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Zhang, Yanlei ; García Lara, Juan M. ; Tribó, Josep A.

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## Unpacking the Black Box of Trade Credit to Socially Responsible Customers

**Yanlei Zhang**<sup>†</sup>

Department of Accounting,  
Copenhagen Business School, Denmark  
yz.acc@cbs.dk

**Juan M. García Lara**

Department of Business Administration,  
Universidad Carlos III de Madrid, Spain  
jmglara@emp.uc3m.es

**Josep A. Tribó**

School of Business,  
Stevens Institute of Technology, USA  
jtribo@stevens.edu

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<sup>†</sup> Corresponding author. Department of Accounting, Copenhagen Business School, Solbjerg Plads 3, C.4. 2000, Frederiksberg, Denmark. E-mail: yz.acc@cbs.dk. Tel.: +45 3815 2352

**Abstract**

We investigate whether suppliers value customer firms' socially responsible activities by examining the relation between corporate social responsibility (CSR) and firms' access to trade credit. We posit that firms with better social performance are more likely to receive trade credit because suppliers view customers' CSR activities as a signal of trustworthiness and of the capacity to meet financial obligations. In addition to this direct channel, we describe other channels: a) trade credit opens the possibility for suppliers to secure a share of their customers' future business opportunities, which are expected to be higher for socially responsible firms, and b) the risk associated with the diffusion of negative shocks through the supply chain due to trade credit is lower for socially responsible firms, making them more attractive partners for suppliers. Consistent with our predictions, we find that socially responsible customers receive more trade credit from suppliers. This relation is more pronounced in situations where the aforementioned channels are more relevant: namely, when the financial health of a customer is of greater importance to its suppliers; when there are greater information asymmetries between suppliers and customers due to a lack of close transactional relationships; when socially responsible activities are more likely to generate growth; and when suppliers are exposed to higher risk in the customer-supplier relationship. We also document that during the global financial crisis, socially responsible customers offered backward liquidity provision to suppliers by reducing their use of trade credit, which represents an extra benefit of having socially responsible customers in production networks.

**Keywords:** Customer-supplier relationships, corporate social responsibility (CSR), trade credit

**JEL Classifications:** G32, G34, M21

## 1 Introduction

Corporate social responsibility (CSR) has become increasingly important in recent years, and many firms invest resources in socially responsible activities.<sup>1</sup> Governments, nongovernmental organizations, and educational institutions also highlight the importance of CSR activities.<sup>2</sup> However, the merits of socially responsible activities are still debated. In this paper, we investigate whether suppliers value customer firms' CSR activities by examining the relation between CSR and firms' access to trade credit. We are particularly interested in the underlying driving forces and the benefits that suppliers expect to obtain when they offer trade credit to socially responsible customers.

Previous studies advance two viewpoints on the merits of CSR activities. Some argue that CSR activities improve a firm's financial performance, referring to the phrase "doing well by doing good". These studies find that CSR activities are associated with higher shareholder value (Jiao, 2010; Edmans, 2011; Deng, Kang, and Low, 2013; Flammer, 2015), better financing conditions (Bae, Kang, and Wang, 2011; Goss and Roberts, 2011; Cheng, Ioannou, and Serafeim, 2014; Kim, Surroca, and Tribó, 2014; Breuer et al., 2018), and lower risk (Bouslah, Kryzanowski, and M'Zali, 2013; Lins, Servaes, and Tamayo, 2017; Shiu and Yang, 2017). In contrast, another stream of literature argues that CSR could be an outcome of agency conflicts and managerial entrenchment (Pagano and Volpin, 2005; Surroca and Tribó, 2008; Cronqvist et al., 2009; Di Giuli and Kostovetsky, 2014; Masulis and Reza, 2015) and that it damages shareholders' wealth.

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<sup>1</sup> According to a survey by *The Economist* (<http://www.economist.com/node/10491077#sthash.Z1yWMJdj.dpbs>), CSR activities are rising sharply in corporate executives' priorities.

<sup>2</sup> For instance, the Global Compact (UNGC) and Industrial Development Organization (UNIDO) of the United Nations encourage firms to adopt socially responsible policies. For more information, see <http://www.unglobalcompact.org/> and <http://www.unido.org/>.

We add to the debate on the costs and benefits of CSR activities through the investigation of suppliers' responses to customer firms' CSR activities in the form of trade credit. Trade credit is offered by suppliers to customer firms accompanied with product market transactions, and it is especially helpful in allowing firms to overcome liquidity constraints. We expect suppliers to be more willing to provide trade credit to socially responsible customers because of both financial and strategic considerations.

Regarding the direct financial reasons, we expect suppliers to grant more trade credit to socially responsible customers because these customers are more likely to honor their financial obligations. We expect this to occur because socially responsible firms are more ethical and therefore less likely to engage in strategic payment delays or defaults and because, as shown in prior research, socially responsible firms tend to have better access to financing sources and are less financially constrained (e.g., Cheng, Ioannou, and Serafeim, 2014; Breuer et al., 2018).

Regarding strategic considerations, we expect socially responsible customers to receive more trade credit because they (i) have higher growth opportunities (Lev, Petrovits, and Radhakrishnan, 2010), which their suppliers want to share in, and (ii) enjoy insurance-like protection against negative shocks (Godfrey, Merrill, and Hansen, 2009). Regarding (i), through the provision of trade credit, suppliers can build good relationships with their socially responsible customers and share in their future growth opportunities. Regarding (ii), when negative events take place, we expect socially responsible customers to be less affected, as socially responsible activities play an insurance role. Additionally, socially responsible firms are expected to be more willing to assume their share of costs from the shock and not just

pass them along. This further mitigates the diffusion of risk from customers to suppliers.

To empirically test our expectations, we use a sample of U.S. nonfinancial firms. We measure a firm's social performance using its CSR rating score in the Kinder, Lydenberg, and Domini (KLD) database. Trade credit and other control variables are collected from Compustat. Our results show that socially responsible customers are more likely to receive trade credit from suppliers. Consistent with the hypothesized direct channel linking CSR and trade credit, we find that the relation between CSR and trade credit is more pronounced when customers are important to suppliers (i.e., represent a large percentage of sales). It is these key customers that suppliers want to be certain can meet their financial obligations. Additionally, the relation between CSR and trade credit decreases when a customer has a closer transactional relationship with its suppliers. This result suggests that suppliers significantly rely on customers' CSR as an informative signal of customers' financial health due to information asymmetry at the early stage of their transactions.

We also find evidence consistent with the other two channels that we study. First, the relation between CSR and trade credit is more pronounced when customer firms' final consumers care more about socially responsible activities. This result supports our expectation that trade credit helps suppliers build business relationships with their socially responsible customers and share in their growth opportunities. Second, the influence of CSR activities on trade credit is also more pronounced when customer firms operate in industries with higher levels of product market competition. This supports the second channel discussed above: by providing trade credit to socially responsible customers, suppliers can reduce the potential diffusion of negative shocks from customers, which are more likely to appear in

competitive markets.

We further demonstrate that during the global financial crisis, socially responsible customers offered backward liquidity provision to suppliers. We find that following the onset of the financial crisis, socially responsible customers *reduced* their use of trade credit and meanwhile *increased* debt financing, particularly when they had an adequate financial situation and when suppliers lacked liquidity. This policy helped alleviate suppliers' liquidity constraints during the crisis, and it reinforces the view that socially responsible customers are ethical and trustworthy and are willing to relax their trade terms when their suppliers experience periods of financing difficulties.

In addition to our main tests based on the whole universe of Compustat nonfinancial firms, we also use a sample of customer-supplier pairs. This paired sample, while smaller, allows us to control for the characteristics of both suppliers and customers, thus alleviating endogeneity concerns related to omitted variables. We also adopt an instrumental variable regression approach and include firm fixed effects in the estimations to better identify causal effects. Using these alternative methods, we obtain results that are consistent with our expectations and in line with those of our main tests.

Our study contributes to the literature in several ways. First, it adds to previous studies by providing an in-depth analysis of suppliers' incentives to grant trade credit to socially responsible customers. A growing stream of literature examines the link between CSR and trade credit. For instance, Zhang et al. (2014) and Yang et al. (2019) find that charitable donations help Chinese nonstate-owned enterprises obtain trade credit; Xu, Wu, and Dao



(2019) examine the association between CSR performance and trade credit in the U.S.<sup>3</sup> However, despite the documented phenomenon, the underlying driving forces behind suppliers' trade credit extension to socially responsible customers are still unclear.<sup>4</sup> We add to this stream of literature by demonstrating suppliers' financial and strategic considerations in their trade credit provision. We attribute the main driving force to suppliers' incentives to ensure repayment of trade credit, and trade credit can also be a strategic choice for suppliers seeking to share in the growth opportunities of socially responsible customers and to nurture relationships with customers who are less likely to transmit negative shocks along the supply chain. We support these arguments by exploring the situations under which these incentives would lead to increased trade credit. Overall, our study presents a more accurate picture of the channels linking CSR with trade credit.

Second, our finding that socially responsible customers acted as liquidity providers during the crisis provides new insights into the literature on trade credit. Previous literature on trade credit focuses on suppliers' liquidity provision to customers (e.g., Klapper, Laeven, and Rajan, 2012; Restrepo, Cardona-Sosa, and Strahan, 2019), especially during the financial crisis (Garcia-Appendini and Montoriol-Garriga, 2013; Costello, 2020; Zhang, 2020). In contrast, our study demonstrates the *backward* liquidity provision from financially sound customers to liquidity-constrained suppliers during the crisis. Thus, it advances our

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<sup>3</sup> Several studies also investigate the role of CSR in customer-supplier relationships but explore different research questions. For instance, Cheung and Pok (2019) examine how a supplier's CSR activities influence its willingness to offer trade credit to customers. Dai, Liang, and Ng (2020) study whether socially responsible customers improve their suppliers' CSR.

<sup>4</sup> The question of why suppliers offer trade credit to socially responsible customers is not well explored in the literature. Zhang et al. (2014) argue that suppliers are sensitive to the moral capital that customers accumulate from philanthropy. Xu, Wu, and Dao (2019) claim that socially responsible firms demand more financing, have better reputations and are more transparent. However, Zhang et al. (2014) and Xu, Wu, and Dao (2019) do not show direct evidence to support their arguments. Yang et al. (2019) argue that philanthropy works as an instrument for a firm to obtain government resources and cover up financial deficiencies in the context of China. However, it is very unlikely that such a theory can be extended to other national settings such as the U.S.

understanding of bilateral financing activities in customer-supplier relationships.

Finally, our study also broadly contributes to the literature on societal trust and trade credit. Wu, Firth, and Rui (2014) and Hasan and Habib (2019) find that regional societal trust influences trade credit flows in production networks in China and in the U.S., respectively. Levine, Lin, and Xie (2018) show international evidence that country-level societal trust facilitates access to trade credit during crises. Our study adds to this line of literature by demonstrating the micro foundations of such aggregate relationships. We show that CSR-induced interfirm trust plays a positive role in impacting trade credit and helps explain the importance of macro-level societal trust for the provision of trade credit. Furthermore, given that CSR can be chosen by firms, our analysis provides practical implications for firms seeking to improve their customer-supplier relationships.

The remainder of our paper is organized as follows. Section 2 develops the hypotheses. Section 3 introduces the sample, methodology, variables, and summary statistics. Section 4 reports the main results, and Section 5 reports the robustness tests. Section 6 concludes.

## **2 Hypotheses development: Customers' CSR activities and trade credit**

We expect suppliers to be more willing to grant trade credit to socially responsible customers because socially responsible firms a) tend to be financially healthier and more trustworthy than firms with poorer CSR performance, b) have growth opportunities that suppliers want to share in, and c) are perceived by suppliers to be less likely to diffuse negative shocks along the supply chain. We explain these three channels in detail below.

### *2.1 Direct financial channel: Ensuring repayment*

Trade credit policies are driven by industry standards (Petersen and Rajan, 1994) and customer-specific characteristics (Ng, Smith, and Smith, 1999; Giannetti, Burkart, and Ellingsen, 2011; Klapper, Laeven, and Rajan, 2012). One especially relevant customer-specific characteristic is the customer's financial situation and willingness to attend to its obligations. Suppliers are in a privileged position, vis-à-vis financial institutions, to assess the credit quality of their customers (Mian and Smith, 1992; Petersen and Rajan, 1997). Accordingly, creditworthy buyers receive more and cheaper trade credit and have longer maturities (Giannetti, Burkart, and Ellingsen, 2011), while risky customers are offered early payment discounts that make trade credit expensive (Klapper, Laeven, and Rajan, 2012).<sup>5</sup>

Against this backdrop on how trade credit flows from suppliers to their customers, prior evidence shows that firms with better CSR performance tend to be less financially constrained and wealthier than their counterparts with fewer CSR activities. Early evidence by Waddock and Graves (1997) links CSR activities with prior good financial performance (uncovering a relation between financial slack and CSR activities) and with future good financial performance. More recent research finds that exogenous increases in firm resources lead to better CSR performance (Sun and Gunia, 2018) and that firms with better CSR performance have a lower cost of equity (El Ghouli et al., 2011; Breuer et al., 2018). Additionally, related to equity financing, Feng, Chen, and Tseng (2018) and Dutordoir, Strong, and Sun (2018) show that seasoned equity offerings (SEOs) of firms with good CSR scores perform better, with less negative market reaction to SEO announcements and less

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<sup>5</sup> An example of this type of two-tier contract is 2/10, n/30: a 2% discount on the outstanding balance if it is paid within 10 days and otherwise the net amount (i.e., no discount and no penalty) if the balance is paid between 10 and 30 days.

underpricing. Regarding debt financing, Jiraporn et al. (2014) find that firms with better CSR performance have better credit ratings; Goss and Roberts (2011) and Kim, Surroca, and Tribó (2014) show that CSR performance is related to a lower cost of private debt. More generally, Cheng, Ioannou, and Serafeim (2014) show that firms with better CSR performance have better access to financing sources and are less financially constrained.

Given this evidence that firms with better CSR performance are financially sounder, we expect that they will be assessed as more creditworthy by suppliers and that suppliers will grant more trade credit and longer maturities. Suppliers can be reasonably certain that these firms will repay within the agreed time limit, either because these firms will generate enough cash flow or because they will have easy access to financing sources. Given the discussion above, our main hypothesis is as follows:

**H1:** *Socially responsible customers are more likely than other firms to receive trade credit from suppliers.*

## *2.2 Strategic considerations: Growth and insurance effects*

We also expect suppliers to provide more trade credit to socially responsible customers to a) share in these customers' growth opportunities and b) reduce the diffusion of negative shocks through the customer-supplier relationship. We develop these expectations below.

### *2.2.1 Suppliers' incentives to share in customer firms' growth opportunities*

A supplier's future performance relies on the growth of its major customers and its bonds with them, to the point that major customers' earnings announcements directly influence the stock prices of suppliers (Pandit, Wasley, and Zach, 2011). Petersen and Rajan

(1997) argue that suppliers hold an “implicit equity stake” over customers. Suppliers are more likely to share in customers’ growth when they have strong economic bonds with their customers (Pandit, Wasley, and Zach, 2011). Trade credit is an effective way to build good relationships with customers (Wilner, 2000; Kim and Shin, 2012). For example, suppliers offer trade credit to strengthen their bonds with customers prior to committing to relationship-specific investments (Dass, Kale, and Nanda, 2015).

Several recent studies link firms’ future growth and performance to current CSR activities and argue that this link stems from end consumers’ awareness of firms’ CSR activities. For instance, Lev, Petrovits, and Radhakrishnan (2010) examine the association between charitable contributions and future revenue growth and find that the association is more pronounced for firms whose predominant customers are individual consumers, who are more sensitive to firms’ CSR activities than business buyers. Servaes and Tamayo (2013) also find that CSR activities add value because of consumers’ awareness of firms’ social performance. Thus, when a socially responsible customer operates in an industry with a higher consumer perception of CSR, it is more likely to be rewarded by its end consumers. Consequently, it is likely to be granted more trade credit by suppliers seeking to share in its growth opportunities. Therefore, we propose the following hypothesis:

**H2:** *The relation between CSR performance and trade credit is more pronounced in industries with higher consumer perceptions of CSR.*

2.2.2 *Suppliers’ risk management concerns in relation to the customer-supplier relationship*

The supplier-customer bond also transfers risks from customers to suppliers. A decrease in customers' sales reduces their demand for intermediate goods (Hertzel et al., 2008; Raddatz, 2010; Itzkowitz, 2013). A customer's bankruptcy triggers negative returns in suppliers (Hertzel et al., 2008) and increases suppliers' own bankruptcy risk (Jacobson and von Schedvin, 2015; Lian, 2017). The fact that suppliers usually cannot force customers to repay trade credit can further accelerate the transmission of shocks (Raddatz, 2010).

CSR provides "insurance-like" protection against negative events. Upon suffering negative events, socially responsible firms are less penalized by their stakeholders (Godfrey, Merrill, and Hansen, 2009; Shiu and Yang, 2017). Similarly, Lins, Servaes, and Tamayo (2017) find that during the global financial crisis, a period in which overall trust experienced a negative shock, socially responsible firms were less negatively affected. These authors' results imply that CSR builds trust between a firm and its outside stakeholders.

Given these prior results, we expect socially responsible customers to suffer less pressure from their stakeholders after a negative shock. Additionally, if socially responsible customers are more trustworthy and ethical than other firms, they are less likely to pass the negative shock on to their suppliers, especially if, by doing so, the financial health of their suppliers would suffer. Therefore, by choosing to provide trade credit to socially responsible customers, suppliers may reduce their exposure to trade credit losses and demand shrinkage along the supply chain. Given the arguments above, our third hypothesis is as follows:

**H3:** *The relation between CSR performance and trade credit is more pronounced when suppliers are exposed to higher risk in the customer-supplier relationship.*

### 3 Research design

#### 3.1 Sample

Our sample includes all U.S. incorporated nonfinancial firms covered by the Kinder, Lydenberg, and Domini (KLD) database and Compustat between 1992 and 2010. We measure a firm's social performance based on its CSR rating in the KLD database. The KLD database provides extensive ratings of firms' social performance based on various information sources, including corporate filings, government data, nongovernmental organization data, and media sources. The KLD database has been widely used in previous studies, such as those of Jiao (2010), Bae, Kang, and Wang (2011), Deng, Kang, and Low (2013), Di Giuli and Kostovetsky (2014), Ioannou and Serafeim (2015), and Flammer and Luo (2017). The KLD database initially covered 647 firms from Standard & Poor's 500 Index and the KLD 400 Social Index in 1991.<sup>6</sup> It was extended to the firms in the Russell 1000 in 2001 and to the firms in the Russell 3000 in 2003. After being acquired by MSCI in 2010, the rating system of KLD was restructured.<sup>7</sup> To ensure that the CSR scores are consistent across the sample period, we use the KLD dataset covering 1991 to 2009. Since the CSR rating score is lagged for one year, it corresponds to Compustat observations covering 1992 to 2010. As a robustness test, we also implement our main tests using KLD data for 2003 to 2009 given that

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<sup>6</sup> The KLD 400 Social Index was launched in 1990. It includes 400 public firms that meet certain standards of social and environmental excellence, and approximately 90% of them are large-cap firms.

<sup>7</sup> The KLD ratings changed substantially after being acquired by MSCI in 2010 (Di Giuli and Kostovetsky, 2014). We compare the CSR indicators from KLD for 2009 and 2010. Among the 34 strengths indicators from 2009, only 11 of them are still comparable in 2010. Among the other 23 indicators, 11 were totally dropped from the ratings system, and 12 were assessed only for a limited number of firms (less than one-third of Russell 3000 firms). Furthermore, 5 new indicators were added in 2010. All these changes make the CSR ratings after 2010 incomparable with previous ones.

this sample period covers the firms in the Russell 3000, which is more representative than the S&P 500 and the KLD 400.

We collect trade credit and firm characteristics from the Compustat industry quarterly file. Given that trade credit has a short maturity (Ng, Smith, and Smith, 1999; Klapper, Laeven, and Rajan, 2012; Restrepo, Cardona-Sosa, and Strahan, 2019), quarterly observations can better capture the evolution of trade credit.<sup>8</sup> Following prior literature, we exclude the observations with negative values of sales or total assets, those with total assets of less than 10 million U.S. dollars, and those with missing values for accounts payable.<sup>9</sup> The final sample consists of 49784 firm-quarter-level observations for 2452 unique firms.

### 3.2 Methodology

To test whether socially responsible firms are more likely to receive trade credit, we estimate the following model:

$$AP_{i,t} = \beta_0 + \beta_1 CSR_{i,t-1} + \gamma X_{i,t} + \alpha_{ind} + \alpha_{quar} + \alpha_{year} \times \alpha_{quar} + \varepsilon_{i,t}. \quad (1)$$

In Equation (1),  $AP_{i,t}$  refers to the trade credit of firm  $i$  at the end of quarter  $t$ , which is measured as accounts payable scaled by purchases ( $AP/Purchases$ ).<sup>10</sup>  $CSR_{i,t-1}$  refers to firm  $i$ 's social performance, which is lagged one year to ensure that it can be observed by suppliers. If  $H1$  holds, coefficient  $\beta_1$  should be positive.<sup>11</sup>

<sup>8</sup> The duration of trade credit is between one and four months. Ng, Smith, and Smith (1999) describe a typical trade credit contract with a duration of one month. Klapper, Laeven, and Rajan (2012) summarize 30,000 trade credit contracts from 56 large customers; they find that the average duration is two months, and the maximum duration is four months.

<sup>9</sup> As a robustness test, we eliminate the restriction on the minimum total assets in the sample selection. The results are qualitatively similar.

<sup>10</sup> This measure captures both the extent to which a firm uses trade credit and its maturity. Classical textbooks on financial statements analysis (e.g., Palepu, Healy, and Bernard, 2003) multiply  $AP/Purchases$  by 360 to obtain the "days of payables". This measure has been widely used in the accounting literature as well. For example, the influential study by Dechow (1994, p. 29) uses this measure to capture the days of payables. Here, the  $Purchases$  variable is calculated as the cost of goods sold ( $COGS$ ) plus the change in inventory. To ensure robustness, we replicate our main tests with accounts payable scaled by cost of goods sold ( $AP/COGS$ ). The results are qualitatively similar.

<sup>11</sup> While we would like to study the credit conceded by each supplier separately, this information is not publicly available. Instead, we examine the total trade credit received by a firm. This implicitly assumes that the percentage of credit sales for one given customer firm is the same across all its suppliers and that all suppliers equally value customer firms' CSR



We also include a set of control variables ( $X_{i,t}$ ) that could influence trade credit. Previous studies explore the determinants of trade credit, including firms' creditworthiness (Petersen and Rajan, 1997), growth opportunities (Petersen and Rajan, 1997), market power (Giannetti, Burkart, and Elingsen, 2011; Klapper, Laeven, and Rajan, 2012), and financial situation (Cuñat, 2007). Trade credit varies across industries (Petersen and Rajan, 1997; Ng, Smith, and Smith, 1999); hence, we include industry fixed effects ( $\alpha_{ind}$ ) to control for time-invariant industrial factors. Trade credit also changes over time (Love, Preve, and Sarria-Allende, 2007), so we include quarter fixed effects ( $\alpha_{quar}$ ) and year  $\times$  quarter fixed effects ( $\alpha_{year} \times \alpha_{quar}$ ) to account for seasonality and time-varying unobservable factors. Following Petersen (2009), we cluster the standard errors by firm and year-quarter to account for cross-sectional and serial correlations.

### 3.3 Variables

We use the CSR rating score in the KLD database to build our proxy for social performance. The KLD database evaluates a firm's social performance based on seven dimensions: community, diversity, corporate governance, employee relations, environmental protection, human rights, and product quality. Every dimension includes several indicators, each of which is assigned either zero or one based on firms' social performance. Following Jiao (2010), we use five dimensions, excluding corporate governance and human rights, to calculate the CSR score.<sup>12</sup>

The KLD contains two types of indicators: strengths and concerns. The strengths

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activities. This approach has been widely used in previous studies on trade credit, including those of Petersen and Rajan (1997), Wilner (2000), Burkart and Ellingsen (2004), and Garcia-Appendini and Montoriol-Garriga (2013).

<sup>12</sup> The strengths on human rights were not reported in the KLD until 1995; thus, the human rights dimension is excluded in our main analysis. As robustness checks, we also use all seven dimensions (Deng, Kang, and Low, 2013) and six dimensions excluding corporate governance only (Di Giuli and Kostovesky, 2014). The results are qualitatively similar.

indicators capture firms' proactive strategies to engage in "doing good" (Kacperczyk, 2009; Ioannou and Serafeim, 2015; Flammer and Luo, 2017). In contrast, the concerns indicators mainly reflect firms' passive activities of "doing no harm", which are theoretically and strategically different from the strengths indicators (Kacperczyk, 2009; Ioannou and Serafeim, 2015).

We measure firms' social performance in two ways: the separate CSR strengths and CSR concerns scores and the net CSR score (i.e., strengths minus concerns). Since the number of indicators in each dimension varies across years, we calculate the CSR strengths and CSR concerns scores as the ratio of strengths (concerns) values to the total number of strengths (concerns) indicators, following Kacperczyk (2009), Ioannou and Serafeim (2015) and Flammer and Luo (2017). We first calculate the CSR strengths and CSR concerns score for each dimension and then add up the different dimensions to obtain the total CSR strengths and CSR concerns score. A higher CSR strengths score indicates better social performance, whereas a higher CSR concerns score indicates worse social performance. The net CSR score is then calculated as the CSR strengths score minus the CSR concerns score.<sup>13</sup>

Our main control variables include (i) creditworthiness and the firm's overall financial situation, (ii) growth opportunities, and (iii) market power.

The proxies for creditworthiness and the overall financial situation include size (natural logarithm of total assets); leverage (the sum of current debt and long-term debt scaled by total assets); profit margin (income before extraordinary items scaled by sales); cash holdings

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<sup>13</sup> Several studies raise doubts on the validity of net CSR measures based on subtracting the CSR concern score from the CSR strength score. These doubts relate to the different properties of strengths and concerns in the KLD (Kacperczyk, 2009; Flammer and Luo, 2017). Therefore, in addition to examining the net CSR score, we also separately study CSR strengths and concerns.

(cash reserves scaled by total assets); asset tangibility (the proportion of tangible assets to total assets); the probability of financial distress (the Altman (1968) Z-score, with coefficients based on Mackie-Mason, 1990); financial constraints (the KZ index proposed by Kaplan and Zingales, 1997, which increases with the level of financial constraints)<sup>14</sup>; the cost of financing (measured through the scaled interest expenses by total debt and through beta as in El Ghoul et al., 2011 and Goss and Roberts, 2011); and the Standard & Poor's credit rating (as in Jiraporn et al., 2014).<sup>15</sup> <sup>16</sup> Asset tangibility, the Altman Z-score, the KZ index, interest expenses, beta, and the credit rating are measured annually instead of quarterly, given that quarterly observations are not available.

Firms' growth opportunities are proxied by sales growth and Tobin's Q. We calculate a firm's sales growth by comparing its sales with those of the same quarter in the previous year.

A firm's market power is proxied by its market share, which is calculated based on the 3-digit Standard Industrial Classification (SIC) code. To avoid distortions introduced by outliers, we winsorize all variables at the 1% and 99% levels.

### 3.4 Summary statistics

Table 1 presents the summary statistics for the main variables of interest. Panel A reports the descriptive statistics. Trade credit (*accounts payable*) represents 58.2% of purchases on average, and the median value is 42.5%, indicating that trade credit is an important financing source for firm operations. The mean value of the net CSR score is -0.113, with a standard

<sup>14</sup> To ensure robustness, we use the Whited-Wu index (Whited and Wu, 2006) and the size-age index (Hadlock and Pierce, 2010) as alternative proxies, and the results are similar.

<sup>15</sup> We transform the Standard & Poor's credit rating to values following Jiraporn et al. (2014). This numeric variable ranges from 1 (D ratings) to 22 (AAA ratings).

<sup>16</sup> However, given that many values for the interest expenses, beta, and credit rating variables are missing, adding them as controls would significantly reduce the number of observations. Therefore, these three controls are included only in some specifications as robustness tests.

deviation of 0.414, while the average CSR strengths (concerns) is 0.211 (0.324), and its standard deviation is 0.311 (0.346). Panel B reports the sample distribution by year. The observations before 2004 represent a small proportion given the limited coverage.

Panel C reports the correlation matrix. Although some control variables show significant correlations among them, we find that multicollinearity issues are not relevant in the estimations (see details below). In particular, once the controls are included in the regression in different steps, we do not find significant variations in the key coefficients. We also employ the variance inflation factor (VIF) and conditional number proposed by Belsley, Kuh, and Welsch (1980) and do not detect multicollinearity problems.

[Insert Table 1 about here]

## **4 Results**

### *4.1 Hypothesis 1: CSR and trade credit*

#### *4.1.1 Main results*

Table 2 contains the results of the estimation of our main model, model (1), where we study the relation between CSR and trade credit. Panel A measures firms' social performance as the net CSR score. Column 1 reports the estimated results based on a univariate regression. The coefficient estimate of the net CSR score is 0.068 and statistically significant at the 1% level. We obtain similar coefficient estimates after including the main controls in columns 2-3. Column 4 further controls for interest expenses and beta, and column 5 controls for the credit rating. Although the sample size in columns 4-5 decreases substantially, the coefficient estimates on the net CSR score are similar. The positive coefficient estimates on the net CSR

score suggest that socially responsible customer firms receive more trade credit, which is consistent with *H1*.

Given the different properties of the strengths and concerns variables (Kacperczyk, 2009; Ioannou and Serafeim, 2015; Flammer and Luo, 2017), we explore how suppliers view CSR strengths versus CSR concerns. As shown in Panel B, the CSR strengths score shows a significantly positive association with trade credit. In contrast, the coefficient estimates of CSR concerns are not statistically significant in any column. This finding suggests that suppliers mainly value customer firms' proactive strategies to engage in "doing good" (strengths) rather than passive actions of "doing no harm" (concerns), which is consistent with the arguments of Ioannou and Serafeim (2015). Accordingly, the significant association between the net CSR score (i.e., strengths minus concerns) and trade credit is only driven by CSR strengths.

[Insert Table 2 about here]

The coefficient estimates of the control variables throughout the two panels of Table 2 are consistent with our expectations. Size, cash holdings, and asset tangibility have positive coefficients, indicating that creditworthy firms receive more trade credit. The coefficients of Tobin's Q are positive, indicating that suppliers are willing to provide trade credit to customers with growth opportunities. The coefficients of the Altman Z-score are negative. Since a higher Z-score represents a lower probability of financial distress, the negative coefficients suggest that suppliers also offer trade credit to financially distressed customers, which is consistent with the findings of Wilner (2000) and Love, Preve, and Sarria-Allende (2007). The coefficients of the KZ index are negative, which suggests that customers' access

to external finance (inversely related to the KZ index) reduces suppliers' concerns about customer creditworthiness and facilitates the provision of trade credit (Klapper, Laeven, and Rajan, 2012). The coefficient of interest expenses is also negative, indicating that firms with lower financing costs obtain more access to trade credit.

As stated above, we use several approaches to check whether multicollinearity among the explanatory variables may be a problem in our setting, and it appears not to be a serious concern. First, given that the coefficients on net CSR are similar across the different specifications that we use, including those incorporating different sets of control variables, there appears to be no estimation biases caused by multicollinearity. Second, the maximum variance inflation factor and conditional number are lower than the thresholds (10 and 30, respectively) below which prior research assumes there are no multicollinearity problems. Third, multicollinearity could reduce the measures of fit of the regression models, but our measures of fit are in line with those reported in the previous literature.<sup>17</sup>

#### *4.1.2 Economic significance of the results and cost-benefit analysis*

Regarding the economic significance of the positive association between CSR and trade credit, the coefficient estimate on CSR strengths is 0.141 after we include the main controls in column 3 of Panel B. This implies that a one standard deviation increase in CSR strengths (0.311, see Table 1) would lead to an increase in quarterly trade credit of 4.4% ( $=0.311 \times 0.141$ ). On an annual basis, it would raise trade credit by 17.6%, which is economically significant.

Even if we believe this is a significant result in economic terms, it is still difficult to

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<sup>17</sup> We obtain  $R^2$ s that are even larger than those reported in similar studies. For example, in Petersen and Rajan (1997), the  $R^2$ s are between 0.14 and 0.15, and in Garcia-Appendini and Montoriol-Garriga (2013) between 0.06 and 0.08.

establish whether CSR investments are optimal for a firm. This is because one must consider all their positive effects (related, as shown in prior research, to capturing future growth, lower costs of financing, etc., and, as in our case, increased trade credit) and their negative effects, including a lack of focus on the firm's main activities, other possible agency costs, etc. Although we do not claim that the main objective of CSR activities is to improve relations with suppliers and trade credit terms, this analysis at least provides an indication of whether the trade credit benefits of CSR may outweigh the costs incurred in CSR activities.

To perform this analysis, we follow Di Giuli and Kostovetsky (2014) and compare the CSR-driven increase in sales, general and administrative (SG&A) expenses with the trade credit benefits reported in our main tests. In an estimation of SG&A/revenue on CSR strengths, CSR concerns and the control variables of specification (1), the coefficient on CSR strengths is 0.034 (available upon request). Then, a 0.1 unit increase in CSR strengths is associated with a 0.34% ( $=0.1 \times 0.034$ ) increase in scaled SG&A. Since the average annual sales revenue is 2182 million, this is linked to a 7.42 million ( $=0.34\% \times 2182$ ) increase in SG&A in the average firm. According to Di Giuli and Kostovetsky (2014), this is the direct cost of CSR. Regarding the trade credit benefit (see column 3 in Panel B of Table 2), a 0.1 unit increase in CSR strengths raises trade credit (AP/Purchases) by 1.41% ( $=0.1 \times 0.141$ ). Since the average value of annual purchases is 3024 million, accounts payable would increase by 42.64 million ( $=1.41\% \times 3024$ ). Assuming a 10% interest rate<sup>18</sup>, the financing savings thanks to the increased trade credit would amount to at least 4.26 million ( $=42.64 \times 10\%$ ) in

<sup>18</sup> To obtain this number, we use the CAPM and take the sample average beta (1.125), the historical risk premium for U.S. companies (6.5%), and the average U.S. short-term interest rate for the period 1992-2010 (approximately 3%; see <https://www.ceicdata.com/en/indicator/united-states/short-term-interest-rate>) and then the interest rate  $10\% = 3\% + 1.125 \times 6.5\%$ .

annual terms, which is of similar order of magnitude to the direct costs computed above (7.42 million).<sup>19</sup> We are aware that this cost-benefit analysis is far from complete, as there are many other costs and benefits of CSR activities, but at least we obtain a benchmark with which we can compare the trade credit benefits of CSR with other benefits and costs reported in prior research.

#### *4.1.3 Analysis of important customers*

To further explore *H1*, which we base on the argument that trade credit flows to firms that are expected to pay back the credit in due time and not default, we explore whether the relation between CSR and trade credit is more pronounced for customers that suppliers see as important. When important customers default, there is a significant impact on their suppliers' business, to the point that suppliers' own survival can be threatened (Hertzel et al., 2008; Jacobson and von Schedvin, 2015). As a mechanism to strengthen the connection between supply-chain partners, trade credit can aggravate negative shocks from important customers (Raddatz, 2010). Therefore, when granting trade credit, suppliers should be especially attentive to the creditworthiness of their key customers, whose purchases represent a large percentage of suppliers' sales. Given this, we expect the relation between CSR and trade credit to be more pronounced for important customers.

We use two proxies to capture the relative importance of customers. First, we define a customer as being important to its supplier if the customer appears in the Compustat customer

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<sup>19</sup> Although trade credit usually has short maturity, it can be rolled over when a customer repays the credit due and makes new purchases on account. Therefore, it is reasonable to assume that customers regularly hold certain amounts of trade credit. The quarterly trade credit (accounts payable) in our sample is relatively stable across quarters within the same year, which is also consistent with this assumption.



segment file. The Compustat customer segment file contains only major customers whose purchases account for at least 10% of suppliers' sales revenue. If a customer is reported as a major customer in the customer segment file, it can be viewed as an important customer to its suppliers. As shown in Table 1, major customers represent 19% of the total sample. Second, we further explore the variations among those major customers, and we define *more* important major customers and *less* important ones based on whether customers are above or below the sample median of suppliers' sales proportion to the major customers. On average, the *more* important major customers' purchases represent 33.8% of suppliers' sales revenue, while the *less* important major customers' purchases represent only 13.4%.

Table 3 contains the results of this analysis. In column 1, we use the indicator variable for major customers as the proxy for customer importance, and in column 2, we use the relative importance of major customers. Given that only the strengths indicator of CSR is related to trade credit in our main analyses, for this test, *H2* and *H3*, and the rest of the sensitivity tests, we focus our analyses on CSR strengths. In column 1, the interaction term CSR strengths  $\times$  Customer importance is positively associated with trade credit, with a coefficient estimate of 0.082. Since the coefficient estimate of CSR strengths is 0.094, it indicates that major customers receive 87% ( $=0.082/0.094$ ) more trade credit than normal customers with similar social performance. Similarly, in column 2, the coefficient estimate on the interaction term, 0.088, is also significantly positive, indicating that, *ceteris paribus*, *more* important major customers receive 121% ( $=0.088/0.073$ ) more trade credit than *less* important ones. In sum, consistent with our expectation, the existence of important customers makes their creditworthiness particularly relevant for suppliers' survival when the latter

provide trade credit. In this context, social performance could be a relevant tool that suppliers interpret as a signal of the financial situation of important customers.

[Insert Table 3 about here]

#### *4.1.4 Analysis of the customer-supplier transactional relationship*

As another extension of *HI*, we examine whether suppliers' reliance on customers' social performance as a signal of financial health would change with customer-supplier transactional relationships. Previous literature finds that suppliers can collect private information on customers through business transactions (Petersen and Rajan, 1997; Burkart and Ellingsen, 2004). With such information, suppliers can infer "buyer reputation and credit ratings" and "reduce concerns about nonpayment" (Ng, Smith, and Smith, 1999, p. 1112). When a customer has more transactions with its suppliers, the latter can directly observe this customer's creditworthiness and rely less on its financial reporting or other signals connected to financial health, such as social performance (Gong and Luo, 2018; Zhang, 2020). Therefore, we expect that when the customer-supplier transactional relationship is closer, suppliers should rely less on CSR to offer trade credit, and the connection between CSR and trade credit will be weaker.

We take advantage of the information of major customers in the Compustat customer segment file to test the above prediction. The customer-supplier transactional relationship is proxied by the duration of the transaction history between a major customer and its suppliers, with a longer duration representing a closer transactional relationship. Two measures of duration are used: first, the cumulative duration of a major customer's transaction history

with its suppliers across years; second, the total duration of a major customer's transaction history with its suppliers in the whole sample period (i.e., 1992-2010). Based on the above variables, we construct two dummies that are equal to one when the above proxies are greater than the sample median, indicating closer transactional relationships, and zero otherwise.<sup>20</sup>

Table 4 shows that the coefficient estimates of the interaction term CSR strengths  $\times$  Transactional relationship are negative and statistically significant in both columns (-0.066 and -0.031 in columns 1 and 2, respectively). Hence, the CSR-trade credit association in the group with closer customer-supplier transactional relationships decreases by 42% ( $=0.066/0.158$ ) in relative terms compared to that of the control group when we use the first proxy and by 25% ( $=0.031/0.126$ ) when we use the second one. This result suggests that suppliers especially view customer CSR as an informative signal of customers' financial health at the early stage of the transactional relationship, which is when information asymmetries are higher. When a customer has more transactions with a given supplier, this supplier reduces its reliance on the customer's CSR as a tool for monitoring. Overall, this finding on the moderating role of transactional relationships provides further support for our argument that customers' social performance is viewed by suppliers as a signal of financial health and the capability to repay trade credit.

[Insert Table 4 about here]

## 4.2 Hypotheses 2 and 3: Customers' growth and insurance effects

### 4.2.1 Suppliers' incentives to share in customer firms' growth opportunities

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<sup>20</sup> Over the 19 years of the sample period, customers in the closer transactional relationship group have a total relationship duration of 17 years on average, while customers in the control group have a relationship duration of 7.58 years.

Our second hypothesis is based on suppliers' incentives to capture and share in customers' growth opportunities. CSR activities improve a firm's social image and increase its growth opportunities, especially if those activities are perceived and valued by clients (Lev, Petrovits, and Radhakrishnan, 2010; Servaes and Tamayo, 2013; Flammer, 2015). According to our *H2*, we expect the relation between CSR and trade credit to be more pronounced when customers are more aware of and place higher value on CSR activities. We use two settings where this is expected to be the case. In the first setting, we focus on business compared to individual buyers because individual buyers are more sensitive to firms' social performance (Lev, Petrovits, and Radhakrishnan, 2010). In the second, we focus on advertising intensity because in industries with higher advertising intensity, consumers care more about a firm's public image, and the firm's growth is more likely to increase thanks to its CSR activities (Servaes and Tamayo, 2013).

To empirically test this prediction, we replicate our main tests interacting the main variables of interest in Equation (1) with our proxies for consumer perception. In particular, we use an indicator variable for individual consumer-predominant industries, following Lev, Petrovits, and Radhakrishnan (2010). It takes the value of one if a firm operates in an individual consumer-predominant industry and zero otherwise. We follow Sharpe (1982) in classifying individual consumer-predominant industries and business buyer-predominant industries.<sup>21</sup> We also use a proxy for advertising intensity, following Fisman, Heal, and Nair (2006) and Servaes and Tamayo (2013). We first calculate the firm-level advertising intensity

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<sup>21</sup> Sharpe (1982) divides all industries into the following clusters: basic industries, capital goods, construction, consumer goods, energy, finance, transportation, utilities, and others. Given that the finance and utilities industries are excluded from our sample, following Sharpe (1982), we classify the consumer goods industry as an individual consumer-predominant industry, and the others as business buyer-predominant industries.

as advertising expenses scaled by sales revenue. From these values, we compute the industry median based on the 2-digit SIC as the industry-level advertising intensity. The proxy for consumer perception is an indicator variable taking the value of one if the industry-level advertising intensity is above the sample median and zero otherwise.<sup>22</sup>

Table 5 presents these results. The first column uses the indicator for individual consumer-predominant industries as the proxy for consumer perception. The second column uses advertising intensity. Consistent with our expectation in *H2*, the coefficient estimates on the interaction term *CSR strengths* × *Consumer perception* are significantly positive for our two consumer perception proxies. This indicates that a socially responsible customer firm is more likely to receive trade credit when it operates in an industry where end consumers care more about CSR activities. The above findings suggest that suppliers' incentives to share in customer firms' growth opportunities additionally determine the link between customer firms' social performance and trade credit.

[Insert Table 5 about here]

#### 4.2.2 Suppliers' risk management concerns along the customer-supplier relationship

Our third hypothesis states that since CSR activities provide firms with “insurance-like” protection over negative events (Godfrey, Merrill, and Hansen, 2009; Kim, Li, and Li, 2014; Lins, Servaes, and Tamayo, 2017; Shiu and Yang, 2017), suppliers have incentives to offer trade credit to socially responsible customers to avoid being affected by negative events that might affect customers. According to *H3*, the relation between social performance and trade credit is expected to be more pronounced when suppliers are exposed to higher risk in the

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<sup>22</sup> Because our proxies for *consumer perception* are industry-level variables, we exclude industry fixed effects in all specifications to avoid potential multi-collinearity problems.

customer-supplier relationship – for example, when negative events affecting customers are expected to have more damaging impacts on suppliers and/or when customer firms are more likely to suffer negative shocks. To test this prediction, we introduce in the model the interaction of customer firms' social performance with suppliers' risk exposure.

Our proxy for suppliers' risk exposure is based on customers' product market competition, and it aims to capture the likelihood of customers suffering negative events. If a customer operates in a more competitive industry, this customer is more likely to face unexpected bankruptcy risk (Lian, 2017). We measure industry-level product market competition in two ways: a) the U.S. census-based Herfindahl-Hirschman index (HHI) proposed by Ali, Klasa, and Yeung (2009) and b) the HHI calculated based on the universe of firms in Compustat. The proxy for suppliers' risk exposure is an indicator variable taking the value of one if product market competition in the industry is above the sample median and zero otherwise.

Table 6 shows the results on suppliers' risk exposure. Columns 1 and 2 measure suppliers' risk exposure using the census-based HHI and the Compustat-based HHI, respectively. The coefficient estimates on the interaction terms are significantly positive in both columns. This result suggests that when suppliers are exposed to a higher level of risk in the customer-supplier relationship, they are more likely to offer trade credit to socially responsible customers. This result is consistent with suppliers assuming that socially responsible customers are less likely to diffuse negative shocks through the supply chain. Overall, our findings suggest that suppliers' risk management concerns represent another underlying mechanism explaining the link between customer firms' social performance and

trade credit.

Moreover, our results using major customers reported in subsection 4.1.3 above, apart from providing evidence supporting the argument about the relevance of CSR as a signal of creditworthiness in trade credit decisions, can also be understood as a test supporting the risk-diffusion argument. Suppliers' concerns about risk diffusion will be greater in the case of important customers. Therefore, by offering more trade credit to important customers with better CSR, suppliers can reduce the diffusion of negative shocks from important customers.

[Insert Table 6 about here]

#### *4.3 Socially responsible customers as liquidity providers during the 2007-2008 financial crisis*

As a contingency analysis, we investigate how the relation between CSR and trade credit was affected by the 2007-2008 financial crisis. This is an interesting setting because due to bank lending constraints, trade credit became an important financing option during that period (Garcia-Appendini and Montoriol-Garriga, 2013; Casey and O'Toole, 2014). However, *ex ante*, it is unclear how socially responsible firms' use of trade credit would change with the crisis. On the one hand, suppliers would value customers' social performance as a signal of creditworthiness in a period of crisis. Hence, socially responsible customers are expected to obtain more trade credit. On the other hand, socially responsible customers might not request trade credit from their liquidity-constrained suppliers, as this would implicitly offer backward liquidity provision to suppliers in a period of crisis and help ensure suppliers' survival. Therefore, it is an empirical question to be tested.

In line with the research design of Duchin, Ozbas, and Sensoy (2010), we use the following specification:

$$DepVar_{i,t} = \beta_0 + \beta_1 CSR_i \times Crisis_t + \beta_2 Crisis_t + \gamma X_{i,t} + \alpha_i + \varepsilon_{i,t}. \quad (2)$$

The sample that we use for this test starts in the third quarter of 2005 and ends in the second quarter of 2008.  $DepVar_{i,t}$  is trade credit (*Accounts Payable/Purchases*), and  $Crisis_t$  is an indicator for the crisis period that equals one for the period between the third quarter of 2007 and the second quarter of 2008 and zero otherwise. Since firms' social performance is measured only once before the crisis, at the end of 2005, the level effect of social performance is subsumed by the firm fixed effects  $\alpha_i$ . The variable of interest is the interaction of firms' social performance and the crisis indicator. The coefficient  $\beta_1$  captures how the relation between CSR and trade credit changed with the crisis.

Panel A in Table 7 reports the results. As shown in column 1, the coefficient of interest  $\beta_1$  on the interaction between CSR strengths and the crisis indicator is significantly negative. To explore under which circumstances socially responsible customers marginally reduced their use of trade credit during the financial crisis, we partition the sample into subsamples based on firms' financing situation. Four proxies for the financing situation are used: (i) access to finance, (ii) cost of debt, (iii) systematic risk, and (iv) credit rating. The even columns in columns 2-9 correspond to the subsamples with a better financing situation, that is, firms with better access to finance, a lower cost of debt, lower systematic risk, or a better credit rating. The results show that socially responsible firms significantly *reduced* their use of trade credit during the crisis when they could afford to do so, that is, when they were in a better financing situation (even columns). In contrast, when a firm was in a worse financing



situation (odd columns), trade credit was not affected during the crisis.

In addition, customers' use of trade credit during the crisis could also have been affected by suppliers' liquidity (Costello, 2020; Zhang, 2020). Following Zhang (2020), we measure suppliers' liquidity as the precrisis cash reserves of a firm's upstream industries. A higher ratio of cash reserves to total assets indicates higher liquidity and lower exposure to the liquidity shock. We identify upstream industries based on the U.S. Bureau of Economic Analysis (BEA) 2002 Input-Output *Use* Table. As shown in columns 10-11, socially responsible firms significantly *reduced* their use of trade credit during the crisis only when their suppliers were exposed to a severe liquidity shock (column 10).

Since the financial crisis could have affected firms' choices between the use of trade credit and external finance, we further examine the relation between social performance and debt financing during the crisis. As shown in Panel B in Table 7, the coefficient on the interaction between CSR strengths and the crisis indicator is significantly positive, particularly for firms that were in a better financing situation (even columns).<sup>23</sup> This suggests that socially responsible firms *increased* debt financing following the onset of the crisis.

[Insert Table 7 about here]

While these results might appear counterintuitive at first, we believe that they stem from financially sound socially responsible customers being willing to help their liquidity-constrained suppliers by not requesting trade credit. This is a signal that socially responsible customers take into consideration the interests of suppliers during a crisis period. When socially responsible customers have enough financial slack, they can support their

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<sup>23</sup> The coefficients of the interaction terms are significantly positive in both columns 10 and 11. It indicates that, apart from relieving suppliers from liquidity constraints, socially responsible firms' increased debt financing also support their own operations or investment activities during the crisis.

liquidity-constrained suppliers by requesting less trade credit and using more debt financing. This explanation is in line with socially responsible customers being trustworthy partners for their suppliers.

Another explanation for this result is that when faced with a liquidity shock, suppliers can try to address their liquidity problems by offering more attractive trade credit terms to encourage early payment.<sup>24</sup> These favorable credit terms could stimulate customers in a better financing situation to repay trade credit earlier and resort to debt financing instead.<sup>25</sup> In any case, even under this conjecture, suppliers can obtain liquidity from customers in a short period of time, which may potentially alleviate their liquidity problems.

In sum, independent of the possible interpretation of the result, we can conclude that socially responsible customers alleviated suppliers' liquidity constraints during the crisis by requesting less trade credit in real terms, particularly when these customers were in a better financing situation and/or when their suppliers lacked liquidity. This finding indicates that socially responsible customers implicitly offered backward liquidity provision to their liquidity-constrained suppliers during the crisis. This is different from the usual liquidity provision from suppliers to customers documented in the literature. Such backward liquidity provision is an extra benefit to suppliers of having socially responsible customers in their production networks.

## 5 Robustness tests

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<sup>24</sup> Suppliers could offer a larger discount for early payment and shorten the discount period. For instance, suppliers can change the credit terms from 2/10, n/30 to 3/10, n/30 or 3/5, n/30.

<sup>25</sup> To verify this conjecture, we need detailed information on the terms of trade credit. However, this information is not publicly available. It is usually difficult for firms to collect and disclose this information because credit terms could change with transactions.

### 5.1 Control for supplier characteristics: customer-supplier paired sample

Since trade credit could be influenced by suppliers' characteristics, as a robustness check, we collect supplier information from the Compustat segment file to construct a sample of customer-supplier pairs. The Statement of Financial Accounting Standard No. 131 requires firms to disclose their major customers whose purchases exceed 10% of sales revenue.<sup>26</sup> By inverting the Compustat segment file, we identify a firm's suppliers that report the firm as a major customer.<sup>27</sup> Similar paired datasets have been widely used in previous studies, such as those of Fee and Thomas (2004), Cohen and Frazzini (2008), Pandit, Wasley, and Zach (2011), and Lian (2017). Given that one customer could have multiple suppliers, following Kim, Song, and Zhang (2015) and Lian (2017), we calculate the weighted average characteristics of suppliers using suppliers' sales proportions to customers as weights. The resulting sample of customer-supplier pairs includes 7180 customer-firm quarter-level observations.<sup>28</sup> We replicate our main tests using this paired sample. In these additional tests, we also control for the relative bargaining power of a customer over its suppliers, which we measure as the ratio of a customer's size to its suppliers' average size, following Hui, Klasa, and Yeung (2012).

We show the results in Table 8. In column 1, we include only customer controls. Similar to the results based on the main sample, the coefficient on customer firms' CSR strengths is

<sup>26</sup> Some firms voluntarily disclose small customers whose purchases represent less than 10% of sales revenue. To ensure comparability, we only keep the major customers that meet the threshold of 10%.

<sup>27</sup> The customers' names reported in the Compustat segment file are usually abbreviated. Following Fee and Thomas (2004) and Brown, Fee, and Thomas (2009), we use an algorithm and manual checking combined methodology to identify the major customers. First, we find four possible matches between the reported customers and the historical names of Compustat firms. Then, we manually check each firm's name, industry, and business description to choose the most likely matches. In some cases, firms report the names of subsidiaries instead of the holding firms. We employ the *LexisNexis* Academic Universe Search to identify whether the reported customers are subsidiaries of Compustat firms.

<sup>28</sup> It is worth noting that although the paired sample allows us to control for suppliers' characteristics, we are not able to identify the majority of suppliers merely based on the Compustat segment file. Furthermore, customer firms are relatively large, and the paired sample is less representative than our main sample. Therefore, the results based on the paired sample should be interpreted with caution.

0.126 and statistically significant at the 1% level. Column 2 further includes supplier controls and the relative size of customers and suppliers (*relative size*). The coefficient estimate on customers' CSR strengths is 0.123, which is also statistically significant. The coefficient on *relative size* is significantly positive, suggesting that higher bargaining power helps customers obtain more access to trade credit. In columns 3-4, we measure social performance as the net CSR score, but it does not play a significant role in the customer-supplier pairs sample. This result suggests that in our research setting, CSR strengths could be a more suitable measure of social performance than the net CSR score, which is likely distorted by the CSR concerns component.

[Insert Table 8 about here]

### 5.2 Instrumental variable regressions

Our regression results might be subject to reverse causality and omitted variable bias. First, customer firms receiving more trade credit could have more resources to invest in CSR activities, resulting in reverse causality. Second, some unobservable characteristics related to firms' social performance might be omitted in our regression specification, which could bias our coefficient estimates.

To deal with these issues, we adopt an instrumental variable approach (i.e., a two-stage least-squares regression). We employ two instrumental variables for firms' social performance. The first instrumental variable is the firm's external political environment, in which CSR may be viewed as something desirable. Di Giuli and Kostovetsky (2014) find that U.S. firms influenced by the Democratic Party are more likely to engage in CSR activities.

Following Di Giuli and Kostovetsky (2014), we measure a firm's external political environment as the first principal component of the proportion of votes received by the Democratic candidates in presidential elections (1988, 1992, 1996, 2000, 2004, 2008), gubernatorial elections (1990-2009), and senatorial elections (1990, 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2006, 2008) in the state where the firm is headquartered.<sup>29</sup> The second instrumental variable is the industry median social performance, following El Ghoual et al. (2011).

We report the results of the instrumental variable regressions in Table 9. The F-statistic for the first-stage regression is greater than 10, and both the external political environment and industry median CSR show significantly positive associations with the CSR strengths score in column 1, suggesting that our instruments are not weak. In untabulated results (available upon request), we also run the first-stage regression using the net CSR score as the dependent variable. In this case, the external political environment is not significantly associated with the net CSR score.

The coefficient estimate on instrumented CSR strengths in column 2 is 0.192, which is marginally larger than the coefficients obtained in the main tests and statistically significant at the 1% level. Therefore, the inferences that we obtain using the instrumental variable approach are identical to those obtained with our main tests. This reduces to some extent concerns that our results are just the outcome of reverse causality or correlated omitted variables.

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<sup>29</sup> The principal component analysis creates a comprehensive measure of the state-level political environment. The first principal component explains 58.12% of the variation in the three election-related variables, and it is calculated as  $0.6678 \times \text{presidential election} + 0.3047 \times \text{gubernatorial elections} + 0.6791 \times \text{senatorial elections}$ . Since elections do not occur every year, we take the proportion of votes received in the last corresponding elections in each state.

[Insert Table 9 about here]

### 5.3 Firm fixed effects model

We employ a firm fixed effects model to further address the endogeneity issue. This model excludes the influence of time-invariant factors from the error term, thus reducing concerns over unobservable omitted variables. As shown in column 1 in Table 10, the coefficient estimate of CSR strengths is 0.028, and it is statistically significant at the 5% level. Column 2 shows the estimation based on net CSR; as in our main results, the coefficient estimate on the net CSR score is not statistically significant. The coefficient estimate on CSR strengths in the firm fixed effects model is relatively smaller than the estimates from the main results, which may be due to the small within-firm variation in CSR given that firms' CSR performance is usually sticky across years. Overall, our main finding is robust to the estimation using firm fixed effects.

[Insert Table 10 about here]

### 5.4 Alternative model specifications, samples, and CSR scores

We check the robustness of our main findings using several alternative model specifications. First, we use a propensity score matching approach to alleviate concerns over model misspecification. The average treatment effect between the high/low CSR strengths groups is statistically significant, and the coefficient estimate of the high CSR strengths indicator in the matched sample is also statistically significant. The high/low net CSR groups do not differ significantly in terms of trade credit. In sum, with the propensity score matching approach, we reach the same inferences regarding the role of CSR.

Second, we estimate the model using the KLD dataset between 2003 and 2009,

corresponding to firm-quarter observations for the period 2004-2010. This sample covers the firms in the Russell 3000, which is more representative than the S&P 500 and the KLD 400. Social performance also shows a significant and positive association with trade credit for this alternative sample.

Third, given that the CSR score in our main results is calculated based on five dimensions of CSR excluding human rights and corporate governance, as a robustness check, we calculate the CSR score based on six dimensions of CSR by adding the human rights dimension for the period 1996-2010. The results based on six dimensions of CSR are similar to our main results, and the inferences do not change.

Finally, we use each of these CSR dimensions individually and compare their relative importance. As in our main results, CSR strengths across the six dimensions show significantly positive associations with trade credit, while CSR concerns do not.

## **6 Conclusions**

Firms' CSR activities have drawn substantial attention from academics and practitioners in recent years. However, the merits of CSR are still under debate. We investigate whether suppliers value customer firms' CSR activities by examining the relation between corporate social performance and access to trade credit. We find that socially responsible customers are more likely to receive trade credit from suppliers. This relation is more pronounced (i) when customers are of greater importance to suppliers, (ii) when customers have less close transactional relationships with suppliers, (iii) when customer firms' end consumers care more about CSR activities, and (iv) when suppliers are exposed to a higher level of risk in the

customer-supplier relationship. Our findings indicate that suppliers are willing to grant trade credit to socially responsible customers because they view customers' CSR activities as a signal of different characteristics: first, customers' trustworthiness and capacity to meet financial obligations; second, customers' growth opportunities, which suppliers want to share in; last, customers' insurance-type protection against the propagation of negative shocks through the supply chain.

We also conduct an analysis based on the 2007-2008 global financial crisis, and the results show that socially responsible customers used less trade credit, particularly when they were financially healthy and/or when their suppliers did not have sufficient liquidity. We interpret this result as evidence of financially sound socially responsible customers providing backward liquidity to suppliers in a period of crisis, particularly when the customers could afford it and when suppliers needed such liquidity.



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**Table 1. Summary statistics and sample distribution**

This table presents summary statistics for the main variables of interest. Panel A reports the descriptive statistics. Panel B reports the distribution of firm-quarter observations and the number of firms across years. Panel C reports the correlation matrix, and \* indicates statistical significance at the 1% level. All panels refer to firm-quarter observations for the period 1992-2010, corresponding to firms' social performance in the KLD database between 1991 and 2009. Variables are defined in the main text.

<i>Panel A: Descriptive statistics</i>				
Variable	N	Mean	Median	Std. dev.
Trade credit	49784	0.582	0.425	0.682
Net CSR	49784	-0.113	-0.083	0.414
CSR strengths	49784	0.211	0.125	0.311
CSR concerns	49784	0.324	0.250	0.346
Size	49784	7.105	6.995	1.562
Leverage	49784	0.211	0.193	0.193
Profit margin	49784	-0.136	0.053	1.564
Cash holding	49784	0.169	0.085	0.198
Asset tangibility	49784	0.317	0.260	0.233
Market share	49784	0.072	0.017	0.120
Sales growth	49784	0.150	0.082	0.551
Tobin's Q	49784	2.117	1.674	1.365
Altman Z-score	49784	1.752	1.935	1.821
KZ index	49784	-4.175	-0.874	13.135
Interest expenses	40713	0.114	0.068	0.289
Beta	28530	1.125	1.036	0.575
Credit rating	22837	13.779	14.000	3.546
<i>Moderators</i>				
Major customer	49784	0.190	0.000	0.392
Sales proportion	7180	0.509	1.000	0.500
Cumulative duration	7180	0.498	0.000	0.500
Total duration	7180	0.498	0.000	0.500
Individual consumer industry	49784	0.445	0.000	0.497
Advertising intensity	49399	0.498	0.000	0.500
Census HHI	21246	0.504	1.000	0.500
Compustat HHI	47059	0.510	1.000	0.500

*Panel B: Sample distribution*

	# of firms	Coverage (total #)	Firm-quarter obs.	Percentage (%)
1992	263	S&P 500, KLD 400 (647)	1011	2.03
1993	273	S&P 500, KLD 400 (652)	1042	2.09
1994	268	S&P 500, KLD 400 (651)	1020	2.05
1995	259	S&P 500, KLD 400 (643)	994	2.00
1996	267	S&P 500, KLD 400 (647)	1020	2.05
1997	267	S&P 500, KLD 400 (652)	1016	2.04
1998	261	S&P 500, KLD 400 (653)	992	1.99
1999	269	S&P 500, KLD 400 (658)	1039	2.09
2000	278	S&P 500, KLD 400 (662)	1069	2.15
2001	252	S&P 500, KLD 400 (663)	968	1.94
2002	473	Russell 1000 (1107)	1845	3.71
2003	502	Russell 1000 (1108)	1935	3.89
2004	1395	Russell 3000 (2963)	5385	10.82
2005	1455	Russell 3000 (3034)	5582	11.21
2006	1291	Russell 3000 (3016)	4986	10.02
2007	1255	Russell 3000 (2963)	4842	9.73
2008	1261	Russell 3000 (2937)	4863	9.77
2009	1316	Russell 3000 (2923)	5093	10.23
2010	1318	Russell 3000 (2912)	5082	10.21

Panel C: Correlation matrix

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)
Trade credit (a)	1																
Net CSR (b)	0.03*	1															
CSR strengths (c)	0.08*	0.57*	1														
CSR concerns (d)	0.04*	-0.67*	0.21*	1													
Size (e)	0.06*	0.03*	0.45*	0.37*	1												
Leverage (f)	0.03*	-0.05*	0.03*	0.10*	0.30*	1											
Profit margin (g)	-0.04*	0.02*	0.06*	0.03*	0.15*	-0.06*	1										
Cash holding (h)	0.06*	0.02*	-0.11*	-0.13*	-0.44*	-0.35*	-0.27*	1									
Asset tangibility (i)	0.07*	-0.06*	0.10*	0.17*	0.28*	0.26*	0.05*	-0.37*	1								
Market share (j)	-0.07*	0.02*	0.19*	0.14*	0.39*	0.11*	0.07*	-0.26*	0.01*	1							
Sales growth (k)	0.03*	-0.01	-0.05*	-0.04*	-0.09*	-0.01*	-0.07*	0.17*	-0.04*	-0.05*	1						
Tobin's Q (l)	0.06*	0.13*	0.04*	-0.11*	-0.19*	-0.20*	-0.08*	0.38*	-0.17*	-0.07*	0.17*	1					
Altman Z-score (m)	-0.15*	0.10*	0.08*	-0.04*	0.13*	-0.20*	0.34*	-0.30*	0.01	0.19*	-0.18*	-0.02*	1				
KZ index (n)	-0.03*	-0.03*	0.03*	0.07*	-0.15*	0.18*	-0.01*	-0.30*	0.29*	0.02*	-0.02*	-0.21*	-0.05*	1			
Interest expenses (o)	-0.02*	-0.03*	-0.06*	-0.01	-0.14*	-0.20*	0.00	0.14*	-0.07*	-0.04*	0.01*	0.07*	0.02*	-0.06*	1		
Beta (p)	0.01	-0.12*	-0.16*	-0.00	-0.12*	-0.04*	-0.07*	0.14*	-0.02*	-0.05*	0.05*	-0.03*	-0.05*	0.07*	0.05*	1	
Credit rating (q)	0.10*	0.23*	0.42*	0.11*	0.51*	-0.35*	0.12*	-0.15*	0.09*	0.23*	-0.07*	0.30*	0.31*	-0.18*	-0.08*	-0.38*	1



**Table 2. Main test of Hypothesis 1: CSR and trade credit**

This table presents the results of regressing trade credit on social performance. The dependent variable is trade credit, which is measured as accounts payable scaled by purchases (AP/Purchases). Panel A measures firms' social performance as the net CSR score; Panel B examines CSR strengths and CSR concerns separately. Variables are defined in the main text. Variance inflation factor (VIF) and the conditional number proposed by Belsley, Kuh, and Welsch (1980) are employed to detect collinearity. Standard errors are clustered by firm and year-quarter following Petersen (2009), and t-statistics are reported in brackets. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

<i>Panel A: Net CSR</i>					
	(1)	(2)	(3)	(4)	(5)
<b>Net CSR</b>	<b>0.068***</b>	<b>0.064***</b>	<b>0.064***</b>	<b>0.098***</b>	<b>0.104***</b>
	(2.76)	(2.64)	(2.63)	(3.29)	(2.99)
Size		0.038***	0.039***	0.045***	0.073***
		(3.45)	(3.53)	(3.00)	(3.62)
Leverage		0.064	0.064	-0.062	-0.126
		(0.98)	(0.98)	(-0.52)	(-0.95)
Profit margin		0.005	0.004	-0.163***	-0.162***
		(0.52)	(0.41)	(-4.76)	(-3.10)
Cash holding		0.179**	0.142	0.358*	-0.002
		(2.08)	(1.63)	(1.69)	(-0.01)
Asset tangibility		0.123	0.151*	0.248**	0.286**
		(1.49)	(1.83)	(2.15)	(2.00)
Market share		-0.143	-0.150	-0.123	-0.278**
		(-1.44)	(-1.50)	(-1.07)	(-2.10)
Sales growth		-0.028*	-0.028*	-0.018	-0.086***
		(-1.91)	(-1.88)	(-0.42)	(-3.04)
Tobin's Q		0.023**	0.022**	0.054***	0.082***
		(2.56)	(2.39)	(2.62)	(3.78)
Altman Z-score		-0.040***	-0.042***	-0.089***	-0.088***
		(-4.80)	(-5.03)	(-3.50)	(-3.38)
KZ index			-0.002**	-0.005*	-0.004
			(-2.22)	(-1.77)	(-1.16)
Interest expenses				-0.084***	0.059
				(-2.88)	(1.41)
Beta				-0.000	0.007
				(-0.01)	(0.37)
Credit rating					-0.002
					(-0.21)
Industry FE	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes
Year × Quarter FE	Yes	Yes	Yes	Yes	Yes
Constant	0.496***	0.194	0.189	0.093	0.088
	(4.51)	(1.33)	(1.32)	(0.45)	(0.40)
Observations	49784	49784	49784	26723	18824
Adjusted R-squared	0.145	0.161	0.162	0.232	0.253
Maximum VIF	1.00	1.91	1.99	1.42	2.25
Conditional number	1.16	8.34	8.44	11.83	26.19

<i>Panel B: CSR strengths vs. CSR concerns</i>					
	(1)	(2)	(3)	(4)	(5)
<b>CSR strengths</b>	<b>0.141***</b> (3.48)		<b>0.141***</b> (3.55)	<b>0.152***</b> (2.96)	<b>0.148***</b> (2.60)
<b>CSR concerns</b>		<b>0.004</b> (0.11)	<b>-0.006</b> (-0.16)	<b>-0.057</b> (-1.33)	<b>-0.069</b> (-1.47)
Size	0.027** (2.29)	0.041*** (3.62)	0.028** (2.26)	0.033* (1.95)	0.061*** (2.82)
Leverage	0.082 (1.23)	0.064 (0.97)	0.081 (1.21)	-0.051 (-0.42)	-0.128 (-0.96)
Profit margin	0.004 (0.37)	0.004 (0.38)	0.004 (0.37)	-0.162*** (-4.71)	-0.162*** (-3.07)
Cash holding	0.136 (1.57)	0.145* (1.68)	0.136 (1.57)	0.331 (1.57)	-0.035 (-0.20)
Asset tangibility	0.140* (1.70)	0.154* (1.86)	0.140* (1.71)	0.236** (2.08)	0.278* (1.96)
Market share	-0.174* (-1.69)	-0.160 (-1.56)	-0.172* (-1.65)	-0.135 (-1.14)	-0.289** (-2.10)
Sales growth	-0.025* (-1.70)	-0.027* (-1.84)	-0.025* (-1.72)	-0.015 (-0.34)	-0.083*** (-3.01)
Tobin's Q	0.020** (2.28)	0.024*** (2.58)	0.020** (2.27)	0.053*** (2.59)	0.082*** (3.79)
Altman Z-score	-0.041*** (-4.89)	-0.041*** (-4.85)	-0.041*** (-4.87)	-0.088*** (-3.44)	-0.087*** (-3.30)
KZ index	-0.002** (-2.18)	-0.002** (-2.22)	-0.002** (-2.18)	-0.005* (-1.75)	-0.004 (-1.17)
Interest expenses				-0.085*** (-2.86)	0.054 (1.29)
Beta				0.003 (0.21)	0.009 (0.49)
Credit rating					-0.003 (-0.31)
Industry FE	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes
Year × Quarter FE	Yes	Yes	Yes	Yes	Yes
Constant	0.243* (1.71)	0.170 (1.19)	0.242* (1.71)	0.156 (0.77)	0.175 (0.79)
Observations	49784	49784	49784	26723	18824
Adjusted R-squared	0.164	0.161	0.164	0.233	0.254
Maximum VIF	2.00	1.99	2.00	1.74	2.25
Conditional number	9.07	9.35	9.99	14.22	28.72

**Table 3. Additional test of Hypothesis 1: The moderating role of customer importance**

This table presents the results for the moderating role of customer importance. The variable of interest is the interaction of CSR strengths and customer importance. *Major customer* in column 1 is an indicator for whether a customer firm is reported as a major customer in the Compustat customer segment file. Column 2 further explores the relative importance of these major customers based on suppliers' *sales proportion* to the major customers. We first calculate a supplier's *sales proportion* to a major customer as the sales to this customer divided by the supplier's total sales, and then we calculate all suppliers' average *sales proportion* to this major customer. Variables are defined in the main text. Standard errors are clustered by firm and year-quarter, and t-statistics are reported in brackets. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Proxies for customer importance	
	(A) Major customer	(B) Sales proportion
	(1)	(2)
<b>CSR strengths × Customer importance</b>	<b>0.082***</b>	<b>0.088***</b>
	(4.37)	(2.88)
CSR strengths	0.094***	0.073***
	(7.47)	(2.82)
Customer importance	0.052***	-0.021
	(4.66)	(-1.01)
Size	0.018***	0.052***
	(5.44)	(5.55)
Leverage	0.093***	0.348***
	(4.04)	(3.63)
Profit margin	0.004	0.055***
	(0.82)	(4.98)
Cash holding	0.128***	0.309**
	(4.29)	(2.23)
Asset tangibility	0.141***	0.223***
	(6.41)	(3.51)
Market share	-0.167***	-0.649***
	(-7.03)	(-9.88)
Sales growth	-0.026**	-0.069
	(-2.47)	(-1.64)
Tobin's Q	0.018***	0.041***
	(6.08)	(6.17)
Altman Z-score	-0.040***	-0.074***
	(-13.34)	(-7.21)
KZ index	-0.002***	-0.006***
	(-5.38)	(-3.10)
Industry FE	Yes	Yes
Quarter FE	Yes	Yes
Year × Quarter FE	Yes	Yes
Constant	0.300***	-0.087
	(4.31)	(-0.83)
Observations	49784	7180
Adjusted R-squared	0.166	0.272

**Table 4. Additional test of Hypothesis 1: The moderating role of customer-supplier transactional relationships**

This table presents the results for the moderating role of customer-supplier transactional relationships. The variable of interest is the interaction of CSR strengths and the duration of the transactional relationship. The sample is restricted to the firms that are reported as major customers in the Compustat customer segment file. In column 1, the duration of the transactional relationship is measured as the *cumulative duration* of the transaction history between a major customer and its suppliers across years. In column 2, it is measured as the *total duration* of the transaction history between a major customer and its suppliers in the whole sample period (i.e., 1992-2010). A longer duration represents a closer transactional relationship. Variables are defined in the main text. Standard errors are clustered by firm and year-quarter, and t-statistics are reported in brackets. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Proxies for transactional relationship	
	(A) Cumulative duration	(B) Total duration
	(1)	(2)
<b>CSR strengths × Transactional relationship</b>	<b>-0.066***</b>	<b>-0.031*</b>
	(-3.71)	(-1.94)
CSR strengths	0.158***	0.126***
	(7.16)	(5.94)
Transactional relationship	-0.001	0.007***
	(-0.38)	(3.89)
Size	0.055***	0.040***
	(5.33)	(3.84)
Leverage	0.335***	0.322***
	(3.49)	(3.35)
Profit margin	0.054***	0.055***
	(4.98)	(4.98)
Cash holding	0.310**	0.291**
	(2.21)	(2.07)
Asset tangibility	0.208***	0.190***
	(3.21)	(2.98)
Market share	-0.682***	-0.664***
	(-10.05)	(-9.95)
Sales growth	-0.066	-0.066
	(-1.55)	(-1.58)
Tobin's Q	0.045***	0.042***
	(6.57)	(6.14)
Altman Z-score	-0.073***	-0.078***
	(-7.07)	(-7.46)
KZ index	-0.006***	-0.005***
	(-2.91)	(-2.82)
Industry FE	Yes	Yes
Quarter FE	Yes	Yes
Year × Quarter FE	Yes	Yes
Constant	-0.110	-0.011
	(-0.90)	(-0.10)
Observations	7180	7180
Adjusted R-squared	0.275	0.275

**Table 5. Test of Hypothesis 2: CSR, trade credit, and expected future growth – the role of consumer perception of CSR activities**

This table presents the results for the moderating role of consumer perception of CSR activities. The variable of interest is the interaction of CSR strengths and consumer perception of CSR activities. Given that the proxies for consumer perception are industry-level variables, we exclude the industry fixed effects from all specifications. Standard errors are clustered by firm and year-quarter, and t-statistics are reported in brackets. Variables are defined in the main text. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Proxies for consumer perception	
	(A) Individual consumer industry	(B) Advertising intensity
	(1)	(2)
<b>CSR strengths × Consumer perception</b>	<b>0.160***</b> (8.87)	<b>0.204***</b> (11.23)
CSR strengths	0.038*** (2.92)	-0.011 (-0.88)
Consumer perception	-0.103*** (-13.51)	-0.041*** (-5.49)
Size	0.039*** (13.43)	0.044*** (15.18)
Leverage	-0.046** (-2.00)	-0.079*** (-3.43)
Profit margin	-0.001 (-0.21)	0.002 (0.37)
Cash holding	0.079*** (2.68)	0.094*** (3.20)
Asset tangibility	0.214*** (9.70)	0.237*** (10.52)
Market share	-0.364*** (-17.88)	-0.401*** (-19.58)
Sales growth	-0.002 (-0.20)	-0.004 (-0.38)
Tobin's Q	0.029*** (9.73)	0.028*** (9.12)
Altman Z-score	-0.057*** (-19.91)	-0.061*** (-21.38)
KZ index	-0.003*** (-7.85)	-0.003*** (-8.08)
Industry FE	No	No
Quarter FE	Yes	Yes
Year × Quarter FE	Yes	Yes
Constant	0.288*** (8.60)	0.238*** (7.12)
Observations	49784	49399
Adjusted R-squared	0.054	0.053

**Table 6. Test of Hypothesis 3: CSR, trade credit, and the insurance-type role of CSR – the role of suppliers' risk exposure**

This table presents the results for the moderating role of suppliers' risk exposure in customer-supplier relationships. The variable of interest is the interaction of CSR strengths and suppliers' risk exposure. Suppliers' risk exposure is proxied by product market competition in the customers' industry, which is measured as the U.S. census-based Herfindahl-Hirschman index (HHI) and the Compustat-based HHI in columns 1 and 2, respectively. Given that product market competition is measured at the industry level, we exclude industry fixed effects from all specifications. The rest of the variables are defined in the main text. Standard errors are clustered by firm and year-quarter, and t-statistics are reported in brackets. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Proxies for suppliers' risk exposure	
	(A) Census HHI	(B) Compustat HHI
	(1)	(2)
<b>CSR strengths × Suppliers' risk exposure</b>	<b>0.093***</b>	<b>0.128***</b>
	(4.47)	(6.67)
CSR strengths	0.040***	0.041***
	(3.04)	(2.67)
Suppliers' risk exposure	0.040***	-0.074***
	(4.24)	(-9.73)
Size	0.046***	0.043***
	(14.76)	(14.14)
Leverage	0.096***	-0.054**
	(2.86)	(-2.29)
Profit margin	0.023***	0.001
	(9.14)	(0.24)
Cash holding	0.103***	0.098***
	(2.96)	(3.21)
Asset tangibility	-0.188***	0.213***
	(-7.61)	(9.44)
Market share	-0.349***	-0.448***
	(-13.22)	(-20.01)
Sales growth	-0.046***	0.001
	(-4.76)	(0.07)
Tobin's Q	0.039***	0.028***
	(10.00)	(8.70)
Altman Z-score	-0.045***	-0.062***
	(-10.81)	(-20.78)
KZ index	-0.004***	-0.003***
	(-5.63)	(-8.00)
Industry FE	No	No
Quarter FE	Yes	Yes
Year × Quarter FE	Yes	Yes
Constant	0.251***	0.270***
	(5.96)	(7.73)
Observations	21246	47059
Adjusted R-squared	0.070	0.052

**Table 7. The effect of the 2007-2008 global financial crisis on socially responsible customers' use of trade credit and debt financing**

This table presents the effect of the financial crisis on socially responsible customers' use of trade credit and debt financing, based on Equation (2) with firm fixed effects. The sample ranges from 2005Q3 to 2008Q2. The variable of interest is the interaction of CSR strengths and the crisis indicator. The crisis indicator equals one for the crisis period 2007Q3-2008Q2 and zero otherwise. The CSR strengths score is measured at the end of 2005. The level effect of CSR strengths is subsumed by firm fixed effects. Panels A and B report the results on trade credit and debt financing, respectively. Column 1 shows the results for the total sample. In columns 2-9, we partition the sample based on firms' financial situations, which are proxied by their access to finance, cost of debt, systematic risk, and credit rating. Columns 10-11 partition the sample based on suppliers' liquidity, which we proxy by the precrisis cash reserves of a firm's upstream industries, following Zhang (2020). Variables are defined in the main text. Standard errors are clustered by firm and year-quarter, and t-statistics are reported in brackets. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

*Panel A: CSR and trade credit during the crisis*

	Total Sample (1)	Subsample analysis									
		Access to finance		Cost of debt		Systematic risk		Credit rating		Suppliers' liquidity	
		High (2)	Low (3)	Low (4)	High (5)	Low (6)	High (7)	High (8)	Low (9)	Low (10)	High (11)
<b>CSR strengths × Crisis</b>	<b>-0.037**</b> (-2.15)	<b>-0.039**</b> (-2.29)	-0.032 (-0.63)	<b>-0.082***</b> (-2.94)	-0.020 (-0.85)	<b>-0.056**</b> (-2.46)	-0.016 (-0.52)	<b>-0.033*</b> (-1.74)	-0.057 (-1.43)	<b>-0.061***</b> (-2.93)	-0.043 (-1.42)
Crisis	0.000 (0.05)	-0.007 (-0.85)	0.004 (0.38)	0.015 (1.26)	0.001 (0.10)	0.010 (0.82)	0.009 (0.86)	0.010 (0.80)	0.016 (1.42)	-0.011 (-1.43)	0.001 (0.08)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	17154	8155	8022	6882	7007	4514	4568	3634	3547	8501	8370
Adjusted R-squared	0.799	0.741	0.831	0.782	0.847	0.727	0.868	0.830	0.849	0.741	0.808

Panel B: CSR and debt financing during the crisis

	Total Sample	Access to finance		Cost of debt		Subsample analysis Systematic risk		Credit rating		Suppliers' liquidity	
	(1)	High (2)	Low (3)	Low (4)	High (5)	Low (6)	High (7)	High (8)	Low (9)	Low (10)	High (11)
	<b>CSR strengths × Crisis</b>	<b>0.002***</b> (2.74)	<b>0.003**</b> (2.37)	0.002 (0.84)	<b>0.004**</b> (2.55)	0.001 (0.96)	<b>0.003*</b> (1.77)	0.001 (0.83)	<b>0.003**</b> (2.01)	0.001 (0.48)	<b>0.003*</b> (1.84)
Crisis	0.000 (1.36)	0.001 (1.05)	0.000 (0.92)	-0.000 (-0.14)	0.001 (1.48)	0.001 (1.47)	0.000 (0.68)	0.002 (1.42)	0.001 (1.36)	0.001 (1.45)	-0.000 (-0.52)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	17695	8328	8356	6948	6993	4669	4680	3765	3693	8607	8569
Adjusted R-squared	0.187	0.158	0.224	0.194	0.196	0.168	0.186	0.169	0.258	0.195	0.178



**Table 8. Robustness test 1: Control for supplier characteristics – paired sample**

This table presents the results after the inclusion of controls for the weighted average supplier characteristics. The dependent variable is trade credit. Supplier information is collected from the Compustat segment file. *Relative size* is measured as the ratio of customer size to average supplier size following Hui, Klasa, and Yeung (2012). The rest of the variables are defined in the main text. Standard errors are clustered by firm and year-quarter, and t-statistics are reported in brackets. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
<b>CSR strengths</b>	<b>0.126***</b>	<b>0.123***</b>		
	(6.58)	(6.40)		
<b>Net CSR</b>			<b>0.007</b>	<b>-0.002</b>
			(0.44)	(-0.14)
Size	0.052***	-0.003	0.076***	0.006
	(5.62)	(-0.07)	(8.79)	(0.15)
Leverage	0.344***	0.354***	0.327***	0.339***
	(3.57)	(3.64)	(3.41)	(3.48)
Profit margin	0.055***	0.063***	0.055***	0.064***
	(5.05)	(4.08)	(5.04)	(4.10)
Cash holding	0.306**	0.306**	0.313**	0.318**
	(2.21)	(2.16)	(2.24)	(2.22)
Asset tangibility	0.224***	0.292***	0.223***	0.297***
	(3.53)	(4.02)	(3.48)	(4.06)
Market share	-0.653***	-0.748***	-0.619***	-0.722***
	(-9.93)	(-10.20)	(-9.21)	(-9.65)
Sales growth	-0.069	-0.067	-0.073*	-0.071*
	(-1.64)	(-1.60)	(-1.73)	(-1.67)
Tobin's Q	0.042***	0.042***	0.043***	0.043***
	(6.21)	(6.13)	(6.35)	(6.24)
Altman Z-score	-0.075***	-0.079***	-0.076***	-0.080***
	(-7.29)	(-7.22)	(-7.33)	(-7.26)
KZ index	-0.006***	-0.007***	-0.007***	-0.008***
	(-3.10)	(-3.71)	(-3.27)	(-3.89)
<i>Supplier controls</i>				
Size		0.040		0.056*
		(1.32)		(1.81)
Leverage		0.026		0.035
		(0.54)		(0.71)
Profit margin		0.007		0.008
		(1.31)		(1.37)
Cash holding		0.037		0.034
		(0.63)		(0.59)
Asset tangibility		-0.145***		-0.168***
		(-2.62)		(-3.02)
Market share		0.236**		0.224*
		(2.05)		(1.94)
Sales growth		-0.013		-0.014

		(-1.33)		(-1.41)
Tobin's Q		-0.002		-0.001
		(-0.25)		(-0.11)
Altman Z-score		0.003		0.003
		(0.91)		(0.83)
KZ index		-0.000		0.000
		(-0.05)		(0.12)
<i>Relative bargaining power</i>				
Relative size		0.046*		0.061*
		(1.81)		(1.78)
Customer industry FE	Yes	Yes	Yes	Yes
Supplier industry FE	No	Yes	No	Yes
Quarter FE	Yes	Yes	Yes	Yes
Year × Quarter FE	Yes	Yes	Yes	Yes
Constant	-0.091	0.370***	-0.258**	0.213
	(-0.86)	(2.68)	(-2.49)	(1.56)
Observations	7180	7180	7180	7180
Adjusted R-squared	0.271	0.296	0.267	0.292

**Table 9. Robustness test 2: Instrumental variable regression**

This table presents the estimated results for the instrumental variable regression. Column 1 shows the first-stage regression, where we regress CSR on the instrumental variables and control variables. The instrumental variables include firms' external political environment and the industry median CSR score. Following Di Giuli and Kostovetsky (2014), we define a firm's external political environment as the first principal component of the proportion of votes received by Democratic candidates in the presidential elections (1988, 1992, 1996, 2000, 2004, 2008), gubernatorial elections (1990-2009), and senatorial elections (1990, 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2006, 2008) in the state where the firm is headquartered. The industry median CSR score is employed as an instrument, in line with El Ghouli et al. (2011). Column 2 shows the second-stage regression. The dependent variable is trade credit (AP/Purchases), and the variable of interest is the instrumented CSR. Standard errors are clustered by firm and year-quarter, and t-statistics are reported in brackets. Variables are defined in the main text. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	1st Stage	2nd Stage
	Dependent variable	
	CSR strengths	Trade credit
	(1)	(2)
<b>CSR strengths (Instrumented)</b>		<b>0.192***</b> (9.65)
Instrumental variables		
Political environment	0.070* (1.93)	
Industry median CSR	0.862*** (25.27)	
Size	0.073*** (9.40)	0.023*** (6.33)
Leverage	-0.105*** (-4.28)	0.093*** (3.97)
Profit margin	-0.003* (-1.92)	0.004 (0.75)
Cash holding	0.028 (1.12)	0.136*** (4.49)
Asset tangibility	0.064** (2.44)	0.138*** (6.12)
Market share	0.134*** (2.72)	-0.185*** (-7.68)
Sales growth	-0.008*** (-3.03)	-0.024** (-2.32)
Tobin's Q	0.015*** (4.11)	0.019*** (6.10)
Altman Z-score	0.001 (0.64)	-0.041*** (-13.48)
KZ index	-0.000 (-0.80)	-0.002*** (-5.42)
Industry fixed effects	Yes	Yes
Quarter FE	Yes	Yes

Year $\times$ Quarter FE	Yes	Yes
Constant	-0.604*** (-6.45)	0.218*** (2.85)
Observations	48671	48671
F-statistics	25.685	
Adjusted R-squared	0.512	0.165

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**Table 10. Robustness test 3: Firm fixed effects model**

This table presents the results based on the firm fixed effects model. The dependent variable is trade credit (AP/Purchases), and the variables of interest are the CSR strengths score and net CSR score in columns 1 and 2, respectively. Variables are defined in the main text. Standard errors are clustered by firm and year-quarter, and t-statistics are reported in brackets. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
<b>CSR strengths</b>	<b>0.028**</b>	
	(2.06)	
<b>Net CSR</b>		<b>0.010</b>
		(1.33)
Size	0.029***	0.031***
	(3.85)	(4.20)
Leverage	0.016	0.016
	(0.54)	(0.52)
Profit margin	-0.011*	-0.011*
	(-1.67)	(-1.66)
Cash holding	0.090***	0.092***
	(2.65)	(2.72)
Asset tangibility	-0.020	-0.024
	(-0.44)	(-0.52)
Market share	-0.142***	-0.143***
	(-2.78)	(-2.79)
Sales growth	-0.023***	-0.023***
	(-2.93)	(-2.97)
Tobin's Q	0.003	0.003
	(0.70)	(0.66)
Altman Z-score	-0.009	-0.009
	(-1.36)	(-1.40)
KZ index	-0.001**	-0.001**
	(-1.97)	(-1.99)
Firm FE	Yes	Yes
Constant	0.379***	0.369***
	(5.83)	(5.68)
Observations	49784	49784
Adjusted R-squared	0.692	0.692

**Credit author statement**

**Yanlei Zhang:** Conceptualization, Formal analysis, Writing - Original Draft

**Juan M. García Lara:** Supervision, Writing - Review & Editing, Resources

**Josep A. Tribó:** Supervision, Writing - Review & Editing, Resources

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