Journal of International Business Studies (2019)

www.jibs.net

Capital structure decisions along the supply chain: Evidence from import competition

Qianqian Huang[1] and Ryoonhee Kim[2]

[1] *College of Business, City University of Hong Kong, Hong Kong, People's Republic of China;* [2] *College of Business and Economics, Soongsil University, Seoul, South Korea*

Correspondence:
Q Huang, College of Business, City University of Hong Kong, Hong Kong, People's Republic of China
e-mail: qiahuang@cityu.edu.hk

Abstract
This paper studies the spillover effect of import competition in downstream industries on upstream capital structure. We find that a large reduction in import tariffs in a customer industry induces suppliers to choose more conservative financial policies. We show that firms lower their leverage more when the customer–supplier relationship is more valuable to the firms and when firms are more vulnerable to the downstream shock. Finally, firms adjust their leverage mainly by issuing more equity.
Journal of International Business Studies (2019).
https://doi.org/10.1057/s41267-019-00225-9

Keywords: globalization; import competition; capital structure; customer–supplier links

INTRODUCTION

The globalization of economic activities in the past few decades has changed the competitive configuration of industries and generated vigorous debate about trade openness among policymakers.[1] Previous international business literature has shown that firms facing increased foreign competition actively adapt their operations to the new product market environment by, for example, modifying entry and exit strategies, changing product quality control, and reallocating resources.[2] Several recent studies show that greater foreign competition can also influence corporate financial policies (Baggs & Brander, 2006; Zhou, Booth, & Chang, 2013). How foreign competition in an industry has a spillover effect into other industries, however, is relatively unstudied. This paper attempts to fill the gap by examining how a significant increase in import competition in downstream industries affects upstream firms' financial policies.

We argue that upstream firms adjust their leverage downward following a trade-induced competition shock downstream. First, intensified import competition in a firm's major customer industry leads to lower expected profitability of the upstream firm (Acemoglu, Autor, Dorn, Hanson, & Price, 2016) and exposes the firm to higher counterparty credit risk (Jorion & Zhang, 2009); both effects increase the expected cost of financial distress for the supplier firm. As Haugen and Senbet (1978, 1988) emphasize, the cost of financial distress is the additional loss from economic distress that high-levered firms have to incur relative to otherwise

Electronic supplementary material The online version of this article (https://doi.org/10.1057/s41267-019-00225-9) contains supplementary material, which is available to authorized users.

Received: 7 September 2017
Revised: 16 December 2018
Accepted: 19 December 2018

identical firms that have no leverage. It can be significant in reality due to various impediments and should negatively affect a firm's optimal leverage based on the trade-off theory (Senbet & Wang, 2012; Haugen & Senbet, 1978, 1988). Second, intensified downstream import competition lowers the benefits of debt financing for upstream firms because the expected payoff from interest tax shields and the need for the disciplinary role of debt are both reduced.

To test our hypotheses, we use tariff data for the US manufacturing sector during the period 1989–2005. We first identify the largest tariff reduction for each industry, focusing on cuts larger than four times the industry average during our sample period. We then use input–output tables to identify customer–supplier industry pairs. We document that a large tariff reduction in the main downstream industry has a significant negative impact on the leverage of upstream firms. Specifically, using a sample of industry pairs that operate in different four-digit NAICS industries, we find that suppliers whose main customers experience a large tariff reduction lower their leverage by about 5% of their assets. The results are robust to alternative definitions of large tariff cuts and to a variety of alternative samples.

To address the selection problem that suppliers with customer tariff cuts significantly differ from other suppliers, we also conduct a difference-in-differences analysis using a matched sample in the short window around the event. We find that in the 2 years following the event, firms with a tariff-affected downstream industry tend to decrease their leverage more than the matched control firms do. We observe no similar patterns in a falsification test using periods that do not involve significant downstream tariff cuts.

Next, we explore the heterogeneity of the impact of customer tariff reductions on supplier leverage. We find that the negative impact on supplier leverage is significantly greater when customers purchase a larger fraction of the supplier's total revenue, when the products supplied to customers are more unique, when suppliers have a less diversified business, and when both supplier and customers operate in a more concentrated industry. Moreover, using the matched sample, we find that financially weaker firms are also more likely to decrease their leverage after the downstream competition shock. Overall, the results are consistent with our hypothesis that customer risk arising from import competition affects suppliers' leverage decisions.

To bolster our argument that firms opt for lower leverage, we next examine whether a major tariff cut causes economic distress for firms in affected industries. If the cut causes economic distress and imposes significant risk on the continuation of an existing trade relationship, it will reduce supplier firms' ability to use debt as a bargaining tool (Bronars & Deere, 1991; Perotti & Spier, 1993). We find that firms filing for bankruptcy protection are more likely to be liquidated if their industry has experienced a major tariff cut, suggesting that they are more likely to be economically distressed and the potential termination of a trade relationship can be a critical concern for their trading partners. Moreover, we find weak evidence that this economic distress propagates to upstream firms. Given the increased operational risk, these findings suggest that the bargaining benefits of debt should be a less relevant factor in suppliers' capital structure decisions.

Finally, to understand how supplier firms adjust toward lower target leverage, we examine how their security issuance and retirement decisions are affected by actual changes in downstream tariff rates. We find that when tariff rates in downstream industries drop, upstream firms lower their leverage mainly by issuing more equity, suggesting that they need equity financing as a buffer against increased distress risk. Although issuing equity is costly when a firm's bankruptcy risk increases, it is still optimal if the benefits to shareholders brought by the new equity are greater than the wealth transfer to creditors.

Our study contributes to the literature in several ways. First, we contribute to the international business literature by providing the first empirical evidence that international competition in downstream industries can affect the financial policies of upstream firms. Many studies have explored how expansion to foreign markets (Abdi & Aulakh, 2018; Errunza & Senbet, 1981; Grande, Schenzler, & Senbet, 2009; Li, Qiu, & Wan, 2011; Mansi & Reeb, 2002) or how foreign competition (Bernard et al., 2006a, 2006b; Rahaman, 2016; Valta, 2012; Xia & Liu, 2017; Xu, 2012) affects firms. We complement these studies by examining the spillover effect of import competition along the supply chain. Second, this paper contributes to the literature on how product market interactions affect firms' financial policies. Studies show that a firm's

leverage is related to the level of domestic competition in its customer or supplier industries (Kale & Shahrur, 2007; Chu, 2012). We provide evidence that downstream import competition is also a relevant consideration in a firm's capital structure decisions. Finally, our paper is related to discussions about whether an optimal capital structure exists (Frank & Goyal, 2009). We show that firm managers incorporate international competitive pressure faced by downstream firms into their capital structure decisions and adjust their leverage in a way that is consistent with predictions of the trade-off theory.

The rest of the paper is organized as follows. The next section presents a brief overview of the relevant literature and develops our hypotheses. After that, we describe our data and empirical strategy. Then we discuss our empirical findings. The final section concludes.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Hypothesis Development

Why should customer firms' exposure to import competition affect suppliers' capital structure? Prior literature suggests that trade liberalization can substantially increase risk faced by domestic firms and that such risk may propagate along the supply chain. Therefore, we conjecture that intensified downstream import competition increases the expected costs of financial distress but lowers the benefits of debt for supplier firms, leading suppliers to choose lower target leverage.

First, as pointed out by Acemoglu et al. (2016), a demand shock to domestically produced goods is likely to propagate upstream. International trade literature suggests that intensified import competition can expose domestic industries to economic distress, which manifests as deteriorating profitability and employment reductions (Pugel, 1980; Pierce & Schott, 2016). As a result, the demand for intermediate inputs produced domestically will be reduced, leading to lower expected future profitability of upstream firms. Additionally, demand shock may trigger price competition between upstream firms and increase variation in earnings. Lower expected profitability and higher earnings variation can harm a firm's ability to meet its debt obligation and thus increase the probability of financial distress.

Second, the probability of financial distress for suppliers may increase due to trade credit exposure. When a firm's major customers become distressed, they may delay payment or default on trade credit to the firm—a type of unsecured debt. In other words, even if suppliers' expected profitability is not adversely affected by increased import competition downstream, they may become financially distressed because of their large exposure to counterparty credit risk. For instance, survey evidence shows that customer nonpayment is a major cause of bankruptcy for small firms in the United States (Bradley & Rubach, 2002). Scholars have thus argued that counterparty credit risk is an important channel of credit contagion (Jarrow & Yu, 2001; Jorion & Zhang, 2009).

In an ideal system, the cost of financial distress would be economically small because it can be resolved with cost-efficient private restructuring (Haugen & Senbet, 1978, 1988). However, impediments such as information asymmetries, holdout problems, and conflicts of interest make the cost significant because they often preclude a private settlement, and firms have to enter formal bankruptcy procedures (Senbet & Wang, 2012).[3] Therefore, intensified downstream import competition increases a supplier firm's probability of filing for bankruptcy. These impediments may also affect a bankrupt firm's decision to reorganize or be liquidated, which means that bankruptcy may not be totally independent from a firm's asset-restructuring decisions. Since asset sales of bankrupt firms can be inefficient, liquidation costs can represent a part of the costs of financial distress (Shleifer & Vishny, 1992). Specifically, in our setting, if a supplier becomes financially distressed, the inefficiency may be aggravated because the entire supplier industry experiences a negative demand shock. Therefore, we argue that greater downstream import competition increases the expected cost of financial distress for supplier firms.

A firm's bankruptcy risk should be reflected in its credit rating, an indicator of the likelihood of debtor default. Survey evidence shows that credit rating is one of the most important considerations when CFOs make debt policy decisions (Graham & Harvey, 2001). When the risk of a rating downgrade increases, a firm may respond by lowering its leverage to maintain financial flexibility. Because of the significant impact of foreign competition on firm performance, credit rating agencies also consider changes in import competition an important factor when determining a firm's rating.[4] Since credit risk can propagate from downstream to upstream, tariff reductions in customer industries

are likely to increase the credit risk of suppliers and adversely affect their credit ratings. To avoid potential downgrades, supplier firms would have incentives to lower their debt ratio. Therefore, in this context, the impact of credit rating on capital structure is consistent with the prediction of the trade-off theory.

Intensified downstream import competition also lowers the expected benefits of debt financing. Based on traditional trade-off theories, when expected profitability declines, the expected payoff from interest tax shields also declines. In addition, when economic distress propagates upstream, the need for discipline provided by debt is also less valuable for supplier firms because they are less likely to have severe free cash flow problems. These arguments lead us to our main hypothesis:

Hypothesis 1: Increased import competition in downstream industries will lead upstream firms to choose lower leverage.

The impact of import competition downstream on supplier leverage should depend on the supplier's exposure to customer risk. We argue that in the following situations the supplier's cost of losing affected customers is higher, and as a result, supplier firms will experience a larger increase in financial distress risk and have greater incentive to lower leverage. First, when a firm sells a major portion of its sales to affected customers, it should be more concerned about potentially losing these customers' business. Second, suppliers of differentiated goods are likely to have greater relationship-specific exposure to their customers because these goods are often tailored to the need of the customers (Giannetti, Burkart, & Ellingsen, 2009; Titman & Wessels, 1988). When there is a negative demand shock, supplier firms may have difficulty finding alternative customers for their differentiated products. Third, non-diversified firms should be more exposed to customer-industry shocks due to the lack of co-insurance benefits of diversification (Duchin, 2010; Gopalan & Xie, 2011). Moreover, non-diversified firms that have only one customer industry are likely to have investments that are specific to that customer industry. Finally, the market structure may also affect the extent to which supplier leverage responds to changes in downstream risk. Several studies have examined the value impact of vertical mergers (e.g., Fan & Goyal, 2006; Kedia, Ravid, & Pons, 2011). In particular, Kedia et al. (2011) find that vertical mergers generate the greatest value when both the acquirer and the target operate in imperfectly competitive markets. These results suggest that relationships should be more important for firms in less competitive industries because these firms are more likely to make relationship-specific investments and have customized assets. If the trade relation is disrupted by an import competition shock, it will be difficult for these firms to find new trading partners quickly. These arguments about exposure to customer risk lead to another testable hypothesis:

Hypothesis 2.1: Increased import competition in downstream industries will have a greater impact on upstream firms' capital structure when the customer–supplier relationship is more important to the supplier firms: (a) when suppliers rely more on the affected customers for generating sales, (b) when suppliers produce differentiated goods, (c) when suppliers have non-diversified business, and (d) when both the supplier and the customer industry are very concentrated.

Furthermore, if indeed the supplier's concern about financial distress risk drives its leverage adjustment, its ex-ante financial condition should also affect its response to the customer competition shock. Specifically, when an adverse economic shock hits, financially weaker firms are more likely to fall into financial distress. Moreover, these firms are likely to lose market share to industry rivals (Opler & Titman, 1994; Frésard, 2010), which will further increase their likelihood of incurring financial distress costs. Therefore, financially weaker firms should have a greater incentive to lower leverage. This leads to the following hypothesis:

Hypothesis 2.2: Increased import competition in downstream industries will have a greater impact on upstream capital structure when the suppliers are financially weak ex ante.

Further Discussion

Since our study focuses on customer–supplier relationships in capital structure decisions, the bargaining benefit of debt should also be discussed in determining the optimal level of debt. Firms may use debt strategically to influence the behavior of non-financial stakeholders that share economic rents (Bronars & Deere, 1991; Perotti & Spier, 1993; Matsa, 2010). Studies show that firms will maintain a higher level of debt to reduce the

amount of surplus available in a negotiation when a trading counterparty has more bargaining power (Hennessy & Livdan, 2009; Chu, 2012). If bargaining consideration motivates the capital structure decisions of suppliers, we would expect results that differ from the trade-off theory's prediction; after customer tariff cuts, we would expect an increase in the supplier's leverage.

Consistent with the bargaining story, Kale and Shahrur (2007) show a positive relation between firm debt level and the degree of concentration in customer industries. They argue that when the customer industry is concentrated, it is costly for suppliers to switch to alternative trading partners, making the bargaining advantage of debt important for these suppliers. However, when customer import competition increases, domestic suppliers may not be able to switch to foreign customers easily (Acemoglu et al., 2016). Thus, intensified import competition downstream would likely strengthen customers' bargaining position because it reduces surplus that can be shared with suppliers.

To assess whether bargaining consideration is important in our setting requires an elucidation of the difference between economic and financial distress. Firms facing economic distress may have questionable going concern value even in the absence of high leverage. In contrast, firms facing financial distress may have difficulty repaying debts but still have a viable operation of real assets. Oliveira, Kadapakkam, and Beyhagi (2017) examine suppliers to customers that are likely to be temporarily financially distressed and find that these suppliers increase their leverage to take advantage of the bargaining benefits of debt. However, in our sample, customer industries are economically distressed, so it is unlikely that supplier firms can extract many economic concessions from them. Moreover, a supplier to an economically distressed firm faces the risk that its customer might terminate the trade relationship entirely (Banerjee, Dasgupta, & Kim, 2008). Kolay, Lemmon, and Tashjian (2016) show that suppliers to economically distressed firms incur significantly greater costs, mainly related to replacing the distressed customers, than suppliers to financially distressed customers. Taken together, because increasing the debt ratio will make supplier firms even more vulnerable to operational and financial risk, the bargaining advantage should be a less important factor for these suppliers. To validate our argument, we will test whether firms in tariff-affected industries are indeed economically distressed.

EMPIRICAL METHODOLOGY AND DATA

A Quasi-natural Experiment: Import Tariff Reductions in Downstream Industries

The international trade literature generally agrees that lower trade barriers, such as lower import tariff rates, increase the competitive pressure that domestic firms receive from foreign rivals. Several papers in international business have used tariff rate reductions as an exogenous shock to import competition. For instance, Baggs and Brander (2006) and Guadalupe and Wulf (2010) examine the effect of tariff reductions caused by the North American Free Trade Agreement (NAFTA) on Canadian and US firms, respectively. Frésard (2010) uses import tariff reductions to explore the interaction between product market competition and corporate cash holdings. Valta (2012) and Frésard and Valta (2016) employ the largest tariff reduction in an industry to examine the effect of import competition on firms' cost of debt and investment, respectively.

We adopt a quasi-natural experiment similar to that in Valta (2012) and examine how upstream firms adjust their financial policies when a large tariff reduction occurs in their main downstream industry. If, as the studies above assume, tariff reduction is exogenous to firms in an industry, it should be exogenous to their suppliers as well. We use the trade data compiled by Schott (2010) to compute the ad valorem tariff rate for each industry year. These data provide import information for NAICS-defined manufacturing industries over the period 1989–2005. The tariff rates are calculated as the fraction of duties collected by US customs over the Free-On-Board customer value of imports. An industry is considered to have experienced a significant tariff reduction in a year if a negative change in the tariff exceeds four times the industry's average cut over the entire sample period. If the average change of the industry's tariff is positive, we consider all negative changes as large cuts, but if the prereduction tariff rate is smaller than 1%, we do not classify the reduction as large.[5] If an industry experiences more than one significant tariff cut, we use the largest as the event (Valta, 2012).

Sample Construction

To identify customer–supplier relationships, two approaches have been used in the literature. The first approach identifies suppliers and customers at the industry level using input–output (IO) links; the second uses actual trading partners at the firm level. We choose industry-level data for our main analysis for the following reasons: First, the sample of firms in the industry-level data set is much larger. Second, it is possible that a firm sells a large fraction of its output to one customer industry but has no principal customers (i.e., those representing more than 10% of total firm sales) to report. Third, when there is a shock to the customer industry, potential but non-current customers are also likely to matter when a firm makes its capital structure decisions. On the other hand, the firm-level dataset captures actual trading relationships and thus the inferences based on the findings from this data have potential to be cleaner. Therefore, we also conduct some tests using firm-level customer–supplier pairs.

To generate the customer–supplier industry pairs, we use the IO tables published by the US Bureau of Economic Analysis (BEA), which provide IO accounts of dollar flows between all producers and purchasers in the US economy. To maintain consistency over our sample period, we use the 1997 IO table in our main analysis, which splits the period roughly in half. The BEA reports the industry linkages at both the six-digit (detail) and two-digit (summary) industry code levels. We use the detailed industry classification because it is more narrowly defined, and firms appearing in Compustat are more likely to be representative of the industry.

Using the IO make and use tables, we construct an industry-by-industry matrix showing how much of each supplier industry's output is consumed by other industries. The greater the share going to a particular customer industry, the more the supplier is assumed to depend on that industry. For the competition in customer industries to affect a supplier's financial policies, the customer's purchases must constitute a large fraction of the supplier's total sales. Therefore, we select as the customer industry the IO industry making the most purchases. For each industry pair, we use the concordance table provided by the BEA to determine each industry's NAICS code. To ensure that each industry pair represents a meaningful trading relationship, we follow Ahern (2012) and require that the major customer industry buy at least 1% of a supplier industry's total output. The average purchase by the main customer industry is 20%.

Next, we merge the tariff data with the customer–supplier industry pairs using NAICS codes. To measure the change in import competition more accurately, we use the most detailed level of tariff data we can identify for each industry. If an IO industry can be identified at the six-digit NAICS level, we use tariff cut information at the six-digit level, and likewise if the industry matched is at a broader NAICS level. Due to the availability of tariff data for both the customer and supplier industries with different NAICS codes, our initial sample covers 123 manufacturing IO industries. In Table IA1 of the Internet appendix, we provide detailed information about the treated industry pairs and the relevant tariff rate changes. We illustrate our industry pairs with the following example: The household and institutional furniture manufacturing industry sells 34% of its output to the audio and video equipment manufacturing industry, which had a large import tariff reduction in 1994 (from 3.46% to 2.79%, or a 20% reduction relative to the pre-reduction rate).

To consistently estimate the effect of downstream tariff cuts on supplier firms, we need to ensure that the downstream shock affects suppliers only through the tariff reduction. However, this condition will be violated if firms in an industry sell most of their output to other firms in the same or a similar industry. To address this problem, we exclude from the sample customer–supplier pairs that operate in the same four-digit NAICS code industries because they are more likely to be directly affected by the same tariff event. To further ensure that the observed effect is not caused by the industry's own shocks, we exclude supplier industries that themselves experience significant tariff cuts during our sample period. However, suppliers can still experience simultaneous and meaningful tariff cuts. To further isolate the effect of downstream tariff cuts, we control for import penetration of supplier industries in all of our analysis. Industries whose main customers never experience a large tariff rate reduction are included as control industries.

In the final step of sample construction, we merge the data with our Compustat sample using firms' primary NAICS codes.[6] We additionally exclude from our main variables firms headquartered outside the United States and firms with missing values. Our final sample includes 6758

Table 1 Summary statistics

	N	Mean	Std Dev	Min	Median	Max
Book leverage	6758	0.249	0.245	0.000	0.216	1.405
Market leverage	6715	0.192	0.187	0.000	0.148	0.713
Post-reduction	6758	0.492	0.500	0.000	0.000	1.000
Log (Total assets)	6758	5.630	2.152	− 0.061	5.638	9.968
Market-to-book	6758	2.095	2.602	0.538	1.328	20.700
Tangibility	6758	0.320	0.201	0.010	0.302	0.802
Import penetration	6758	0.286	0.144	0.005	0.258	0.941
Industry concentration	6758	0.110	0.103	0.035	0.075	0.697
ΔTariff rate	6758	− 0.144	0.274	− 1.927	− 0.055	1.684
Net debt issuance	5746	0.021	0.149	− 0.349	0.000	0.846
Net equity issuance	5717	0.118	0.417	− 0.128	0.005	3.133
Cash net debt issue	5311	0.016	0.109	− 0.203	− 0.000	0.611
Cash net equity issue	5124	0.051	0.220	− 0.142	− 0.000	1.592

This table presents summary statistics for our main sample. The sample includes manufacturing companies over the period 1989–2005 that do not share the same four-digit NAICS code with their main customer industry and that have not experienced significant tariff reductions during the sample period. Detailed variable definitions are provided in the "Appendix". All firm-level financial variables are winsorized at the 1st and 99th percentiles.

firm-year observations for 948 firms between 1989 and 2005. Table 1 shows summary statistics of our main sample. Detailed definitions of the variables are given in the "Appendix". All the firm-level financial variables are winsorized at their 1st and 99th percentiles to reduce the influence of outliers. Following other studies, we measure a firm's financial leverage using both book- and market-leverage ratios.[7] The median book (market) leverage ratio is 24.9% (19.2%) for our sample.

Empirical Model

To examine how increases in downstream import competition affect upstream leverage, we use the following linear regression model:

$$\text{Leverage ratio}_{i,j,t} = \alpha + \beta\ \text{Post-reduction}_{j,t} + \gamma \text{Controls}_{i,t-1} + \delta_j + \eta_t + \varepsilon_{i,t} \quad (1)$$

The dependent variable is the book or market leverage ratio of firm *i* in industry *j* in given year *t*. *Post-reduction* is a dummy variable that equals one if industry *j*'s customer industry has experienced a significant tariff rate reduction by year *t*, and zero otherwise. We include industry fixed effects (δ_j) to control for time-invariant heterogeneity across industries, where industry is defined using detailed IO industry classification, and year fixed effects (η_t) to control for time trend.

We also consider a number of known determinants of a firm's leverage, including firm size (logarithm of total assets), growth opportunities (market-to-book ratio), profitability, asset tangibility, cash flow volatility, and tax credit (Frank & Goyal, 2009). However, in our main specification, we do not include profitability, cash flow volatility, or tax credit because these variables are likely to be endogenously affected by the downstream tariff cuts and including them would bias our estimates (Roberts & Whited, 2013). We also include import penetration of the supplier's industry, calculated as the ratio of imports to the sum of domestic production. Finally, we separately control for the effect of the supplier industry's domestic competition by including the natural logarithm of the Herfindahl–Hirschman Index (HHI), calculated based on all Compustat firms.

RESULTS

Baseline Results

Table 2 reports the estimated impact of customer import competition on supplier leverage.[8] Columns (1) and (3) present estimates from our baseline regressions. We find that the coefficient estimates on the *Post-reduction* dummy are negative and statistically different from zero in both regressions. The positive impact on market leverage further implies that firms experiencing changes in customer import competition promptly adjust their leverage. In a robustness test, we further control for firm profitability, cash-flow volatility, and tax credit in the regressions. Table IA2 of the internet appendix presents the results. We show that the negative effect on leverage remains after we add these firm-level controls.

Table 2 Effect of downstream tariff reduction on supplier leverage

	Book leverage		Market leverage	
	(1)	(2)	(3)	(4)
Post-reduction	− 0.050***		− 0.046***	
	(0.013)		(0.012)	
$Post^{2+}$		− 0.065***		− 0.055***
		(0.025)		(0.017)
$Post^{1}$		− 0.051***		− 0.052***
		(0.021)		(0.015)
$Post^{0}$		− 0.039**		− 0.032**
		(0.020)		(0.014)
Pre^{-1}		− 0.024		− 0.019
		(0.019)		(0.012)
Log (Total assets)	− 0.015**	− 0.015***	− 0.003	− 0.003
	(0.006)	(0.004)	(0.003)	(0.003)
Market-to-book	0.010**	0.010***	− 0.011***	− 0.011***
	(0.004)	(0.004)	(0.002)	(0.001)
Tangibility	0.284***	0.284***	0.170***	0.170***
	(0.087)	(0.041)	(0.047)	(0.028)
Import penetration	− 0.222	− 0.202	− 0.178	− 0.167
	(0.171)	(0.160)	(0.120)	(0.118)
Industry concentration	− 0.031**	− 0.036**	− 0.029***	− 0.033***
	(0.012)	(0.015)	(0.011)	(0.011)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	6758	6758	6715	6715
R-squared	0.212	0.212	0.358	0.358

This table presents results from regressions of supplier leverage on customer tariff reduction. The sample is composed of manufacturing companies over the period 1989–2005 that do not share the same four-digit NAICS code with their main customer industry and that have not experienced significant tariff reductions during the sample period. The dependent variable in columns (1) and (2) is *Book leverage*, and in columns (3) and (4), *Market leverage*. Detailed variable definitions are provided in the "Appendix". Robust standard errors, adjusted for industry-level clustering, are reported in parentheses. ***, **, *Statistical significance at the 1, 5, and 10% levels, respectively.

The effect of downstream tariff cuts on supplier leverage is also economically meaningful. All else being equal, a significant tariff reduction in the customer industry is associated with a five-percentage-point reduction in supplier firms' book leverage. To put the magnitude of this decrease into perspective, the marginal effect is about as large as the marginal impact of a one-standard-deviation decrease in a firm's asset tangibility. Take the aforementioned industry pair as an example. When the audio and video equipment manufacturing industry had its large import tariff reduction in 1994, firms in the upstream household and institutional furniture manufacturing industry on average lowered their book leverage from 0.24 before the reduction to 0.2 after the reduction.

To better establish the causality, we next study the dynamic effects of the tariff reductions on supplier leverage. Following Bertrand and Mullainathan (2003), we replace the *Post-reduction* dummy with four dummies: Pre^{-1}, $Post^{0}$, $Post^{1}$, and $Post^{2+}$. Each dummy equals one if the firm's customer industry will experience or has experienced a significant tariff reduction 1 year from now (Pre^{-1}), this year ($Post^{0}$), 1 year ago ($Post^{1}$), and at least 2 years ago ($Post^{2+}$). The dummy variable Pre^{-1} allows us to assess whether any significant leverage adjustment can be found before the large tariff cut in customer industries. The results are reported in columns (2) and (4) of Table 2. The estimated coefficient of Pre^{-1} is not significantly different from zero; meanwhile, the coefficients on the post-year dummies are all significantly negative. Moreover, the coefficient on $Post^{0}$ is economically smaller than that on $Post^{1}$ and $Post^{2+}$, which is consistent with a causal interpretation of our results. Overall, there appears to be no significant effect on leverage before the downstream tariff cut, but only significant effects after.

It is worth discussing whether the magnitude of the impact we document is consistent with prior evidence. In our sample, the average reduction in

the tariff rate during the event year is 1.04%, corresponding to a 29% decrease relative to the average tariff rate of 3.55% one year before the reduction. We examine the direct impact of these tariff reductions on the firms whose industries experience large tariff cuts. The results are reported in Table IA3 of the Internet appendix. We find that a significant tariff reduction in the industry is associated with about five-percentage-point reduction in firms' book leverage. The magnitude is comparable to that in Xu (2012).[9] In other words, our estimated spillover effect of downstream tariff reduction on supplier leverage in Table 2 is close to the direct impact of import competition. This echoes Acemoglu et al.'s (2016) finding that the impact of downstream import competition on employment growth can be as large as that of import competition in a firm's own industry.

Nevertheless, the estimated indirect impact may seem large considering our definition of supplier-customer industry pairs (i.e., 1% of total sales). To better establish causality, we also examine the distribution of the effect conditional on suppliers' sales dependence on the customer industry. For treated firms whose industry sales dependence is in the top quartile of the sample, the average sales to the tariff-affected customer industry are 29% and the average leverage changes from 0.30 to 0.22 after the tariff reductions. In contrast, for firms whose sales dependence is in the bottom quartile, the average sales are 6% and on average the leverage changes from 0.28 to 0.27. Overall, these findings suggest that sales dependence is important in determining the leverage effect and we will discuss it further later.

Robustness Tests

Table 3 reports outcomes of tests to ensure the robustness of our results. Panel A presents results from book leverage regressions. First, because an import tariff reduction is likely to be associated with simultaneous reductions in export tariffs due to bilateral trade agreements, we control for the supplier industry's export intensity to remove the confounding effect of potential export shocks. We follow Colantone and Sleuwaegen (2010) and calculate the export intensity as industry exports divided by the sum of domestic production and industry imports. Column (1) shows that our results are not affected. Second, we estimate a Tobit model and a median regression, respectively, to ensure that our results are not driven by zero-leverage firms. Results in columns (2) and (3) show that the estimated coefficient on *Post-reduction* remains negative and statistically significant.

Third, we generate alternative measures for exposure to customer import competition. Because it is possible for an upstream industry to have more than one downstream industry experiencing large tariff reductions, we construct a continuous measure to capture the flow-weighted fraction of customer industries that have experienced such reductions. It is equal to one if large tariff reductions occurred in all customer industries and zero if they occurred in no customer industries. We also re-define the *Post-reduction* dummy by requiring that the main customer industry buy at least 10% of the output.[10] As shown in Table 3 columns (4) and (5), the results are robust to these alternative measures.

Fourth, we reexamine the effect of downstream import competition by replacing the industry fixed effects with firm fixed effects. As column (6) shows, the magnitude of the leverage effect is reduced, but it is still statistically and economically significant. Fifth, to further ensure that our results are not driven by tariff shocks common to supplier firms, we redo our analysis by excluding firms that share the same three-digit NAICS codes with their main customers and that have experienced a large tariff cut at the three-digit NAICS level. The results in column (7) show that our findings are again robust to this alternative sample. Sixth, we reestimate the impact on supplier book leverage using an industry-level regression. Because industries with more firms received more weight in our original tests, we convert all firm-level variables into industry averages to ensure that each industry is equally represented in the analysis. The results in column (8) show that the effects are not driven by overrepresented industries.

Finally, we reexamine the effect of downstream competition using customer–supplier pairs identified at the firm level. According to the statement of financial accounting standards (SFAS) Nos. 14 and 131, public companies are required to disclose the existence of customers that account for more than 10% of their annual sales. We follow the literature to link these customers to companies covered by Compustat (Fee & Thomas, 2004).[11] Given the economic importance of all reported principle customers, we thus define a supplier firm as treated if any of its principal customers has a significant tariff cut in its industry as measured at the four-digit NAICS level. We then follow our earlier approach and exclude firms that share a four-digit

Table 3 Effect of downstream tariff reduction on supplier leverage: robustness tests

	Control for export intensity (1)	Tobit regression (2)	Median regression (3)	Continuous measure (4)	Customers' sales ≥ 10% (5)	Firm fixed effects (6)	Different NAICS3 (7)	Industry level (8)	Firm-level customers (9)
Panel A: Book leverage									
Post-reduction	− 0.049***	− 0.054***	− 0.040***	− 0.079***	− 0.056***	− 0.026**	− 0.039**	− 0.050*	− 0.044*
	(0.014)	(0.014)	(0.013)	(0.028)	(0.018)	(0.013)	(0.015)	(0.028)	(0.026)
Log (Total assets)	− 0.015**	− 0.013**	0.001	− 0.015**	− 0.023**	0.020***	− 0.019***	− 0.006	− 0.006
	(0.006)	(0.006)	(0.003)	(0.006)	(0.009)	(0.007)	(0.007)	(0.021)	(0.005)
Market-to-book	0.010**	0.011**	− 0.002*	0.010**	0.014***	− 0.004	0.019***	− 0.010	− 0.004
	(0.004)	(0.005)	(0.001)	(0.004)	(0.005)	(0.003)	(0.005)	(0.011)	(0.003)
Tangibility	0.284***	0.353***	0.275***	0.283***	0.325**	0.277***	0.187***	0.024	0.357***
	(0.087)	(0.121)	(0.077)	(0.088)	(0.129)	(0.073)	(0.060)	(0.158)	(0.076)
Import penetration	− 0.233	− 0.265	− 0.216	− 0.216	− 0.316	− 0.211	0.034	− 0.286	− 0.533**
	(0.207)	(0.183)	(0.142)	(0.175)	(0.187)	(0.129)	(0.259)	(0.243)	(0.247)
Industry concentration	− 0.030	− 0.015	− 0.021	− 0.026**	− 0.048***	− 0.010	− 0.055*	− 0.032	− 0.008
	(0.018)	(0.013)	(0.014)	(0.011)	(0.014)	(0.011)	(0.032)	(0.042)	(0.020)
Industry FE	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6758	6758	6758	6758	5473	6639	3629	676	1670
R-squared	0.212	–	0.165	0.211	0.172	0.700	0.214	0.442	0.290
Panel B: Market leverage									
Post-reduction	− 0.045***	− 0.049***	− 0.043***	− 0.052*	− 0.045***	− 0.031**	− 0.034*	− 0.045*	− 0.045**
	(0.012)	(0.012)	(0.015)	(0.031)	(0.016)	(0.015)	(0.018)	(0.025)	(0.021)
Log (Total assets)	− 0.003	− 0.002	0.001	− 0.003	− 0.003	0.036***	− 0.006*	0.021	− 0.000
	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.007)	(0.004)	(0.015)	(0.004)
Market-to-book	− 0.011***	− 0.013***	− 0.006	− 0.012***	− 0.006***	− 0.007***	− 0.012***	− 0.012***	− 0.018***
	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.001)	(0.003)	(0.004)	(0.002)
Tangibility	0.170***	0.219***	0.187***	0.169***	0.170**	0.197***	0.126***	− 0.082	0.186***
	(0.047)	(0.066)	(0.041)	(0.048)	(0.063)	(0.037)	(0.045)	(0.092)	(0.054)
Import penetration	− 0.232*	− 0.206	− 0.221**	− 0.174	− 0.267**	− 0.175	0.126	− 0.230	− 0.578**
	(0.134)	(0.129)	(0.106)	(0.126)	(0.131)	(0.131)	(0.170)	(0.153)	(0.246)
Industry concentration	− 0.023*	− 0.018	− 0.021	− 0.022*	− 0.035***	0.003	− 0.010	− 0.005	0.003
	(0.012)	(0.011)	(0.013)	(0.011)	(0.012)	(0.011)	(0.023)	(0.031)	(0.018)
Industry FE	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6715	6715	6715	6715	5439	6597	3602	675	1654
R-squared	0.358	–	0.343	0.356	0.348	0.753	0.310	0.586	0.372

This table reports results from more robustness tests. The dependent variable in Panel A is *Book leverage*, and in Panel B, *Market leverage*. Column (1) includes export intensity as an additional control variable. Column (2) conducts Tobit regression. Column (3) uses median regression. Column (4) uses a continuous measure to capture the flow-weighted fraction of customer industries that have experienced tariff reductions. Column (5) includes only industries whose downstream industry purchases at least 10% of the output. Column (6) controls for firm fixed effects. Column (7) includes only firms that do not share the same three-digit NAICS code with their main customer industry. Column (8) uses industry-level observations created by collapsing the main firm-level observations to industry averages. Column (9) includes customer–supplier pairs that are identified at the firm level by Compustat customer segment data. Detailed variable definitions are provided in the "Appendix". Robust standard errors, adjusted for industry-level clustering, are reported in parentheses.

***, **, *Statistical significance at the 1, 5, and 10% levels, respectively.

NAICS code with any of their principal customers and firms that themselves experience any significant tariff cut during our sample period. This reduces our sample size further. As shown in column (9), the results are consistent with the findings from the industry-level analysis.

In Panel B of Table 3, we show that our findings for market leverage remain in all regressions. In untabulated analysis, we further ensure that our results are not driven by other omitted factors. First, we drop all observations after 2001 and find that our results are not driven by China's accession to the WTO. In addition, we further control for transportation costs, proxied by the freight rate; our results remain unchanged. Overall, we find that changes in the degree of import competition in customer industries have both quantitative and qualitative effects on supplier leverage.[12]

Matched Sample Results

It is possible that suppliers whose customers face intensified import competition may differ from other suppliers in ways that are systematically related to supplier firms' leverage choices. To address such endogeneity, we conduct a difference-in-differences analysis around large tariff reductions using the matched sample. Because we can identify the event year for the control firms, the matched sample also allows us to examine whether the leverage adjustment appears shortly after the event.

We use Abadie and Imbens's (2002) matching estimator (full covariate) and construct a matched sample around the major tariff cuts in customer industries. Specifically, for each treated supplier, the matching estimator selects the nearest neighbor with a replacement from the group of nontreated suppliers. We define a treated supplier as a firm operating in an industry whose downstream industry experiences a large tariff reduction in year t; a nontreated supplier is a firm whose downstream industry experiences no such reduction. A control supplier is then selected from the nontreated suppliers; it is the closest match to a treated supplier in terms of firm size, market-to-book ratio, and book leverage measured 1 year before the tariff reduction, or year $t-1$.[13] We match by firm size and market-to-book ratio because they are important determinants of financial leverage. By additionally matching by book leverage, we control for the cumulative impact of firm-specific factors that is summarized in the different choices of leverage before the event. The matching procedure ensures that the treated and control suppliers closely resemble each other in terms of key firm characteristics ex ante but differ in whether their downstream industry experiences a large tariff reduction. The difference between the change in leverage for treated and control firms thus reveals the causal effect of changes in the degree of downstream import competition.

We run the baseline regression model using the matched sample for the period $t-1$ to $t+2$. Columns (1) and (2) in Panel A of Table 4 report that the coefficients of *Post-reduction* are negative and statistically significant in the book leverage regressions. All else being equal, a downstream tariff reduction decreases supplier leverage by about 3.2 percentage points by the end of the year following the reduction. Columns (3) and (4) show that the estimated coefficients of the *Post-reduction* dummy are again negative in regressions of market leverage, and the estimated effect is statistically significant in column (4). Overall, results in Panel A of Table 4 reconfirm that suppliers decrease their leverage significantly after their downstream industry experiences a large tariff reduction.

Next, we repeat the analyses using placebo periods to examine whether the same pattern of leverage changes is observed in periods that do not involve significant tariff cuts in downstream industries. A similar pattern would suggest that the documented leverage effect could merely be a reflection of a general trend over our sample period. We perform this falsification test using the same treated firms and years $(t-3)$ relative to the actual event years. The same matching procedure as that used in Panel A is used to select control firms. We then examine the change in firm leverage from year $(t-3)$ to year $(t-1)$. The results are presented in Panel B of Table 4. We find that the coefficient on *Post-reduction* is not significantly different from zero in any of the regressions, lending further credence to our argument that the observed changes in supplier leverage really stem from the downstream tariff reductions.

Cross-sectional Differences in the Effect on Supplier Leverage

In this section, we explore cross-sectional variations in the effects on supplier leverage of import competition in customer industries. This analysis can alleviate the omitted variable concern and help us understand the underlying channel through

Table 4 Matching sample analysis

	Book leverage		Market leverage	
	$t-1$ to $t+1$ (1)	$t-1$ to $t+2$ (2)	$t-1$ to $t+1$ (1)	$t-1$ to $t+2$ (2)
Panel A: Matching sample				
Post-reduction	− 0.032*	− 0.038**	− 0.023	− 0.025*
	(0.016)	(0.015)	(0.014)	(0.014)
Log (total assets)	− 0.016**	− 0.016**	− 0.006	− 0.006
	(0.007)	(0.007)	(0.004)	(0.004)
Market-to-book	− 0.017***	− 0.018***	− 0.027***	− 0.027***
	(0.004)	(0.004)	(0.007)	(0.008)
Tangibility	0.268***	0.281***	0.147***	0.139***
	(0.060)	(0.064)	(0.052)	(0.050)
Import penetration	− 0.856**	− 0.659**	− 0.758**	− 0.495*
	(0.384)	(0.307)	(0.343)	(0.266)
Industry concentration	− 0.009	− 0.018	− 0.021	− 0.006
	(0.030)	(0.028)	(0.026)	(0.031)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	1057	1353	1048	1343
R-squared	0.300	0.284	0.405	0.401
Panel B: Placebo tests				
Post-reduction	− 0.006	− 0.018	0.013	− 0.001
	(0.034)	(0.033)	(0.020)	(0.020)
Log (total assets)	− 0.013	− 0.008	− 0.006	− 0.004
	(0.008)	(0.007)	(0.005)	(0.004)
Market-to-book	− 0.026***	− 0.025***	− 0.027***	− 0.027***
	(0.005)	(0.005)	(0.008)	(0.008)
Tangibility	0.121	0.097	0.056	0.041
	(0.140)	(0.111)	(0.065)	(0.054)
Import penetration	− 0.189	− 0.188	− 0.840**	− 0.480**
	(0.666)	(0.325)	(0.316)	(0.223)
Industry concentration	− 0.017	− 0.004	− 0.022	− 0.021
	(0.048)	(0.034)	(0.025)	(0.026)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	551	708	541	696
R-squared	0.274	0.281	0.393	0.398

This table reports results from the matching analysis. Panel A contains analysis based on a matched sample around large tariff reductions in downstream industries. For each treated firm (whose customer industry has a large tariff reduction at year *t*), a control firm is matched based on its size, market-to-book ratio, and book leverage measured at $t-1$. The dependent variable in columns (1) and (2) is *Book leverage*, and in columns (3) and (4), *Market leverage*. Columns (1) and (3) report results for the period of ± 1 year around the tariff reduction year *t*, and columns (2) and (4) are for the period from 1 year before to 2 years after the reduction. Panel B contains placebo tests, for which the estimation is done 3 years before the actual major tariff cuts. Detailed variable definitions are provided in the "Appendix". Robust standard errors, adjusted for industry-level clustering, are reported in parentheses. ***, **, *Statistical significance at the 1, 5, and 10% levels, respectively.

which downstream import competition affects upstream leverage.

Value of the customer–supplier relationship

We first investigate whether suppliers are more likely to reduce leverage when the relevant customer relationships are more valuable to the firm. First, we examine whether the effect is stronger when the suppliers depend more on sales to the customer. We construct *Sales dependence*, a dummy variable that equals one if the supplier industry's sales to the major customer industry are above the sample median. We then interact it with our *Post-reduction* dummy and add the interaction term to our baseline regression. Results in column (1) of Table 5 show that the negative impact is mostly concentrated in firms more dependent on the customer industry.

Second, because they may have difficulty finding alternative customers, we test whether suppliers producing differentiated goods are affected more.

Table 5 Supplier leverage and relationship-specific investments

	(1)	(2)	(3)	(4)
Panel A: Book leverage				
Post-reduction	− 0.007	− 0.014	− 0.028**	− 0.030**
	(0.023)	(0.029)	(0.013)	(0.014)
Post-reduction × Sales dependence	− 0.062**			
	(0.031)			
Sales dependence	− 0.065			
	(0.042)			
Post-reduction × Differentiated goods		− 0.061**		
		(0.028)		
Differentiated goods		0.091		
		(0.109)		
Post-reduction × Non-diversified business			− 0.026*	
			(0.015)	
Non-diversified business			− 0.029	
			(0.018)	
Post-reduction × Concentrated industries				− 0.034**
				(0.015)
Concentrated industries				0.008
				(0.020)
Log (Total assets)	− 0.013**	− 0.016**	− 0.019***	− 0.015**
	(0.006)	(0.007)	(0.006)	(0.006)
Market-to-book	0.009**	0.010**	0.010**	0.010**
	(0.004)	(0.005)	(0.005)	(0.005)
Tangibility	0.332***	0.287***	0.289***	0.283***
	(0.074)	(0.085)	(0.087)	(0.087)
Import penetration	− 0.234	− 0.200	− 0.227	− 0.229
	(0.172)	(0.182)	(0.185)	(0.175)
Industry concentration	− 0.031**	− 0.035**	− 0.030**	− 0.034**
	(0.013)	(0.015)	(0.012)	(0.014)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	6758	6733	6758	6758
R-squared	0.212	0.212	0.217	0.212
Panel B: Market leverage				
Post-reduction	− 0.014	− 0.017	− 0.035**	− 0.028**
	(0.022)	(0.015)	(0.016)	(0.012)
Post-reduction × Sales dependence	− 0.057*			
	(0.032)			
Sales dependence	0.029			
	(0.031)			
Post-reduction × Differentiated goods		− 0.027		
		(0.018)		
Differentiated goods		0.025		
		(0.098)		
Post-reduction × Non-diversified business			− 0.017	
			(0.015)	
Non-diversified business			− 0.021	
			(0.010)	
Post-reduction × Concentrated industries				− 0.029*
				(0.017)
Concentrated industries				− 0.002
				(0.013)
Log (Total assets)	− 0.002	− 0.004	− 0.005*	− 0.003
	(0.003)	(0.003)	(0.003)	(0.003)

Table 5 (*Continued*)

	(1)	(2)	(3)	(4)
Market-to-book	− 0.013***	− 0.011***	− 0.011***	− 0.011***
	(0.003)	(0.002)	(0.002)	(0.002)
Tangibility	0.208***	0.175***	0.174***	0.169***
	(0.047)	(0.046)	(0.047)	(0.047)
Import penetration	− 0.192	− 0.165	− 0.194	− 0.181
	(0.123)	(0.126)	(0.129)	(0.119)
Industry concentration	0.028**	− 0.031**	− 0.029**	− 0.033**
	(0.012)	(0.015)	(0.011)	(0.015)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	6715	6690	6715	6715
R-squared	0.358	0.359	0.361	0.358

This table reports the results from regressions with various interaction terms. The dependent variable in Panel A is *Book leverage*, and in Panel B, *Market leverage*. *Sales dependence* indicates whether the supplier industry's sale to the major customer industry is above or below the sample median. *Differentiated goods* indicates whether the supplier produces differentiated goods. *Non-diversified business* indicates whether the firm has more than one business segment measured at the three-digit SIC level. *Concentrated industries* indicates whether both the supplier and customer industry's HHI is in the top quartile for all observations. Detailed definitions of other variables are provided in the "Appendix". Robust standard errors, adjusted for industry-level clustering, are reported in parentheses.
***, **, *Statistical significance at the 1, 5, and 10% levels, respectively.

We follow the same classifications used by Giannetti et al. (2009) and construct the dummy variable *Differentiated goods*, which equals one if the supplier outputs differentiated goods and zero otherwise. Results in column (2) show that the negative impact on supplier leverage is driven by suppliers producing differentiated goods.

Third, we examine whether a supplier firm's industry diversification affects the impact on leverage. We define a dummy variable, *Non-diversified business*, that equals one if the firm operates in a single three-digit SIC industry and zero otherwise. Consistent with our conjecture, results in column (3) show that suppliers with a less-diversified business make greater leverage adjustments following major downstream tariff cuts.

Finally, we examine whether the industry market structure also affects the extent to which a supplier responds to changes in customer import competition. Following Kedia et al. (2011), we define concentrated industries as those with HHI in the top quartile of our sample. We then generate an indicator variable, *Concentrated industries*, which takes a value of one if both the supplier and the customer industry are concentrated. Results in column (4) show that the impact on supplier leverage is also more pronounced when both the supplier and customer operate in less competitive industries.

Overall, these results are highly consistent with the prediction that the spillover effects of import competition in customer industries on supplier leverage are stronger when the customer–supplier relationship is more important to the supplier firms.

Ex-ante financial strength

We next examine whether the documented leverage effects depend on supplier firms' ex-ante financial condition. Because supplier firms' financial strength is likely to be affected by a downstream tariff reduction, we conduct our analysis using the matched sample and separate firms based on their ex-ante financial strength measured at year $(t-1)$ for both the treated and the nontreated groups. As noted previously, the firms in these two groups have similar key characteristics before the downstream competition shock. For this reason, the matched sample also helps us address the concern that firm-specific factors may have led to different pre-shock leverage choices and biased our estimates.

We use leverage and cash holdings to measure a firm's ex-ante financial condition. Opler and Titman (1994) shows that firms with higher leverage are more adversely affected by negative economic shocks. Frésard (2010) further shows that cash holdings also affect a firm's ability to withstand a negative shock. Therefore, when the downstream import competition intensifies, supplier firms with

Table 6 Supplier leverage and ex-ante financial strength

	Book leverage		Market leverage	
	High leverage (1)	Low cash (2)	High leverage (3)	Low cash (4)
Post-reduction	− 0.002	− 0.025*	− 0.021	− 0.034***
	(0.021)	(0.014)	(0.016)	(0.012)
Post-reduction × Financially weak	− 0.062**	− 0.021*	− 0.046**	− 0.009
	(0.024)	(0.012)	(0.019)	(0.006)
Financially weak	0.170***	0.077***	0.126***	0.058***
	(0.017)	(0.015)	(0.012)	(0.012)
Log (Total assets)	− 0.012**	− 0.009	− 0.007**	− 0.005
	(0.005)	(0.005)	(0.003)	(0.004)
Market-to-book	− 0.008**	− 0.009**	− 0.022***	− 0.023***
	(0.004)	(0.004)	(0.003)	(0.003)
Tangibility	0.177***	0.129**	0.098**	0.062
	(0.050)	(0.052)	(0.040)	(0.042)
Import penetration	− 0.365**	− 0.361**	− 0.271*	− 0.265*
	(0.173)	(0.169)	(0.141)	(0.142)
Industry concentration	− 0.020	− 0.023	− 0.017	− 0.017
	(0.015)	(0.016)	(0.012)	(0.012)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	5029	5028	5007	5006
R-squared	0.386	0.299	0.482	0.417

This table examines whether supplier firms adjust leverage more when they are financially weaker. The dependent variable in columns (1) and (2) is *Book leverage*, and in columns (3) and (4), *Market leverage*. *Financially weak* is a dummy variable indicating whether the firm is financially weaker before the event based on book leverage (columns (1) and (3)) and cash holdings (columns (2) and (4)), respectively. Detailed definitions of other variables are provided in the "Appendix". Robust standard errors, adjusted for industry-level clustering, are reported in parentheses.
***, **, *Statistical significance at the 1, 5, and 10% levels, respectively.

more debt obligations or less cash holdings are more likely to be financially distressed. Using firm-level leverage and cash holdings, we construct two industry-year, median-adjusted measures for each firm at year $(t-1)$. We then generate a dummy variable, *Financially weak*, which equals one if a firm's adjusted leverage is above or its adjusted cash holdings are below the sample median.

As reported in Table 6, we find that the effect of downstream tariff cuts on supplier leverage is generally stronger for firms with weaker financial condition ex ante. This is consistent with the idea that firms are more likely to de-lever when they are more vulnerable to customer import competition shocks.

Economic Distress and Bargaining Benefits of Debt

We argued earlier that the bargaining benefits of debt are unlikely to motivate suppliers to adjust their capital structure when their customers are economically distressed due to intensified import competition. To confirm that the tariff-affected firms are indeed exposed to economic distress, we examine bankruptcy outcomes. When a firm fails to meet its debt payment obligation, it may file for bankruptcy reorganization (Chapter 11 of the Bankruptcy Code). Such filings can be caused by pure financial distress or by economic distress (which results in subsequent financial distress). Bankrupt firms facing economic distress have questionable going concern value, so these firms should be more likely to be liquidated in Chapter 11 (Haugen & Senbet, 1978).[14]

To test our conjecture, we obtain bankruptcy filings from New Generation Research Bankruptcy Data. This database provides information about each bankruptcy case's filing date, final outcome, and effective date. We manually merge the bankruptcy filing data with all manufacturing firms that have tariff and financial information. During our sample period, only 344 bankruptcy filings have financial information available for the last fiscal year before the filing. Univariate comparison shows that in industries that have experienced a significant import tariff reduction, 40% of the bankrupt firms are liquidated in Chapter 11. In industries experiencing no such cuts, 29% are liquidated.

Table 7 Import competition and bankruptcy outcomes

	Liquidation	
	(1)	(2)
Post-reduction	0.217*	0.229*
	(0.132)	(0.129)
Log (Total assets)	− 0.033**	− 0.032*
	(0.016)	(0.019)
Book leverage	− 0.125**	− 0.130**
	(0.054)	(0.054)
Tangibility		0.103
		(0.178)
Profitability		− 0.019
		(0.046)
Industry FE	Yes	Yes
Observations	279	276
Pseudo *R*-squared	0.084	0.090

This table reports the results from the bankruptcy outcome analysis. The dependent variable is *Liquidation*. Both regressions control for industry fixed effects (four-digit NAICS). Detailed variable definitions are provided in the "Appendix". Robust standard errors, adjusted for industry-level clustering, are reported in parentheses.
***, **, *Statistical significance at the 1, 5, and 10% levels, respectively.

To further examine whether firms that file for bankruptcy after large import tariff cuts are more likely to be liquidated, we conduct a multivariate probit regression. Table 7 presents these results in terms of marginal effects. The dependent variable is *Liquidation*, a dummy indicating whether the bankrupt firm is liquidated in Chapter 11. The results in column (1) show that the coefficient on *Post-reduction* is positive and significant, indicating that a bankrupt firm is more likely to be liquidated if its industry has experienced a large import tariff reduction. We also find that larger firms and those with higher leverage are less likely to be liquidated, consistent with Dahiya, John, Puri, and Ramirez (2003). The negative sign on leverage is also consistent with the trade-off theory prediction that firms with lower expected costs of financial distress choose higher leverage ex ante. In column (2), we further control for asset tangibility and pre-filing performance; our main results are not affected.

We next focus on supplier firms in our main sample to examine whether they are also exposed to some economic distress when their customers face intensified import competition. In the much smaller sample of suppliers, we have 25 bankruptcy filings in our sample period that have pre-filing financial information. Among these, three firms were liquidated, all after their main customer industry had a major import tariff reduction. These three liquidations represent 27.3% (3 of 11) of firms that experienced customer import tariff cuts. These results are consistent with our conjecture that economic distress propagates upstream; however, we hesitate to draw strong conclusions given the small sample size.

Overall, our evidence is consistent with the idea that intensified import competition can lead to economic distress of firms. As a result, it is unlikely that bargaining consideration would be an important factor in a supplier's capital structure decisions around major downstream tariff reductions.

Leverage Adjustment and Issuance

Our results thus far establish that firms lower their optimal leverage when their customers experience large import tariff reductions. However, the theory does not predict the mechanism through which leverage ratios are lowered: firms could sell off assets to retire debt or issue equity. In this section, we adopt a methodology similar to that employed by Xu (2012) to investigate how firms adjust their capital structure. We estimate our baseline Eq. (1) in first differences, where *Post-reduction* is replaced by change in tariff rate (Δ*Tariff rate*). Lagged annual changes of the explanatory variables in the main regression are included as control variables. Additionally, we include lagged leverage to capture the cumulative impact of past capital structure decisions.

The regression results are reported in Table 8. In columns (1) and (2), the dependent variables are net debt issuance and net stock issuance, respectively, constructed using firms' balance sheet data. We find that firms whose customers are experiencing greater downstream tariff reductions have significantly higher net stock issuance. In columns (3) and (4), we measure net debt and equity issuance using firms' cash flow statements: *Cash net debt issuance* is Debt issuance – Debt retirement, and *Cash net stock issuance* is Equity sale – Equity purchase. Results in column (4) confirm again that firms issue significantly more equity when their major customers suffer larger tariff reductions. However, we find no significant changes in net debt issuance (columns 1 and 3).

Our findings that suppliers issue equity to lower leverage may appear puzzling given that equity holders are residual claimers. Indeed, if a firm is severely distressed and close to bankruptcy, equity holders may be unwilling to provide additional capital because most of the benefits from issuing equity will be transferred from equity holders to creditors (Myers, 1977). However, although the

Table 8 Mechanics of capital structure adjustments after downstream tariff reductions

	Net debt issuance (1)	Net equity issuance (2)	Cash net debt issuance (3)	Cash net equity issuance (4)
ΔTariff rate	− 0.007	− 0.058*	− 0.014	− 0.044**
	(0.012)	(0.033)	(0.008)	(0.020)
ΔLog (Total assets)	0.046***	0.110***	0.032***	0.021
	(0.009)	(0.033)	(0.007)	(0.025)
ΔMarket-to-book	0.001	0.038***	0.006***	0.016***
	(0.001)	(0.008)	(0.002)	(0.003)
ΔTangibility	0.096**	0.178*	0.107***	0.106*
	(0.046)	(0.101)	(0.029)	(0.060)
ΔImport penetration	− 0.051	0.146	0.029	− 0.092
	(0.124)	(0.425)	(0.111)	(0.235)
ΔIndustry concentration	0.006	0.002	0.000	0.000
	(0.017)	(0.021)	(0.014)	(0.014)
Lagged book leverage	− 0.121***	0.348**	− 0.023	0.173***
	(0.020)	(0.136)	(0.023)	(0.056)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	4879	4856	4493	4335
R-squared	0.059	0.116	0.044	0.092

This table reports results from regressions of debt and stock issuance on the change in downstream tariff rates and control variables. The dependent variables are *Net debt issuance*, *Net stock issuance*, *Cash net debt issue*, and *Cash net equity issue* in columns (1)–(4), respectively. *ΔTariff rate* is the annual change of import tariff rate imposed on the customer industry. All other control variables except lagged book leverage are lagged annual changes of their corresponding firm characteristics. Detailed variable definitions are provided in the "Appendix". Robust standard errors, adjusted for industry-level clustering, are reported in parentheses.
***, **, *Statistical significance at the 1, 5, and 10% levels, respectively.

probability of financial distress increases for supplier firms after their customers' competition shock, such an impact does not necessarily result in an extremely high bankruptcy probability of these firms. For instance, fewer than 20% of these firm years have *Z*-score below 1.8. For firms with extremely high bankruptcy risk, they may not be able to de-lever at all due to their inability to retire debt or issue equity.[15]

Equity issuance is likely to benefit equity holders by boosting a firm's competitiveness during difficult times. Supplier firms may issue equity to cover their profit shortfall and finance investment needed to find alternative customers (i.e., foreign customers). Several studies have shown that firms mostly use equity to finance deficits and investments in intangible assets such as R&D, selling and general administrative expense, and advertising campaigns (Hovakimian et al., 2001; Fama & French, 2005; Gatchev, Spindt, & Tarhan, 2009). Moreover, supplier firms may issue equity to replenish their cash balances, which can be used as a competitive threat to rivals (Frésard, 2010). In either case, debt financing is not preferred because it may further increase firms' bankruptcy risk and limit their ability to respond to product market threats (Bolton & Scharfstein, 1990; Zingales, 1998). Consistent with our findings, Xu (2012) finds that firms rely more on issuing equity than on retiring debt to lower leverage when import competition intensifies in their own industry, and Dasgupta and Žaldokas (2017) show that firms issue more equity when they face increased competition resulting from stronger antitrust enforcement. Overall, for affected supplier firms, issuing equity can serve an import role in maintaining financial flexibility in the face of a changing product market.[16]

CONCLUSION

It is well acknowledged that globalization exposes firms to greater international competition and has a profound impact on firm performance. However, there is very limited empirical evidence in the international business literature on how trade liberalization affects firm policies through product market interactions. Prior research shows that the level of domestic competition in a firm's customer or supplier industries is important to firms' capital structure decisions. Given the significantly increased trade liberalization in the past few decades, we argue that it is important to investigate

the impact of international competition on the financial policies of firms that are linked through the supply chain.

In this paper, we use a sample of US manufacturing firms during the period of 1989–2005 and examine on how changes in import competition arising from tariff reductions in downstream industries spill over to upstream capital structure. We find that upstream firms choose significantly lower leverage after downstream industries experience large tariff reductions. This effect is magnified when the customer–supplier relationship is more valuable to the firm and when firms are more vulnerable to downstream shock. Firms lower their leverage mainly by issuing more equity.

These findings suggest that changes in international trade policy can lead to changes in the financial structure of firms along the supply chain, extending well beyond the industry where a trade policy is actually adopted. Although we focused on the impact of downstream import competition on upstream capital structure, we also reversed our point-of-view to examine the impact of upstream shocks on downstream firms – impacts that Acemoglu et al. (2016) point out that are unclear. Untabulated results show that the estimated coefficient on upstream tariff cuts is positive, though not statistically significant. The positive sign is consistent with the argument that increased upstream competition may benefit downstream firms by lowering input prices (Acemoglu et al., 2016; Pierce & Schott, 2016).

This paper is also related to the literature on the interaction between product market competition and capital structure. Most of these studies have focused on shocks that directly affect domestic competition.[17] Our study suggests that investigating firms' strategic responses to changes in their product market environment that are caused by foreign competition shocks could be fruitful research in future studies.

ACKNOWLEDGEMENTS

We thank Lemma Senbet (the editor) and three anonymous referees for their constructive comments. We also thank Heitor Almeida, Ran Duchin (discussant), Fangjian Fu (discussant), Jarrad Harford, Erik Lie, Pedro Matos (discussant), Sheridan Titman, Philip Valta, and participants at the 2017 Financial Intermediation Research Society (FIRS) Conference, the 2016 CityU of Hong Kong International Finance Conference on Corporate Finance and Financial Markets, and the 2016 Asia–Pacific FMA conference for helpful suggestions and comments. We gratefully acknowledge financial support by a grant (CityU 21500314) from the Research Grants Council of the HKSAR Government and the City University of Hong Kong.

NOTES

[1]For example, during his presidential campaign, Donald Trump railed against China and several other Asian countries for stealing American jobs. As president, he also withdrew the United States from the Trans-Pacific Partnership in January 2017.

[2]See Bernard, Jensen, and Schott (2006a, b), Coucke and Sleuwaegen (2008), and Colantone and Sleuwaegen (2010), among others.

[3]The literature generally agrees that it is difficult to empirically distinguish costs attributable to financial distress from those attributable to economic distress because most firms in financial distress also suffer from poor operating performance. The evidence on the magnitude of the cost of financial distress is also mixed. See Senbet and Wang (2012) for detailed discussion.

[4]For example, Moody's issued the following reports: "Import tariff will provide near-term boost for domestic steel producers" (sector comment, 1 March 2018); "Retail plastic bag import tariff extension credit positive for Novolex" (issuer comment, 7 April 2016); "Russia's World Trade Organization entry is credit negative for some domestic cargo producers" (sector comment, 19 Dec 2011).

[5]Our results remain the same if these tariffs are included. Further, if we define significant cuts as three or five times the industry average, our results change only slightly; however, results generally become stronger for larger cuts.

[6]Because some firms have multiple segments, a supplier can be classified as not having downstream import tariff cuts when the downstream industry is defined based on its primary segment, but as having such cuts when viewed from the perspective of non-primary segments. However, in our sample, primary segments provide most of the business for most firms, and since reporting of non-primary segments is questionable (Bens, Berger, & Monahan, 2011), our analyses focus on the primary segments. As we will show later, the leverage impact is smaller for conglomerate firms due to the potential co-insurance effect.

[7]Our prediction about the relation between customer risk and supplier leverage is mainly for book leverage. For market leverage, our prediction is not definitive because the costs of leverage adjustments can affect the observed impact. If a prompt leverage adjustment cannot be made, the observed effect may have the opposite sign because firm value decreases before firms can adjust toward their optimal debt ratio. Market leverage regressions can also be subject to the problem of spurious correlation because one common explanatory variable, market-to-book ratio, includes market value in the construction. To partially address this concern, we repeat all our later market leverage analyses by excluding the market-to-book ratio, and our results are not significantly affected. Though managers mostly target book leverage (Graham & Harvey, 2001), by examining market leverage we can have some understanding of whether firms actively adjust their leverage after the competition shock and whether market value changes caused by the shock drive the observed impact on market leverage.

[8]Because standard errors based on larger and fewer clusters contain less bias (Cameron & Miller, 2015), we report results clustered by industry. Clustering by firm returns similar results.

[9]In our sample, the average large tariff reduction is associated with a 3.22% increase in import penetration in the year of tariff reduction. Using the coefficient on import penetration in Xu (2012), we estimate a 3.2% reduction in book leverage. The magnitude is slighter smaller than our estimate in Table IA3, presumably because we estimate the leverage effect over a longer term.

[10]The number of observations in this test is smaller because we remove all industry pairs where the customer purchases less than 10% of the supplier's output. The results are the same if we keep all observations but require the affected customer industries to have purchased at least 10% of the supplier's total output. We also conduct analyses by considering all customer industries that have more than 10% of a supplier industry's total output. Specifically, a supplier industry is defined as having experienced an increase in customer import competition if any of its major customer industries has a significant tariff cut as measured at the four-digit NAICS level. Industries that share a four-digit code with their major customer industries and that themselves experience a significant tariff cut during our sample period are removed. The estimated coefficient on this alternative measure remains significantly negative.

[11]SFAS 131, a revision of SFAS No. 14, was published in June 1997 and does not require firms to report the identity of their principal customers. Since not all firms have principal customers that account for more than 10% of their sales and if they do, not all firms reveal the identities of these customers, our firm-level sample is much smaller than our main sample. For firms whose principal customers' identities are not disclosed, we assume their customers experience no major tariff cuts. This assumption may add errors to our estimation. Some firms also report customers that account for less than 10% of their sales but which they consider important to their business. Our results are not sensitive to the exclusion of these customers.

[12]As cash is often considered as negative debt, we also examine supplier firms' cash and net debt (debt–cash). Unreported results confirm again that supplier firms opt for lower leverage.

[13]We use a matching algorithm that simultaneously minimizes the Mahalanobis distance across all matching covariates. For each treated firm *i*, we find a matched nontreated firm *j* such that the Mahalanobis distance is the smallest. A nontreated firm that is the nearest neighbor to treated firm A can also be chosen as the nearest neighbor to treated firm B.

[14]Chapter 7 provides for a different liquidation mechanism, but the liquidation of public firms mainly takes place under Chapter 11. We focus on firms filing for Chapter 11 because these firms have intention to reorganize and we can use these filings to assess whether these firms are forced into bankruptcy due to financial distress or economic distress.

[15]In other words, the presence of firms with extremely high bankruptcy risk is likely to bias the data against our attempts to find the results of leverage adjustment. Given this exception to the prediction, for a proper comparison we reexamine columns (1) and (2) of Table 6 by excluding firms with adjusted leverage in the highest decile from the analysis. Unreported results remain robust. Franks and Sanzhar (2006) also find that among firms that are close to or already in distress, equity financing is also not rare. They show that during the period 1989–1998 a large proportion of the seasoned equity issuances in the United Kingdom was made by distressed firms.

[16]As Fama and French (2005) point out, though SEOs are rare in the United States, equity issuance is actually very common. In addition to SEOs, firms issue equity through private placements, convertible debt, warrants, direct purchase plans, rights issues, and so on. From 1993 to 2002, 86% of their sample firms issue some equity each year. .

[17]Most studies in this literature (i.e., Zingales, 1998, and Kim, 2016) show that financial weakness hurts product market performance.

REFERENCES

Abadie, A., & Imbens, G. 2002. Simple and bias-corrected matching estimators for average treatment effects. Technical Working Paper T0283, NBER.

Abid, M., & Aulakh, P. S. 2018. Internationalization and performance: Degree, duration, and scale of operations. *Journal of International Business Studies,* 49(7): 832–857.

Acemoglu, D., Autor, D., Dorn, D., Hanson, G. H., & Price, B. 2016. Import competition and the great U.S. employment sag of the 2000s. *Journal of Labor Economics,* 34(S1): 141–198.

Ahern, K. R. 2012. Bargaining power and industry dependence in mergers. *Journal of Financial Economics,* 103(3): 530–550.

Baggs, J., & Brander, J. A. 2006. Trade liberalization, profitability, and financial leverage. *Journal of International Business Studies,* 37(2): 196–211.

Banerjee, S., Dasgupta, S., & Kim, Y. 2008. Buyer–supplier relationships and the stakeholder theory of capital structure. *Journal of Finance,* 63(5): 2507–2552.

Bens, D., Berger, P., & Monahan, S. 2011. Discretionary disclosure in financial reporting: An examination comparing internal firm data to externally reported segment data. *Accounting Review,* 86(2): 417–450.

Bernard, A. B., Jensen, J. B., & Schott, P. K. 2006a. Survival of the best fit: Exposure to low-wage countries and the (uneven) growth of US manufacturing plants. *Journal of International Economics,* 68(1): 219–237.

Bernard, A. B., Jensen, J. B., & Schott, P. K. 2006b. Trade costs, firms and productivity. *Journal of Monetary Economics,* 53(5): 917–937.

Bertrand, M., & Mullainathan, S. 2003. Enjoying the quiet life? Corporate governance and managerial preferences. *Journal of Political Economy,* 111(5): 1043–1075.

Bolton, P., & Sharfstein, D. S. 1990. A theory of predation based on agency problems in financial contracting. *American Economic Review,* 80(1): 93–106.

Bradley, D. B., & Rubach, M. J. 2002. Trade credit and small businesses: A cause of business failures? Working Paper. University of Central Arkansas.

Bronars, S. G., & Deere, D. R. 1991. The threat of unionization, the use of debt, and the preservation of shareholder wealth. *Quarterly Journal of Economics,* 106(1): 231–254.

Cameron, A. C., & Miller, D. L. 2015. A practitioner's guide to cluster-robust inference. *Journal of Human Resources,* 50(2): 317–373.

Chu, Y. 2012. Optimal capital structure, bargaining, and the supplier market structure. *Journal of Financial Economics,* 106(2): 411–426.

Colantone, I., & Sleuwaegen, L. 2010. International trade, exit and entry: A cross-country and industry analysis. *Journal of International Business Studies,* 41(7): 1240–1257.

Coucke, K., & Sleuwaegen, L. 2008. Offshoring as a survival strategy: Evidence from manufacturing firms in Belgium. *Journal of International Business Studies,* 39(8): 1261–1277.

Dahiya, S., John, K., Puri, M., & Ramirez, G. 2003. Debtor-in-possession financing and bankruptcy resolution: Empirical evidence. *Journal of Financial Economics,* 69(1): 259–280.

Dasgupta, S., & Žaldokas, A. 2017. Anti-collusion enforcement: Justice for customers and equity for firms, Working Paper. Hong Kong University of Science and Technology.

Duchin, R. 2010. Cash holdings and corporate diversification. *Journal of Finance,* 65(3): 955–992.

Errunza, V. R., & Senbet, L. W. 1981. The effects of international operations on the market value of the firm: Theory and evidence. *Journal of Finance,* 36(2): 401–417.

Fama, E. F., & French, K. R. 2005. Financing decisions: Who issues stock? *Journal of Financial Economics,* 76, 549–582.

Fan, J. P. H., & Goyal, V. K. 2006. On the patterns and wealth effects of vertical mergers. *Journal of Business,* 79, 877–902.

Fee, C. E., & Thomas, S. 2004. Source of gains in horizontal mergers: Evidence from customer, supplier, and rival firms. *Journal of Financial Economics,* 74(3): 423–460.

Frank, M. Z., & Goyal, V. K. 2009. Capital structure decisions: Which factors are reliably important? *Financial Management,* 38(1): 1–37.

Franks, J. R., & Sanzhar, S. V. 2006. Evidence on debt overhang from distressed equity issues, Working Paper. London Business School.

Frésard, L. 2010. Financial strength and product market behavior: The real effects of corporate cash holdings. *Journal of Finance,* 65(3): 1097–1122.

Frésard, L., & Valta, P. 2016. How does corporate investment respond to increased entry threat? *Review of Corporate Finance Studies,* 5, 1–35.

Gatchev, V. A., Spindt, P. A., & Tarhan, V. 2009. How do firms finance their investments? The relative importance of equity issuance and debt contracting costs. *Journal of Corporate Finance,* 15(2): 179–195.

Giannetti, M., Burkart, M., & Ellingsen, T. 2009. What you sell is what you lend? Explaining trade credit contracts. *Review of Financial Studies,* 24(4): 1261–1298.

Gopalan, R., & Xie, K. 2011. Conglomerates and industry distress. *Review of Financial Studies,* 24(11): 3642–3687.

Graham, J. R., & Harvey, C. R. 2001. The theory and practice of corporate finance: Evidence from the field. *Journal of Financial Economics,* 60(2–3): 187–243.

Grande, A., Schenzler, C., & Senbet, L. W. 2009. Valuation effects of global diversification. *Journal of International Business Studies,* 40(9): 1515–1532.

Guadalupe, M., & Wulf, J. 2010. The flattening firm and product market competition: The effect of trade liberalization on corporate hierarchies. *American Economic Journal: Applied Economics,* 2(4): 105–127.

Haugen, R. A., & Senbet, L. W. 1978. The insignificance of bankruptcy costs to the theory of optimal capital structure. *Journal of Finance,* 33(2): 383–392.

Haugen, R. A., & Senbet, L. W. 1988. Bankruptcy and agency costs: Their significance to the theory of optimal capital structure. *Journal of Financial and Quantitative Analysis,* 23(1): 27–38.

Hennessy, C. A., & Livdan, D. 2009. Debt, bargaining, and credibility in firm–supplier relationship. *Journal of Financial Economics,* 93(3): 382–399.

Hovakimian, A., Opler, T., & Titman, S. 2001. The debt-equity choice. *Journal of Financial and Quantitative Analysis,* 36(1): 1–24.

Jarrow, R. A., & Yu, F. 2001. Counterparty risk and the pricing of defaultable securities. *Journal of Finance,* 56(5): 1765–1799.

Jorion, P., & Zhang, G. 2009. Credit contagion from counterparty risk. *Journal of Finance,* 64(5): 2053–2087.
Kale, J., & Shahrur, H. 2007. Corporate capital structure and the characteristics of suppliers and customers. *Journal of Financial Economics,* 83(2): 321–365.
Kedia, S., Ravid, S. A., & Pons, V. 2011. When do vertical mergers create value? *Financial Management,* 40, 845–877.
Kim, R. 2016. Financial weakness and product market performance: Internal capital market evidence. *Journal of Financial and Quantitative Analysis,* 51(1): 307–332.
Kolay, M., Lemmon, M., & Tashjian, E. 2016. Spreading the misery? Sources of bankruptcy spillover in the supply chain. *Journal of Financial and Quantitative Analysis,* 51(6): 1955–1990.
Li, S., Qiu, J., & Wan, C. 2011. Corporate globalization and bank lending. *Journal of International Business Studies,* 42(8): 1016–1042.
Mansi, S. A., & Reeb, D. M. 2002. Corporate international activity and debt financing. *Journal of International Business Studies,* 33(1): 129–147.
Matsa, D. A. 2010. Capital structure as a strategic variable: Evidence from collective bargaining. *Journal of Finance,* 65(3): 1197–1232.
Myers, S. C. 1977. Determinants of corporate borrowing. *Journal of Financial Economics,* 5(2): 147–175.
Oliveira, M., Kadapakkam, P. R., & Beyhaghi, M. 2017. Effects of customer financial distress on supplier capital structure. *Journal of Corporate Finance,* 42, 131–149.
Opler, T. C., & Titman, S. 1994. Financial distress and corporate performance. *Journal of Finance,* 1(3): 45–56.
Perotti, E., & Spier, K. E. 1993. Capital structure as a bargaining tool: The role of leverage in contract renegotiation. *American Economic Review,* 83(5): 1131–1141.
Pierce, J., & Schott, P. 2016. The surprisingly swift decline of U.S. manufacturing employment. *American Economics Review,* 106(7): 1632–1662.
Pugel, T. A. 1980. Foreign trade and U.S. market performance. *Journal of Industrial Economics,* 29(2): 119–129.
Rahaman, M. M. 2016. Chinese import competition and the provisions for external debt financing in the US. *Journal of International Business Studies,* 47(8): 898–928.
Roberts, M., & Whited, T. 2013. Endogeneity in empirical corporate finance. *Handbook of the Economics of Finance,* 2, 493–572.
Schott, P., 2010. U.S. manufacturing exports and imports by SIC or NAICS category and partner country, 1972–2005, Working Paper. Yale University.
Senbet, L. W., & Wang, T. Y. 2012. Corporate financial distress and bankruptcy: A Survey. *Foundations and Trends in Finance,* 5(4): 243–335.
Shleifer, A., & Vishny, R. 1992. Liquidation values and debt capacity: A market equilibrium approach. *Journal of Finance,* 47(4): 1343–1366.
Titman, S., & Wessels, R. 1988. The determinants of capital structure choice. *Journal of Finance,* 43(1): 1–19.
Valta, P. 2012. Competition and the cost of debt. *Journal of Financial Economics,* 105(3): 661–682.
Xia, T., & Liu, X. 2017. Foreign competition, domestic competition and innovation in Chinese private high-tech new ventures. *Journal of International Business Studies,* 48(6): 716–739.
Xu, J. 2012. Profitability and capital structure: Evidence from import penetration. *Journal of Financial Economics,* 106(2): 427–446.
Zhou, J., Booth, L., & Chang, B. 2013. Import competition and disappearing dividends. *Journal of International Business Studies,* 44(2): 138–154.
Zingales, L. 1998. Survival of the fittest or the fattest? Exit and financing in the trucking industry. *Journal of Finance,* 53(3): 905–938.

APPENDIX

See Table 9.

Table 9 Variable definitions

Variable	Definition
Δ Tariff rate	The annual percentage point change in import tariff rate of customer industries, calculated as this year's tariff rate (%) – the prior year's tariff rate (%). Source: Peter Schott's website
Book leverage	(Long-term debt + Debt in current liabilities)/Total assets. Source: Compustat
Cash	Cash and cash equivalents/Total assets. Source: Compustat
Cash flow volatility	The standard deviation of first differences in EBIT scaled by total assets over the past 10 years. The value is missing if there are fewer than six observations in calculation. Source: Compustat
Cash net debt issuance	The issuance of long-term debt minus the debt reduction divided by the prior year's total assets. Source: Compustat
Cash net equity issuance	The sale of equity minus the purchase of equity divided by the prior year's total assets. Source: Compustat
Concentrated industries	An indicator variable that takes the value of one if both the supplier and the customer industry's HHI is in the top quartile of our sample, and zero otherwise. Source: Compustat
Differentiated goods	An indicator variable that takes the value of one if the supplier outputs differentiated goods, and zero otherwise. We use the same classifications as Giannetti, Burkart, and Ellingsen (2009). Specifically, manufacturing industries with the two-digit SIC codes 25, 27, 30, 32, and 34–39 are considered to be producing differentiated goods. Source: Compustat
Export intensity	Industry exports divided by the sum of domestic products and imports. Source: Peter Schott's website

Table 9 (*Continued*)

Variable	Definition
Financially weak	An indicator variable that takes the value of one if a firm's adjusted leverage is above or its adjusted cash holdings are below the sample median, and zero otherwise. Source: Compustat
Import penetration	Industry imports divided by the sum of domestic product and imports for the industry. Source: Peter Schott's website
Industry concentration	The sales-based HHI of the firm's four-digit NAICS industry. Log (Industry concentration) is used in all regressions. Source: Compustat
Liquidation	An indicator variable that takes the value of one if the bankrupt firm is liquidated in Chapter 11 and zero otherwise. Source: New Generation Research Bankruptcy Data
Market leverage	(Long-term debt + Debt in current liabilities)/Market value of assets. Source: Compustat
Market-to-book	(Total assets − Book equity + Market value of equity)/Total assets. Source: Compustat
Net debt issuance	The change in debt/The prior year's total assets. Source: Compustat
Net stock issuance	The change in outside common equity/The prior year's total assets. Source: Compustat
Non-diversified business	An indicator variable that takes the value of one if the firm operates in one three-digit SIC industry, and zero otherwise. Source: Compustat
Post-reduction	An indicator variable that takes the value of one if a significant tariff rate reduction has occurred in the customer industry, and zero otherwise. Source: Peter Schott's website
Pre^{-1}	An indicator variable that takes the value of one if the firm's customer industry will experience a significant tariff reduction 1 year from now, and zero otherwise. Source: Peter Schott's website
$Post^{0}$	An indicator variable that takes the value of one if the firm's customer industry has experienced a significant tariff reduction this year, and zero otherwise. Source: Peter Schott's website
$Post^{1}$	An indicator variable that takes the value of one if the firm's customer industry had a significant tariff cut 1 year ago, and zero otherwise. Source: Peter Schott's website
$Post^{2+}$	An indicator variable that takes the value of one if the customer industry experienced a significant tariff cut at least 2 years ago, and zero otherwise. Source: Peter Schott's website
Profitability	EBIT/Total assets. Source: Compustat
Sales dependence	An indicator variable that takes the value of one if the supplier industry's sales to the major customer industry are above the sample median, and zero otherwise. Source: Peter Schott's website
Tangibility	Net property, plant and equipment/Total assets. Source: Compustat
Tax credit	Investment tax credit/Total assets. Source: Compustat
Total assets	Total assets. Source: Compustat

ABOUT THE AUTHORS

Qianqian Huang is an Assistant Professor of finance at City University of Hong Kong. Her research interests are in the areas of empirical corporate finance, with a focus on corporate governance, mergers and acquisitions, and network economics. Her work has been published in academic journals including the Journal of Financial Economics, Journal of Financial and Quantitative Analysis, and Journal of Corporate Finance.

Ryoonhee Kim is an Assistant Professor of finance at Soongsil University. She is currently interested in corporate finance, corporate governance, capital structure, and the interaction between financial structure and product market. Her work has been published in the Journal of Financial and Quantitative Analysis.

Supplementary information accompanies this article on the Journal of International Business Studies website (www.palgrave.com/journals).
Accepted by Lemma Senbet, Area Editor, 19 December 2018. This article has been with the authors for three revisions.