portfolios, respectively, when *PD* interacts with lagged *IO*. Panel B1 and B2 report equally and value-weighted monthly returns to 25 portfolios, respectively, where *PD* interacts with *ΔSIO*. Panel C1 and C2 report equally and value-weighted monthly returns to 25 portfolios, respectively, when *PD* interacts with *Adj_ΔIO*. Each portfolio's time-series returns are regressed on the Fama-French-Carhart four factors model to obtain risk-adjusted returns (FF-4F Alpha). *t*-statistics associated with each alpha value are reported in parentheses. The last row in each panel reports the *p*-value for the *GRS* test (Gibbons *et al*., 1989) with the null hypothesis that the five risk-adjusted distress premiums are jointly equal to zero. *, **, and *** represent significance levels at 10%, 5% and 1%, respectively.

Table 7 Sub-period analysis of double-sorted portfolios

Equally weighted monthly returns

	1(low)	2	3	4	5(high)
Lagged IO					
2003-2007					
Diff 1-5	0.72	0.73	-0.89	-0.31	0.61
	(1.42)	(0.88)	(-1.41)	(-0.65)	(0.97)
FF-4F alpha	0.37	0.03	-0.63	-0.22	0.71
	(0.82)	(0.04)	(-1.14)	(-0.46)	(1.31)
GRS p-value			0.25		
2008-2012					
Diff 1-5	0.25	0.09	-0.24	0.74	0.70
	(0.83)	(0.19)	(-0.61)	(1.91)*	(1.30)
FF-4F alpha	0.46	0.12	0.13	1.10	0.84
	(1.40)	(0.25)	(0.32)	(2.71)***	(1.68)*
GRS p-value			0.05		
ΔSIO					
2003-2007					
Diff 1-5	0.21	0.68	0.02	0.35	0.12
	(0.36)	(0.99)	(0.04)	(0.61)	(0.21)
FF-4F alpha	-0.32	0.36	-0.02	0.70	0.41
	(-0.79)	(0.62)	(-0.05)	(1.50)	(0.79)
GRS p-value			0.35		
2008-2012					
Diff 1-5	-0.25	0.11	-0.40	-0.58	-0.49
	(-0.52)	(0.27)	(-0.66)	(-1.72)	(-0.92)
FF-4F alpha	0.11	0.38	0.28	-0.31	-0.01
	(0.24)	(0.95)	(0.47)	(-0.88)	(-0.03)
GRS p-value			0.40		
Adj_ΔIO					
2003-2007					
Diff 1-5	0.33	0.09	-0.12	-0.40	0.47
	(0.50)	(0.13)	(-0.14)	(-0.51)	(0.47)
FF-4F alpha	0.04	0.16	0.56	0.13	0.39
	(0.06)	(0.25)	(0.66)	(0.17)	(0.36)
GRS p-value			0.45		
2008-2012					
Diff 1-5	-0.35	-0.16	-0.19	-0.02	0.15
	(-0.78)	(-0.29)	(-0.31)	(-0.46)	(0.27)
FF-4F alpha	0.02	-0.08	0.10	0.44	0.51
	(0.06)	(-0.14)	(0.24)	(0.93)	(0.81)
GRS p-value			0.43		

Value-weighted monthly returns

	1(low)	2	3	4	5(high)
Lagged IO					
2003-2007					
Diff 1-5	1.07	0.74	-0.97	-0.19	0.43
	(2.46)**	(1.64)	(-1.37)	(-0.37)	(1.15)
FF-4F alpha	0.65	0.52	-0.92	0.13	0.53
	(1.58)	(1.16)	(-1.29)	(0.28)	(1.04)
GRS p-value			0.28		
2008-2012					
Diff 1-5	0.03	0.99	0.39	1.08	0.50
	(0.08)	(1.51)	(0.71)	(1.76)*	(0.70)
FF-4F alpha	0.49	1.35	1.08	1.45	0.80
	(1.02)	(1.92)**	(2.00)**	(2.25)**	(1.02)
GRS p-value			0.03		
ΔSIO					
2003-2007					
Diff 1-5	0.89	0.18	0.07	0.49	0.37
	(1.11)	(0.54)	(0.10)	(0.84)	(0.47)
FF-4F alpha	0.41	0.31	0.24	0.69	0.64
	(0.64)	(1.45)	(0.36)	(1.06)	(0.92)
GRS p-value			0.23		
2008-2012					
Diff 1-5	0.17	0.47	0.27	-0.14	0.19
	(0.25)	(0.69)	(0.36)	(-0.23)	(0.26)
FF-4F alpha	0.72	0.64	0.56	0.09	0.43
	(0.97)	(1.58)	(1.29)	(0.15)	(0.96)
GRS p-value			0.15		
Adj_ΔIO					
2003-2007					
Diff 1-5	-0.19	0.15	0.52	0.06	0.16
	(-0.19)	(0.15)	(0.46)	(0.07)	(0.14)
FF-4F alpha	0.02	0.39	0.88	0.30	-0.08
	(0.06)	(0.46)	(1.04)	(0.91)	(-0.06)
GRS p-value			0.40		
2008-2012					
Diff 1-5	-0.16	0.45	-0.14	0.13	0.74
	(-0.19)	(0.61)	(-0.26)	(0.17)	(0.94)
FF-4F alpha	0.50	0.60	0.16	0.82	1.09
	(0.57)	(1.08)	(0.29)	(1.18)	(1.36)
GRS p-value			0.12		

This table reports the distress premium across lagged *IO, ΔSIO* and *Adj_ΔIO* quintiles. Lagged *IO* is institutional ownership in the past three months. *ΔSIO* is the contemporaneous change in standardized *IO*. *Adj_ΔIO* is the change in the fraction of tradable shares held by all institutions for a stock in quarter *q,* less the average change in quarter *q* for stocks within the same capitalization quintile, divided by the cross-sectional mean fraction of tradable shares held by all institutions in that quarter for stocks within the same capitalization quintile. The results are based upon the regressions for two sub-periods, i.e sub-period (2003-2007) and sub-period (2008-2012). *t*-statistics associated with each alpha value are reported in parentheses. The last row in each panel reports the *p*-value for the *GRS* test (Gibbons *et al*., 1989) with the null hypothesis that the five risk-adjusted distress premiums are jointly equal to zero. *, **, and *** represent significance levels at 10%, 5% and 1%, respectively.

Table 8 Cross-sectional regression analysis of monthly stock return on distress risk

	2003-2102						2003-2007	2008-2012	2003-2007	2008-2012	2003-2007	2008-2012	2003-2007	2008-2012
	All stocks	No IO	With IO				With IO							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
PD	-0.0123	-0.0016	-0.0147	-0.0138	0.0063	-0.0078	-0.0148	-0.0146	-0.0126	-0.0150	0.0097	-0.0085	-0.0059	-0.0084
	(-2.35)**	(-0.27)	(-2.24)**	(-1.96)**	(0.16)	(-1.03)	(-2.01)**	(-1.86)*	(-1.43)	(-2.09)**	(0.19)	(-0.75)	(-0.61)	(-0.94)
Lagged IO				0.0214					0.0377	0.0054				
				(2.42)**					(2.75)***	(0.53)				
ΔSIO					0.0423						0.0453	0.0423		
					(16.39)***						(6.66)***	(14.96)		
Adj_ΔIO						0.0205							0.0185	0.0225
						(13.61)***							(5.86)***	(9.99)***
Turnover	-0.3711	-0.5672	-0.3297	-0.3141	-0.3675	-0.3237	-0.2643	-0.3958	-0.2509	-0.3773	-0.4030	-0.3959	-0.2718	-0.3742
	(-5.23)***	(-4.46)***	(-3.23)***	(-3.24)***	(-3.47)***	(-3.04)***	(-1.68)*	(-4.06)***	(-1.73)*	(-3.74)***	(-2.42)**	(-3.11)***	(-1.68)*	(-3.68)***
BTM	0.0062	0.0059	0.0058	0.0075	0.0126	0.0084	0.0185	0.0049	0.0202	0.0050	0.0211	0.0010	0.0200	0.0013
	(1.29)	(1.32)	(0.98)	(1.30)	(1.90)*	(1.43)	(2.36)***	(0.63)	(3.16)***	(0.64)	(2.42)**	(1.11)	(2.68)***	(0.20)
Illiquidity	1.1611	1.3672	1.2454	1.2217	1.1202	1.2228	0.1541	2.3165	0.0922	2.3303	0.0761	2.4132	0.4484	2.8632
	(1.79)*	(1.63)*	(1.74)*	(1.74)*	(2.92)***	(1.53)	(1.51)	(1.89)*	(1.19)	(1.88)*	(0.86)	(2.63)**	(1.94)**	(1.80)*
Size	-0.0035	-0.0104	-0.0041	-0.0047	-0.0031	-0.0049	-0.0004	-0.0077	-0.0023	-0.0075	-0.0009	-0.0061	-0.0020	-0.0077
	(-1.69)*	(-3.62)***	(-2.10)**	(-2.74)***	(-2.14)**	(-2.63)***	(-0.14)	(-3.29)***	(-0.85)	(-3.38)***	(-0.35)	(-2.16)**	(-0.71)	(-3.25)***
Skewness	-0.0004	-0.0005	-0.0027	-0.0025	-0.0031	-0.0027	-0.0034	-0.0022	-0.0032	-0.0018	-0.0040	-0.0007	-0.0027	-0.0027
	(-0.35)	(-0.27)	(-1.52)	(-1.56)	(-1.60)	(-1.56)	(-1.44)	(-0.78)	(-1.32)	(-0.70)	(-1.50)	(-0.26)	(-1.20)	(-0.95)
Lag Return	-0.0508	-0.0774	-0.0380	-0.0383	-0.0698	-0.0492	-0.0282	-0.0475	-0.0288	-0.0476	-0.0367	-0.0670	-0.0378	-0.0650
	(-5.98)***	(-5.51)***	(-3.88)***	(-3.89)***	(-6.14)***	(-4.95)***	(-1.82)*	(-4.14)***	(-1.85)*	(-4.21)***	(-2.35)**	(-6.59)***	(-2.47)**	(-5.40)***
Momentum	0.0070	-0.0015	0.0094	0.0076	0.0106	0.0063	0.0243	0.0053	0.0205	0.0051	0.0257	0.0040	0.0201	0.0030
	(1.39)	(-0.25)	(1.78)*	(1.54)	(2.00)**	(1.28)	(3.50)***	(0.99)	(3.14)***	(1.05)	(3.76)***	(0.86)	(3.40)	(1.41)
Volatility	-0.0710	0.1029	0.0101	0.0355	0.2906	0.1243	-0.1455	0.1631	-0.0811	0.1501	0.2085	0.2385	0.0000	0.2469
	(-0.51)	(0.46)	(0.05)	(0.16)	(1.11)	(0.54)	(-0.46)	(0.68)	(-0.28)	(0.66)	(0.65)	(0.65)	(0.00)	(1.09)
Cons	0.0752	0.2224	0.1011	0.1160	0.0867	0.1149	0.0358	0.1658	0.0691	0.1617	0.0406	0.1212	0.0687	0.1601
	(1.69)*	(3.64)***	(2.27)**	(1.40)	(2.03)**	(2.60)***	(0.42)	(2.68)***	(1.17)	(2.69)***	(0.78)	(1.71)*	(1.07)	(2.59)***
Avg.stocks	1,238	224	1,026	1,026	1,026	1,026	847	1,201	847	1,201	847	1,201	847	1,201

This table reports Fama-MacBeth cross-sectional regression of monthly stock return on distress probability (*PD)* and other control variables. *PD* is predicted probability of ST estimated from the distress prediction model. Lagged *IO* is the level of *IO* in quarter *q-1*. *ΔSIO* is the contemporaneous change in standardized *IO*. *Adj_ΔIO* is the change in the fraction of tradable shares held by all institutions for a stock in this quarter minus the averaged this quarter change for stocks within the same capitalization quintile divided by the cross-sectional mean fraction of tradable shares held by all institutions in that quarter for stocks within the same capitalization quintile. *BTM* is the book-to-market ratio with the last financial year's book value equity divided by total market capitalization in the last month. *Turnover* is the average daily turnover during the past 12 months, ending in month *t-1*. *Illiquidity* is the average ratio of absolute values of monthly returns divided by the total number of shares traded in the past 12 months, ending in *t-1*. *Size* is total market capitalization in nature logarithm form in month *t-1*. *Skewness* is the average daily return skewness in the past 12 months, ending in month *t-1*. *Lagged Return* is returns in month *t-1*. *Momentum* is the average past 12-month returns momentum, ending in month *t-1*. *Volatility* is the average daily return standard deviation in the past 12 months, ending in month *t-1*. The time-series averages of coefficients for each variable and associated Newey-West *t*-statistics are reported in the table. *, **, and *** represent significance levels at 10%, 5% and 1%, respectively. The first, fourth, fifth and sixth columns report the results for all sample stocks. The second column reports the results for the stocks without any *IO*. The third, seventh, eighth and ninth columns report the results for the stocks with *IO*.

Table 9 The change in the distress-based preference to explain the distress premium

Panel A: Distress premium in quarters with strong and weak preference change for distress	Equally weighted	Value-weighted
ΔSIO		
Quarters with a strong change in the distress-based preference	0.0187	0.0263
	(2.82)***	(3.30)***
Quarters with a weak change in the distress-based preference	-0.0103	-0.0119
	(-1.46)	(-1.14)
Diff	0.0291	0.0382
	(2.99)***	(3.28)***
Adj_ΔIO		
Quarters with a strong change in the distress-based preference	0.0130	0.0160
	(1.97)**	(1.95)**
Quarters with a weak change in the distress-based preference	-0.0056	-0.0027
	(-0.82)	(-0.32)
Diff	0.0187	0.0188
	(1.97)**	(1.80)*
Panel B: Time-series regression of distress premium on preference change for distress		
ΔSIO^L-ΔSIO^H	0.0862	0.1097
	(3.27)***	(3.46)***
Cons	0.0043	0.0074
	(0.89)	(1.27)
Adj_R^2	0.09	0.10
Adj_ΔIO^L-Adj_ΔIO^H	0.0016	0.0018
	(2.31)**	(2.10)**
Cons	0.0006	0.0032
	(0.12)	(0.52)
Adj_R^2	0.04	0.04

This table reports the results that the change in the distress-based preference on distress explains the distress anomaly. We define ΔSIO^L ($Adj\_\Delta IO^L$) and ΔSIO^H ($Adj\_\Delta IO^H$) as changes in preferences of the lowest and highest distress portfolio respectively. Differences on changes in preferences between the two decile portfolios i.e., ΔSIO^L-ΔSIO^H and $Adj\_\Delta IO^L$ - $Adj\_\Delta IO^H$, are proxied for the change in the distress-based preference. We rank the sample quarters by ΔSIO^L-ΔSIO^H or $Adj\_\Delta IO^L$ - $Adj\_\Delta IO^H$ and separate the quarters into two groups by a 50% cut-off rate. The first group includes quarters with a strong change in the distress-based preference, while the second group includes quarters with a weak change in the distress-based preference. We also undertake a time-series regression approach to regressing the distress premiums on (ΔSIO^L –ΔSIO^H) and ($Adj\_\Delta IO^L$ - $Adj\_\Delta IO^H$), respectively. *t*-statistics are reported in parentheses. *, **, and *** represent significance levels at 10%, 5% and 1%, respectively.

Table 10 Testing other explanations for distress anomaly

		PD	BTM	Size	Turnover	Illiquidity	Price	Momentum	Skewness	Volatility
Panel A: Determinants of the institutional demand (ΔSIO and Adj_ΔIO) in quarters *following* the low and high distress premium										
Low distress premium $_{q-1}$	ΔSIO	-0.011	-0.005	0.006	0.018	0.002	-0.017	0.005	-0.001	-0.017
		(-2.16)**	(-0.84)	(0.37)	(2.57)**	(0.32)	(-1.35)	(0.45)	(-0.16)	(-1.51)
	Adj_ΔIO	-0.028	-0.003	-0.006	0.004	0.016	0.021	0.010	0.007	-0.006
		(-2.90)***	(-0.28)	(-0.25)	(0.19)	(1.29)	(0.45)	(0.58)	(0.68)	(-0.26)
High distress premium $_{q-1}$	ΔSIO	-0.005	-0.003	-0.020	0.002	-0.003	-0.029	0.011	-0.002	-0.007
		(-1.50)	(-0.57)	(-1.48)	(0.34)	(-0.43)	(-2.13)**	(1.26)	(-0.50)	(-0.81)
	Adj_ΔIO	0.000	-0.025	0.015	0.038	0.006	-0.071	0.008	-0.005	-0.021
		(-0.04)	(-2.21)**	(0.68)	(1.80)*	(0.42)	(-1.37)	(0.51)	(-0.54)	(-1.49)
Panel B: Determinants of the institutional demand (ΔSIO and Adj_ΔIO) in quarters *with* the low and high distress premium										
Low distress premium $_{q}$	ΔSIO	-0.005	0.000	-0.016	0.012	-0.007	-0.036	0.011	0.001	-0.004
		(-1.26)	-(0.03)	(-1.01)	(1.55)	(-0.98)	(-2.47)**	(1.39)	(0.14)	(-0.47)
	Adj_ΔIO	-0.004	-0.016	0.012	0.039	-0.007	-0.050	0.010	-0.001	-0.020
		(-0.52)	(-1.37)	(0.50)	(1.58)	(-0.46)	(-0.95)	(0.85)	(-0.06)	(-1.65)*
High distress premium $_{q}$	ΔSIO	-0.010	-0.008	0.001	0.008	0.006	-0.011	0.005	-0.004	-0.018
		(-2.47)**	(-1.45)	(0.08)	(1.22)	(0.81)	(-0.97)	(0.42)	(-0.78)	(-1.87)*
	Adj_ΔIO	-0.023	-0.012	-0.002	0.005	0.028	-0.004	0.008	0.003	-0.008
		(-2.10)**	(-1.05)	(-0.10)	(0.31)	(2.64)***	(-0.08)	(0.40)	(0.34)	(-0.30)

This table reports quarterly regression results. Panel A reports the determinant of institutional demand (*ΔSIO* and *Adj_ΔIO*) as a dependent variable in quarters following low and high distress premiums. The distress premium (the average monthly return differences between the bottom and top decile portfolios in each quarter) is separated into low and high groups by a 50% cut-off rate. Panel B reports determinants of institutional demand in quarters with the low and high premiums. Each controlling variable is standardized by subtracting the cross-sectional mean value and dividing by the cross-sectional standard deviation. *PD* is the predicted probability of ST in quarter q. *Size* is the natural log of the market capitalization for a firm's tradable shares at the end of quarter q. *BTM* is the book value of equity in the last financial year divided by total market capitalization at the end of quarter q; *Turnover* is the average daily turnover during the past 12 months, ending in quarter q. *Price* is the closing price at the end of quarter q. *Illiquidity* is the ratio of absolute values of monthly returns divided by the total number of shares traded averaged over the past 12 months, ending in quarter q. *Momentum* is the averaged past 12-month returns, ending in quarter q. *Volatility* is the averaged daily return standard deviation in the past 12 months, ending in quarter q. *Skewness* is the averaged daily return skewness in the past 12 months, ending in quarter q. *t*-statistics associated with each coefficient are reported in parentheses. *, **, and *** represent significance levels at 10%, 5% and 1%, respectively.

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Table 11 Determinants of institutional ownership at the beginning and end of year

	PD	BTM	Size	Turnover	Illiquidity	Price	Momentum	Skewness	Volatility
$Q_{2,t}$	-0.030	-0.041	0.248	-0.112	-0.011	0.394	0.035	-0.006	-0.012
	(-2.26)**	(-1.27)	(5.77)***	(-2.57)**	(-0.70)	(12.77)***	(-1.79)*	(-0.44)	(-0.51)
$Q_{1,t+1}$	-0.018	-0.020	0.225	-0.112	0.002	0.366	0.012	-0.003	0.027
	(-1.30)	(-0.65)	(4.92)***	(-2.98)***	(-0.13)	(10.36)***	(-0.47)	(-0.26)	(-1.20)
Diff	-0.011	0.024	-0.022	0.000	-0.014	0.027	0.023	-0.003	-0.039
	(-0.59)	(0.38)	(-0.49)	(0.00)	(-0.59)	(0.58)	(0.70)	(-0.15)	(-1.20)
$Q_{2\&3,t}$	-0.032	-0.045	0.234	-0.103	0.003	0.380	0.039	0.007	-0.031
	(-3.37)***	(-2.01)	(7.58)***	(-3.68)***	(-0.20)	(17.62)***	(3.68)***	(-0.61)	(-2.12)**
$Q_{4,t}$ & $Q_{1,t+1}$	-0.021	-0.043	0.239	-0.102	0.000	0.405	0.028	-0.011	0.010
	(-2.25)**	(-1.95)	(7.71)***	(-4.26)***	(-0.01)	(17.13)***	(1.71)*	(-1.17)	(-0.74)
Diff	-0.011	-0.002	-0.005	-0.002	0.003	-0.024	0.011	0.017	-0.041
	(-0.81)	(-0.07)	(-0.10)	(-0.04)	(0.15)	(-0.76)	(0.59)	(1.21)	(-2.04)**

This table reports quarterly regression results. It reports determinants of *IO* at the beginning and end of each information period and test their difference. Each controlling variable is standardized by subtracting the cross-sectional mean value and dividing by the cross-sectional standard deviation. *PD* is the predicted probability of ST in quarter *q*. *Size* is the natural log of the market capitalization for a firm's tradable shares at the end of quarter *q*. *BTM* is the book value of equity in the last financial year divided by total market capitalization at the end of quarter *q*; *Turnover* is the average daily turnover during the past 12 months, ending in quarter *q*. *Price* is the closing price at the end of quarter *q*. *Illiquidity* is the ratio of absolute values of monthly returns divided by the total number of shares traded averaged over the past 12 months, ending in quarter *q*. *Momentum* is the averaged past 12-month returns, ending in quarter *q*. *Volatility* is the averaged daily return standard deviation in the past 12 months, ending in quarter *q*. *Skewness* is the averaged daily return skewness in the past 12 months, ending in quarter *q*. *t*-statistics associated with each coefficient are reported in parentheses. *, **, and *** represent significance levels at 10%, 5% and 1%, respectively.

Appendix A1: ST events in the sample period

ST reasons	Number of ST cases
Continuous loss in past two years and book value equity below par	467
Failure to disclose annual report on time	6
Negative audit opinions for latest financial reports	36
Under lawsuits for bank loan default	10
Failure in financial investments and loan guarantee	5
Suspended operations that were caused by other reasons	6
Bankruptcy filings	6
Extraordinary losses in the prior year and inadequate liquidity	9
Total	545

Note: The table reports the number of ST events for different type of reasons. The sample period is from January 1998 to December 2012.

Appendix A2: Variable description

Size: total market capitalizations of tradable shares in the last month.

Turnover: the average ratio of the number of shares traded, divided by the number of tradable shares outstanding in the past 12 months.

Book-to-market ratio (BTM): book equity value at the end of the last financial year over market value equity in the last month.

Illiquidity: the average ratio of an absolute value of monthly returns divided by the total number of shares traded in the past 12 months (Amihud, 2002).

Volatility: the daily return standard deviation in the past 12 months.

Momentum: the cumulative monthly returns in the past 12 months.

Skewness: the daily return skewness in the past 12 months.

lagReturn: the previous month's returns.

Price: the closing price at the end of month.

Institutional ownership (IO): a firm's tradable A-shares owned by aggregated institutional investors to the firm's total outstanding tradable A-shares