



# Financial distress and customer-supplier relationships



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## ABSTRACT

Using a customer-supplier matched sample from 1980 to 2014, I study the role of customer-supplier relationships on suppliers' financial distress. If a significant amount of a supplier's sales is tied to a major customer, the supplier's financial health is influenced by the major customer's financial conditions. I find that a supplier's probability of financial distress is positively related to its major customer's financial distress status. This relation persists up to two years after a major customer is in financial distress. Further, I show that the relationship is more pronounced when customer-supplier relationships are stronger, when a major customer is more likely to fail in the future, and when the supplier makes unique products. The results highlight the importance of understanding customer-supplier relationships when analyzing a firm's probability of financial distress.

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## 1. Introduction

Researchers have focused on customer-supplier relationships and the financial implication on suppliers. Existing evidence shows that major customers' financial conditions influence the performance of suppliers in the capital market, because a large portion of the suppliers' earnings are from major customers. For instance, [Cohen and Frazzini \(2008\)](#) show that suppliers' stock returns are positively correlated with the customers' stock returns. [Hertzel et al. \(2008\)](#) document a negative valuation effect of a customer's bankruptcy filings on its suppliers and the rivals in the suppliers' industries. Moreover, [Jarrow and Yu \(2001\)](#) and [Gençay et al. \(2015\)](#) show that the counterparty risk plays a role in determining the price of public debts. However, prior studies focus on the price effect of customer-supplier relationships on suppliers, e.g. stock returns and credit spreads, rather than the risk effect of customer-supplier relationships on suppliers. Using a theoretical model, [Jarrow and Yu \(2001\)](#) argue that firm default risk arises not only from exposure to common risk factors but also from firm-specific counterparty risk. Major customers, as big counterparties of suppliers, influence their suppliers' default risk when the major customers are in financial distress. So far, we do not have a comprehensive study on whether and how risks transfer along the supply chain. This paper aims to fill the void by examining the impact of distressed major customers on the probability of suppliers' financial distress in the future.

[Gilson \(1989\)](#) defines financial distress as the inability to meet fixed payment obligation on debt. [Opler and Titman \(1994\)](#) argue that the loss in financial distress is substantial, and financial distress is costly not only to debtholders and shareholders, but also to customers, suppliers and employees. Using the Compustat Customer Segment data from 1980 to 2014, I show that the future distress risk of suppliers is positively related to the distressed major customers. The effect is persistent up to two years after major customers are financially distressed. Further, I find that the effect is more pronounced when the customer-supplier relationships are stronger, when major customers are more likely to fail in the future, and when suppliers make specialized or unique products.

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The main results are less likely to be influenced by simultaneity bias. For instance, risky customers and risky suppliers simultaneously choose each other to do business. First, I lag one year between suppliers and customers. It is less likely that my research is suffered from the simultaneous bias because one year lag allows time effect to show up. Second, the effect of financially distressed major customers on suppliers deteriorates over time, which counters the simultaneity bias explanation. Third, from an untabulated instrumental variable regression, I use customers' firm characteristics in previous year as instrumental variables for the customers' financial distress indicator. The first stage regression Wald test fails to reject exogenous hypothesis of the customers' financial distress variable, though the main results are consistent in the instrumental variable regression. The main results are less likely to be driven by unobserved characteristics that correlated with both groups of customers and suppliers. I match treatment and control firms using propensity score matching method that include a vector of customers' characteristics from previous year, a vector of suppliers' characteristics, year and industry fixed effects. I find that the main results are not changed.

This paper contributes to the literature of customer-supplier relationships. Previous studies have examined the effect of customer-supplier relationships on information transfer (Cohen and Frazzini, 2008), distress cost (Hertzel et al., 2008), bargaining power (Fee and Thomas, 2004; Brown et al., 2009), debt contracting (Kim et al., 2015), cash holdings (Itzkowitz, 2013), investment-cash flow sensitivity (Itzkowitz, 2015), payout policy (Wang, 2012), leverage (Titman and Wessels, 1988; Oliveira et al., 2017), tax avoidance (Huang et al., 2016), accounting conservatism (Hui et al., 2012), analyst forecast (Guan et al., 2015), and cost of capital (Dhaliwal et al., 2016). In this paper, I study the transfer of distress risk from customer firms to supplier firms. The probability of suppliers' financial distress is more pronounced when the inter-firm relationships are stronger, when customers are more likely to fail in the future, and when suppliers make specialized or unique products. The findings shed lights on the risk contagion along supply chain. The findings explain the negative valuation effect of suppliers when their customers file bankruptcy in Hertzel et al. (2008) and the increase of suppliers' cost of debt when their customers' performance deteriorates in Kim et al. (2015).

This paper also contributes to the financial distress literature. First, I show that customers' financial distress status plays an important role when predicting the probability of suppliers' financial distress. Shumway (2001) proposes a model that combines a vector of accounting and market variables and shows that his model better predicts a firm's bankruptcy risk than Altman's (1968) and Zmijewski's (1984) models. Chava and Jarrow (2004) confirm the better performance of Shumway's (2001) model. But they point out that including industry effects in predicating distress risk is important. Besides those variables mentioned above, I show that customers' financial distress status is positively and significantly associated with the suppliers' probability of financial distress in the future. I also show that the effect of customers' financial distress persists up to two years. Second, I support the contagion effect of financial distress from customer firms to supplier firms. Lang and Stulz (1992) show that a firm's financial distress affects its rivals in the same industry. Hertzel et al. (2008) argue that financial distress not only affects the rivals in the same industry but also the suppliers along the supply chain. Besides the valuation effect found in the existing literature, I provide direct evidence on the transfer of financial distress risk from customers to suppliers.

The remainder of this paper is organized as follows. Section 2 discusses the development of hypotheses and the empirical strategy. Section 3 describes the data, variables and summary statistics. Section 4 reports the empirical results and Section 5 provides concluding remarks.

## 2. Hypotheses development and empirical strategy

My main hypothesis is that financial distress transfers from customers to suppliers along the supply chain. First, major customers in financial distress may fail to fulfill their obligations to supplier firms, which increases the cash flow risks and default risks of their suppliers (Jarrow and Yu, 2001; Giesecke and Weber, 2004). Second, financially distressed customers may decrease the future demand on the products or services from suppliers, which deteriorates the suppliers' future earnings and cash flows (Olsen and Dietrich, 1985; Pandit et al., 2011). So the existence of financially distressed customers increases the supplier's default risk. Third, prior literature suggests that customer-supplier relationship is established via long-term contracts, strategic alliance or relationship-specific investments (Titman, 1984; Banerjee et al., 2008; Raman and Shahrur, 2008; Johnson et al., 2010; Irvine et al., 2015). The switching cost of finding a new customer is very high for a supplier. Therefore, the failure of major customers will negatively impact the future earnings of suppliers, thereby increasing the default risk of suppliers.

**Hypothesis I.** Financial distress transfers from customer firms to supplier firms.

In cross-section, customer-supplier relationships vary by different characteristics of suppliers and customers. When customer-supplier relationships are stronger, I expect that the effect of financially distressed customers on their suppliers is much higher. As suggested by prior literature, a strong business relationship can be formed by large stake on suppliers' sales or by concentrated customers. Therefore, a larger stake customers hold on a supplier, a higher chance the supplier is likely to suffer when its major customers are in financial distress.

**Hypothesis II.** All else being equal, the effect of financially distressed customers on suppliers is more pronounced when the customer-supplier relationship is stronger.

As I argue above, because suppliers' earnings are tied to the major customers' demand, the risks of earnings and cash flows of suppliers increase if the financially distressed major customers fail in the future. Therefore, the effect of financially distressed customers on suppliers is more pronounced when the customers are more likely to fail in the future. I use customers' financial

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