Competitive Pressure and Corporate Policies

Laurent Frésard[†] and Philip Valta[‡]

This version: February 2012

Abstract

This paper examines the impact of increased product market competition on corporate investment and financing decisions. Using reductions in import tariff rates as a source of variation in competitive pressure, we find that firms *simultaneously* reduce capital and R&D investment, increase cash reserves and equity, and decrease debt in response to intensified product market competition. These adjustments are especially strong among industry followers, non-diversified and non-exporting firms, and in more competitive markets. Also, the impact of competition turns out to be magnified when firms are exposed to greater financing risk. Overall, the results highlight that competitive pressures play a considerable role in driving the allocation of resources within firms.

JEL Classification: G15, G34, G31

Keywords: Product market competition, financing policies, corporate investment, cash holdings, tariff reduction

---

We thank Francois Derrien, Michel Dubois, Rudiger Fahlenbrach, Dirk Hackbarth, Uli Hege, Jerry Hoberg, Evgeny Lyandres, Adrien Matray, Sebastien Michenaud, Boris Nikolov, Gordon Phillips, Urs Peyer (EWFC discussant), Peter Pontuch (AFFI discussant), Carolina Salva, David Thesmar and seminar participants at the University of Maryland, the 2011 French Finance Association (AFFI) Meeting in Paris, the 2012 European Winter Finance Conference (EWFC) in Flims for valuable comments and suggestions. We thank Ben Munyan for excellent research assistance.

[†] University of Maryland, Robert H. Smith School of Business. Address: Van Munching Hall, College Park, MD 20741. E-mail address: lfresard@rhsmith.umd.edu Phone : (+1) 301 405 96 39. Fax: (+1) 301 314 91 20.

[‡] HEC Paris. Address: 1, Rue de la liberation, 78351 Jouy-en-Josas . E-mail address: valta@hec.fr Phone :+33 1 39 67 97 42. Fax: +33 1 39 67 70 85.

1. Introduction

Firms do not operate in a vacuum but interact with rivals in the product market. They are in constant competitive interactions with other firms, struggling to gain customers, expand market shares, or fight for survival. Over the last decades, rapid technological innovations, accelerated market deregulations, and advances in globalization have contributed to increase the competitiveness of product markets, thereby intensifying pressures on many U.S. corporations (e.g. Bernard, Jensen, and Schott (2006), Irvine and Pontiff (2009), or Bloom, Draca, and Van Reenen (2011)). Because competition directly impacts firms' future prospects, the riskiness of their business environment, as well as the provision of incentives among stakeholders, it is of paramount importance to properly appraise the interplay between firms' financial choices and their competitive environment. Although recent developments have considerably broadened our understanding of how competition shapes corporate policies, the literature has so far concentrated on studying the effect of competition in isolation.[1] Indeed, existing research examines the link between competition and *one* specific policy (e.g. capital structure), ignoring the simultaneous effects that competition may have on other corporate actions.[2] While highly informative, this partial focus may overlook complex economic mechanisms through which the intensity of competition impinges on the allocation of resources within the firm. This paper helps to bridge this gap by examining how firms modify several dimensions of their financing and investment choices in reaction to intensified product market rivalry.

To gauge the effects of competition on corporate policies, we exploit changes in industry-level import tariff rates as a source of variation in competition. As suggested by Bernard, Jensen, and Schott (2006), or Frésard (2010), the softening of trade barriers facilitates the penetration of foreign rivals into local markets and triggers an intensification of competitive pressure on U.S. firms. Using tariff data for the U.S. manufacturing sector, we identify 91 large reductions in import tariff rates between 1972 and 2005, occurring in 74 unique industries and affecting 1,108 firms. During these trade liberalization events, the average tariff rate drops from more than 4.60% to less than 2.36%. In

[1] In particular, existing research highlights that the intensity of competition is related to firms' capital structure, cash policy, takeover activity, payout policy, risk management, executive compensation, corporate governance, or innovation practices. We review this literature in Section 2.

[2] One notable exception is MacKay and Phillips (2005) who analyze the joint effect of competition on financial leverage, technology, and risk.

parallel, because lower tariff rates decrease the costs for foreign rivals to compete on U.S. markets, these reductions prompt a significant boost in import penetration (from an average of 15.17% to 18.01%). Hence, while not driven by firms' policies, these events generate abrupt shifts in competition that increase pressures on U.S. manufacturing firms.

In a first set of tests, we find that the intensification of competition breeds significant changes on corporate policies. Following tariff rate reductions, firms substantially alter their investment behavior. Specifically, firms cut capital, R&D, and acquisition expenditures, reduce fixed assets, and considerably increase their cash reserves. Our estimates reveal economically important effects. In particular, the ratio of capital expenditures to total assets of firms experiencing a tariff rate reduction falls by 1.20% compared to matched firms, representing a decline of $9.88 million on average. Similarly, firms reduce both their R&D and acquisitions as the ratios of R&D and acquisition expenses to total asset decline by 0.83% ($6.83 million) and 0.41% ($3.37 million), respectively. Additionally, the ratio of cash holdings to total assets increases by 1.70%, or $14 million. These adjustments indicate that firms respond to increased competition by substituting productive assets for liquid assets. Notably, we find no evidence that firms strategically increase investment in order to maintain or enhance their competitive advantage in the product market.

We also uncover significant effects on the financing side. In industries hit by a tariff rate reduction, firms reduce net debt issuance by 2.27% relative to matched firms. In parallel, we observe that net equity issuance moves in the opposite direction. Treated firms increase the ratio of net equity issuance to total assets by 1.71% compared to matched firms. As a result, we observe no change in the overall financing activity. Yet, the observed switch of financing sources induces a significant reduction in leverage. The ratio of long-term debt to total assets decreases by 2.29%, while the ratio of short-term debt to total assets remains mostly unaffected. While the reduction of leverage is consistent with existing evidence (e.g., MacKay and Phillips (2005), or Xu (2011)), our results indicate that this finding obtains primarily as firms switch from debt to equity financing.

The changes in investment choices appear to be tied to the adjustments on the financing side. In particular, the reduction of capital expenditures is systematically related to the decrease of net debt issuance. The estimated decline in capital investment amounts to 2.60% when firms simultaneously

reduce net debt and equity issuance. In contrast, there is no effect on investment when firms do not alter their financing sources. Moreover, we find that the build-ups of cash reserves are largely linked to net equity issuance. The increase in cash is largest (2.41%) when firms simultaneously increase net equity issuance *and* debt issuance. The effect is also large (4.35%) when firms increase net equity issuance but decrease debt issuance These patterns indicate that firms do not (or cannot) increase financing or draw down cash balances to maintain their investment activity. Rather, they primarily channel the fresh funds into precautionary cash reserves. Overall, this first set of results reveals that firms respond to an increased competitive pressure by scaling back investment spending, increasing their precautionary cash, and limiting financial risk by reducing leverage.

Despite substantial adjustments in their investment and financing policies, firms manage to keep similar levels of profitability shortly after the increase in competitive pressure. We uncover no significant effect on profit margin, sales growth, or return on equity during the year that follows tariff rate reductions. Nevertheless, we estimate that treated firms cut down employment after a tariff reduction. When we take a longer perspective and compare the average three-year performance before and after the competitive shock, we observe a significant decline in performance. The average profit margin (return on equity) of firms in affected industries shrinks by 12.65% (5.78%) compared to that of matched firms. Similarly, sales growth declines by 3.52%. These results reveal that increased product market rivalry hurts corporate profits on average, but that the effect takes some time to materialize.

To ensure a clean identification, all our estimates are obtained using a difference-in-differences matching approach. Specifically, we define "treated" firms as firms operating in industries that experience a reduction in import tariff rates in a given year. We compare each of these firms with "matched" firms from industries that do *not* experience such an event. We match these two groups of firms on the basis of their asset size, growth opportunities, cash flow, cash holdings, and long-term leverage ratio during the year that *precedes* the event.[3] This procedure allows us comparing the behavior of otherwise similar firms, with the only difference being the change in competitive pressure

[3]In support for our identification, we show that before the reduction of import tariff rates, treated and matched firms are indistinguishable along most observable dimensions.

from foreign rivals. We perform various analyses to cement the validity of our results. In particular, we provide evidence that support the parallel trends assumption underlying our difference-in-differences approach. We compare trends in the outcomes (growth rates in corporate policies) across treated and matched firms over a three-year period preceding the reductions in import tariff rates and find no evidence that the investment and financing policies of these two groups follow different trends prior to the event. Rather, they only start diverging *after* the tariff rate reductions occur. This result is important because it confirms that treated firms do not modify their financial policies in *anticipation* of a tariff reduction. In addition, we execute placebo tests that replicate our experiment over the years prior to the reductions of tariff rates and we find no significant difference in corporate policies between treated and matched firms during these placebo periods. Also, we show that the impact of competition increases monotonically with the magnitude of tariff rate reductions. For large reductions (when average tariff rates drop by 3.42%) capital expenditures decrease by 1.22%, while cash reserves increase by 2.86%. By contrast, we find almost no effect for small tariff changes (when average tariff rates fall by 1.23%). Finally, our results are robust to alternative estimation methodologies, such as different matching procedures (e.g., propensity score) and OLS specifications.

Because tariff rate reductions apply to *all* firms in a given industry, our setting allows us to examine which firms are most sensitive to variations in competitive pressure. In a second set of tests, we show that firms' reactions markedly depend on their competitive position in the product market and their exposure to competitive threats. In particular, the impact of increased competition appears to be concentrated among industry laggards, non-diversified and non-exporting firms. In contrast, we find almost no alteration in the behavior of industry leaders, firms that operate in multiple industries and firms that participate in the export market. These latter firms appear to be shielded from the strengthened pressure triggered by tariff rate reductions. In a similar vein, firms' response to competitive shocks is magnified when they operate in competitive markets and markets featuring many firms. We find virtually no effect in concentrated markets and industries populated by fewer firms.

From a different perspective, we examine whether the impact of competitive pressure depends on firms' exposure to financing risk. As suggested by Bolton and Scharfstein (1990), intense

competition could constrain firms' access to external finance, thereby influencing their investment and financing choices. In line with this conjecture, we uncover differential effects of tariff rate reductions depending on firms' financing prospects. When financing risk is high, firms respond by increasing net equity issuance, augmenting cash balances, and simultaneously reducing investment. On the contrary, when financing risk is low, we find suggestive evidence that firms maintain investment and reduce their leverage by switching from debt to equity financing. This asymmetric behavior suggests that competitive pressure impinges on financial choices in part because it affects firms' access to financing.

Finally, we find little support for the idea that the observed distortions in investment and financing choices originate in the disciplining effect that competitive pressure exerts on the management. In particular, we find no systematic evidence that the decline of corporate investment triggered by increased competition is more pronounced for firms exhibiting lower governance standards. Similarly, the changes in cash reserves and financing appear to be similar across well governed and poorly governed firms.

Our results highlight several new facets of the relation between product market competition and corporate policies. First, we show that sudden changes in competitive pressure prompt firms to adjust on *several* margins at the same time. Moreover, as the observed changes in investment policies appear to be closely related to the adjustments on the financing side, our analysis underscores the subtle economic mechanisms that link competition to the allocation of resources with the firm. Second, the economic magnitude of the effects we uncover appear non-trivial. Although our analysis cannot be easily extrapolated outside our sample, our estimates suggest that competitive pressure plays a considerable role in shaping a variety of financial decisions. As such, we believe our results can help appraise the financial implications of abrupt changes in the competitiveness of product markets. Besides tariff rate reductions, such changes could be triggered by certain governmental policies (e.g., deregulation or antitrust decisions) or by large variations in exchange rates. In addition, our analysis establishes salient new results. In particular, ours is the first paper to show that the strengthening of competition causes significant reductions in capital investment (capital and acquisition expenditures). Although the link between product market competition and capital

investment has extensively been analyzed in theoretical works (e.g. Spence (1977), Dixit (1980), and more recently Grenadier (2002)), empirical evidence has so far remained surprisingly rare.[4]

More generally, our study is part of a growing initiative among finance researchers to better understand and quantify how firms' financial decisions depend on the interactions they entertain with firms in their direct business environment. For example, recent studies emphasize that corporate policies are largely influenced by the decisions of their peers (e.g. Leary and Roberts (2010)), the similarity with their competitors' products (e.g. Hoberg and Phillips (2011)), the nature of the relationship with the workforce (e.g. Matsa (2010), or Simintzi, Vig, and Volpin (2010)), the relation with suppliers and customers (e.g. Banarjee, Dasgupta, and Kim (2008)), or the connections with political circles (e.g. Khwaja and Mian (2005), or Faccio (2009)). In complement, our analysis underlines that the intensity with which firms interact with rivals in the product market matters for understanding their financing and investment choices.

The rest of the paper proceeds as follows. In Section 2 we review the relevant literature. Section 3 outlines the sample and empirical strategy. Section 4 presents and characterizes the impact of competition on corporate policies. Section 5 analyzes which firms are most affected by competitive pressure. Section 6 looks at the effect of competitive pressure on performance and employment. Finally, Section 7 presents the conclusions.

2. The link between product market competition and corporate policies

There is a widespread sense that the intensity with which firms compete with rivals in the product market affects their financial policies. Indeed, firms do not operate in a vacuum but generate cash flows through their actions in the product market. They make various strategic choices seeking to expand their customer base, increase their market shares, and ultimately gain a dominant position. The outcomes of these strategic choices critically depend on the actions taken by their rivals, as well as on the structure of the product market. As a result, firms' policies arise from an equilibrium in the product market that reflects strategic interactions among market participants.

[4] Notable exceptions are Akdogu and MacKay (2008) who examine how industry concentration is associated with firms' investment *timing*, or Kovenock and Phillips (1997) who show that rival firms are more likely to strategically invest when firms experience an increase in leverage.

Intuitively, the connections between product market competition and firms' financial choices are multifaceted and can occur through a host of different channels. Consider a simple representation of how firms make financial choices in a world without capital market imperfections (costly external financing or agency conflicts). In this "perfect" environment, managers follow simple rules to determine their corporate policies. Typically, they decide on the optimal level of investment (e.g., capital expenditures, R&D expenses, or acquisitions) and financing (e.g., debt issuances, cash savings, or share repurchases) that maximizes the present value of their firm. The present value is obtained by discounting the cash flows that managers expect to produce through their decisions at a rate that reflects the risk of these uncertain cash flows. Because product market competition directly affects both the cash flow and risk dimensions, it plays a role in shaping corporate policies.

First, it has long been established that competitive pressure reduces market power and drives down expected profit (e.g., Tirole (2006)). For instance, Bolton and Scharfstein (1990) argue that deep-pocketed rivals can increase their output to drive down industry prices and inflict severe losses for financially weaker firms. In a competitive setting the potential actions of rivals directly feedback on a firm's prospects, thereby affecting various corporate policies. For example, because competition modifies expected growth opportunities, firms adapt investment decisions (e.g., Grenadier (2002)) or innovation effort (e.g., Aghion, Bloom, Blundell, Griffith, and Howitt (2005)) to cope with their product market setting. Moreover, because competition lowers expected cash flows, the tax benefit of debt is reduced, lowering firms' incentive to take on debt.

Second, intense competition in the product market also increases the riskiness of firms' expected cash flows (Raith (2003), Gaspar and Massa (2006), or Irvine and Pontiff (2009)). On the one hand, market power decreases uncertainty about future cash flows. On the other hand, market power enables firms to smooth out fluctuation in cash flows. As a result, the degree of competition could materially affect corporate policies if managers are not risk-neutral. For instance, the greater uncertainty triggered by intense competition could lead risk-averse managers to opt for more conservative investment (e.g. delay investment projects) or financing policies (e.g. decrease leverage).

Competition also impinges on firms' financial decisions *indirectly*. Departing from a frictionless world, product market competition could affect corporate policies if it is related to firms'

ability to obtain external financing or the magnitude of agency conflicts between a firm and its claimholders. As a matter of fact, intense competition could exacerbate financing frictions and hamper firms' ability to obtain external funding. This effect may arise via two channels. First, because it reduces expected profits and increases cash flow risk, competition reduces firms' (ex-ante) pledgeable income and hence alters the willingness of investors or creditors to provide funds (Hou and Robinson (2006), or Valta (2011)). Second, the competitive nature of the product market also affects the collateral value of firms' assets. The value of collateralizable assets is a critical determinant of firms' funding capacity when contracts are incomplete and transaction costs are large (e.g. Benmelech, Germaise, and Moskowitz (2005)). As suggested by Shleifer and Vishny (1992) the value of firms' existing assets is determined in equilibrium by the number of potential buyers. As a result, when assets are industry-specific, the structure of the product market plays an important role in shaping firms' ability to borrow (Ortiz-Molina and Phillips (2010)). Overall, because firms' access to external funds depends on market structure and firms' position in the product market, competition may have an influence on firms' financing and investment decisions.

From a related perspective, competition could also influence corporate policies because it is linked to the magnitude of agency conflicts and the provision of incentives within firms. In line with Hart (1983), the presence of competitors could attenuate agency conflicts for two reasons. First, strong competition in the product market puts pressure on managers to reduce slack and improve economic efficiency. As such, competitive pressure can impact firms' financial choices because it realigns incentives between managers and various claimholders. For instance, competition could curb managerial preferences for empire building, thereby affecting decisions on capital expenditures, cash holdings, asset growth, or the volume of acquisitions made by the firm. Also, competition could prevent managers from enjoying a "quiet life" and force them to make more difficult and costly choices such as engaging in long-term projects or closing inefficient business units (Bertrand and Mullainathan (2003)). Second, competitors' performance brings about information that helps various finance providers to improve their monitoring activity (DeFond and Park (1999)).

Overall, both theory and basic economic intuition point out that competition relates to decisions on corporate assets, liabilities, or governance structure. Existing evidence largely confirms

this claim. In particular, this research shows that product market competition relates to firms' capital structure decisions (e.g. MacKay and Phillips (2005), Lyandres (2006), or Xu (2011)), cash policy (e.g. Haushalter, Klasa, and Maxwell (2007)), payout policy (e.g. Grullon and Michaelly (2007)), timing of investment (e.g. Akdogu and MacKay (2008)), risk management (e.g. Haushalter, Klasa, and Maxwell (2007)), executive compensation (e.g. Aggarwal and Samwick (1999) or Cunat and Guadalupe (2009)), the structure of governance (e.g. Giroud and Mueller (2010a, 2010b), or Huang and Peyer (2010)), innovation policies (e.g. Aghion, Bloom, Blundell, Griffith, and Howitt (2005)), or the hierarchical organization of firms (e.g. Bloom, Sadun, and Van Reenen (2010), or Guadalupe and Wulf (2011)).

Unambiguously, the above studies highlight that firms' corporate choices are not made in isolation but are related to their competitive environment. Yet, the interpretation of existing evidence is constrained in two ways. First, with the exception of the paper by MacKay and Phillips (2005), prior research typically examines the effect of competition on *one* specific corporate policy. Although informative, this partial view could mask subtle economic mechanisms through which competition operates. Because competition can affect both expected cash flows and discount rates, it can simultaneously influence multiple dimensions of firms' financial decisions. For example, an increase in competition could induce firms to limit their leverage (e.g. Xu (2011)). Simultaneously, such a financing change could go along with changes in investment behavior such as a decrease in capital expenditures.

Second, the nature of product market competition is likely to be endogenous to corporate decisions. As a matter of fact, a large body of evidence indicates that firms strategically use their financial structure to influence product market outcomes. For instance, firms alter their capital structure to modify the actions of their rivals and hurt their profitability (Bolton and Scharfstein (1990), or Brander and Lewis (1986)). Firms also use their financial structure to gain market shares at the expense of their rivals and signal that they are tough competitors (Campello (2006), or Frésard (2010)). On this ground, the structure of product market competition is *jointly* determined with

corporate decisions. This interaction makes it challenging to identify a causal link going from product market competition to firms' financial choices.[5]

3. Empirical Design

In an ideal empirical experiment, we would compare the corporate policies of a firm to the same firm's policies in cases where competition was exogenously modified. This experiment is infeasible because the counterfactual is not observed. As a result, we must find empirical proxies for the hypothetical policies that a firm would choose if it were facing a different intensity of competition. A natural starting point would be to compare the average policies across industries that have different degrees of competition or to measure the changes in policies following changes in competition. These approaches would provide valid estimates of the impact of competition only if product market competition or changes in competition were exogenous to corporate policies. As discussed before, these conditions are unlikely to be satisfied. Thus, simply comparing corporate policies across industries or time could mix the real effects that competition has on firms' decisions with the predictable differences in policies that generate various intensities of competition.

To lessen this concern we rely on a quasi-natural experiment that triggers exogenous increases in competition in some industries but not in others. We examine whether firms that experience such competitive shocks adapt their corporate policies differently than otherwise similar firms that do not experience any change in competition. Below, we describe the sample construction, detail the quasi-natural experiment that we use to capture variations in product market competition, outline how we estimate the counterfactual, and discuss the validity of our empirical strategy.

3.1. Sample construction and industry definition

We use data from Compustat's North America Fundamentals Annual database over the period 1972-2005. Because we want to examine whether and how competition affects the mix of resources

[5] Exceptions include Zingales (1998) who assesses the effect of competition on firms' survival, Xu (2011) who looks at the effect of competition on leverage, Cunat and Guadalupe (2005, 2009) who look at the effect of competition on executive compensation and incentives, Aghion, Bloom, Blundell, Griffith, and Howitt (2005) who examine the impact of competition on innovation, and Guadalupe and Wulf (2011) who investigate the effect of competition on corporate hierarchies.

and uses within firms, we consider investment- and financing-related variables. Specifically in the baseline analysis we focus on the following eleven variables (policies): capital expenditures, R&D expenditures, acquisition expenses, fixed assets (property, plant and equipment), cash holdings, total assets, net debt issuance, net equity issuance, total financing (sum of debt and equity issuance), long-term and short-term (book) leverage. We exclude firm-year observations for which information on these variables is not available and winsorize all ratios at the 1% level in each tail. Moreover, we exclude observations with negative assets, sales, capital expenditures, fixed assets, and cash holdings, observations with sales growth larger than 500%, as well as observations where cash holdings, capital expenditures and fixed assets are larger than total assets. Appendix A provides details of the definitions of all the variables used in the analysis. In the following analysis, we classify product markets (industries) at the four-digit SIC level and restrict our focus on manufacturing firms (2000-3999 SIC range).[6] This selection procedure leaves us with a sample of 222 four-digit SIC industries.

3.2. The Quasi-Natural Experiment: Reductions in import tariff rates

The logic of our experiment is to exploit reductions in import tariff rates to identify variations in competition. According to the vast literature on barriers to trade, the globalization of economic activities and trade openness imply that firms are increasingly exposed to competitive pressure. As surveyed by Tybout (2003), the general consensus of this literature is that the lessening of trade barriers triggers a significant intensification of competition from foreign rivals. Indeed, reductions in import tariff rates decrease the cost of entering U.S. product markets and boost import penetration. Because goods and services from foreign rivals have a bigger presence on domestic markets, reductions of import tariffs spur an increase in competitive pressure on domestic producers. As reported by Bernard, Jensen, and Schott (2006) and Katics and Petersen (1994), the lessening of trade barriers significantly changes the competitive configuration of industries.

On this ground, we follow Frésard (2010) and use "large" reductions of import tariff rates as events that trigger a sudden increase in the competitive pressure faced by U.S. firms. To measure reductions of import tariff rates at the (four-digit SIC) industry level, we use product-level import data

[6] We do so because tariff observations are only available for manufacturing industries.

compiled by Feenstra (1996), Feenstra, Romalis, and Schott (2002), and Schott (2010).[7] This data spans the period 1972-2005 and includes 508 manufacturing industries. Products imported to the U.S. are coded based on the Harmonized System (HS) established by the World Customs Organization (WCO). Each product is assigned a ten-digit HS code. Feenstra (1996) and Schott (2009) have developed concordance tables that map each HS product code into four-digit SIC codes.[8] Using this mapping we compute, for each industry-year, the *ad valorem* tariff rate as the duties collected by U.S. Customs divided by the Free-on-Board value of imports. After merging the tariff data with the firm-level accounting data from Compustat, we are left with 133 industries.

We characterize tariff rate reductions in a given industry in terms of deviations in the yearly change in tariff rates from the same industry's average (absolute) change. In our baseline tests, we define that a large tariff rate reduction (tariff cut) occurs in a specific industry-year when a negative change in the tariff rate is *three* times larger than its average (absolute) change.[9] In the following analysis, we use five different definitions of tariff cuts to assess the sensitivity of our results to this choice. Moreover, to make sure that tariff cuts truly reflect non-transitory and relevant changes in the competitive environment, we exclude tariff cuts that are followed by equivalently large increases in tariff rates over the three subsequent years as well as instances where the tariff rate is smaller than 1%. With this definition, we identify 91 events between 1972 and 2005. These events occur in 74 unique industries.[10] Appendix B presents all the industries in our sample that experience a tariff cut as well as the magnitude of the tariff rate reduction. As shown in Figure 1, tariff rate reductions are not clustered in any specific period. This guarantees that our experiment does not mix confounding effects that are time-specific such as economic downturns or stock market booms and busts.

[Insert Figure 1 about here]

[7] The tariff data are available on Peter Schott's Web site: http://www.som.yale.edu/faculty/pks4/sub_international.htm
[8] Because HS codes are solely based on product characteristics, and SIC codes also take into account the method of production, HS codes cannot be directly matched to SIC codes. As a result, it is possible that a given HS category is matched to several four-digit SIC codes. Yet, we find no case in which a specific product (HS code) was assigned to multiples (four-digit) SIC codes in the industries that compose our sample.
[9] Because the coding of imports changed in 1989, we ignore in our analysis the tariff changes that occurred between 1988 and 1989.
[10] Over our sample period, there is a decreasing trend in import tariff rates. As a result, there are very few instances (only six events) where we can identify a large "increase" in tariff rates. This limitation prevents us from executing the reverse test of how policies react to tariff increases.

Reassuringly, the evolution of tariff cuts displayed in Figure 1 is consistent with the recent U.S. trade history. In particular, we identify large tariff rate reductions occurring in 14 different industries in 1976. This wave corresponds to the implementation of preferential tariff arrangements (under the so-called "Generalized System of Preferences (GPS)") on various products from developing countries such as wood products, cigarettes, electrical items, or toys (Baldwin and Murray (1977)).[11] A second wave took place in the early eighties where we uncover tariff cuts touching 24 industries between 1980 and 1982. These reductions follow the ratification of the General Agreement on Tariffs and Trade (GATT) Tokyo round and the enactment of the U.S. Trade Agreement Act (TAA) in 1979. Starting in 1980, multilateral and bilateral tariff rate reductions entered into force on a large variety of products, decreasing average tariff rates on industrial product imports from 6.1% ad valorem to 4.2%.[12] We also observe several tariff rate reductions in the early nineties and cuts in 17 industries in 1995. This wave coincides with the adoption of the Free Trade Agreement (FTA) between the U.S. and Canada in 1989, followed by the North American Free Trade Agreement (NAFTA) in 1994 that created a trilateral trade block between the United States, Canada, and Mexico. The implementation of the FTA mainly consisted of the elimination of existing tariffs between Canada and the U.S. (Trefler (2004)), while the NAFTA brought the immediate elimination of tariffs on more than half of U.S. imports from Mexico (Chambers and Smith (2002)).

3.3. Identification strategy

We design a test that compares the policies of firms that experience an increase in competition to a set of similar firms that do not experience such a change. We define the firms that operate in industries that are affected by a reduction in tariff rates in a given year as the "treated" firms. Then, from the set of non-treated firms, we construct a matching sample of firms that are similar to the treated firms except for the change in competition they experience. Specifically, for each treated firm we choose, with replacement, its nearest neighbor from the group of all the firms that operate in a different (four-digit SIC code) industry during the same year. Following Almeida, Campello,

[11] Baldwin and Murray (1977) provide details on these preferential tariff arrangements, the so-called "Generalized System of Preferences (GSP)", that the United States have implemented subsequently to the Trade Act of 1974.
[12] See the 1979 annual report of the Office of the United States Trade Representative (USTR).

Laranjeira, and Weisbenner (2011), we match firms on the basis of their size (the logarithm of total assets), growth opportunities (market-to-book ratio), cash flow, cash holdings, and long-term debt-to-assets ratio during the year that precedes the event. We use a matching algorithm that simultaneously minimizes the (Mahalanobis) distance across all these matching characteristics (covariates).[13]

This matching procedure is designed to ensure that, prior to the change in competition, treated and matched observations have identical distributions along each of the matching dimensions. By doing so, we minimize the possibility that cross-sectional or time-series differences across firms and industries affect our results. Hence, we assume that in the absence of the treatment, the treated group would behave similarly to the matched group.[14] To be considered in our final sample, treated and matched firms need to have no missing observations on any matching variable during a window of at least one year around the event. Our final sample comprises 1,108 treated observations and the same number of matched observations. The matched observations are from 120 different industries. On average, each treated industry is matched to firms operating in 9.04 distinct industries.[15]

[Insert Table 1 about here]

Table 1 presents the summary statistics (mean, 25th, 50th (median), and 75th percentiles) for the treated and matched firms during the year that precedes the reductions in tariff rates. We consider the matching variables as well as the various corporate policies used in the subsequent analyses. Overall, the treated firms are very similar to the matched firms. Although treated firms appear to have a higher market-to-book ratio, the Kolmogorov-Smirnov tests reveal that there are no statistical differences in the distributions of the matching variables across treated and matched firms. The *p*-values range between 0.23 (for cash holdings) to 0.95 (for size). In sum, our matching process removes any meaningful differences along matching observables from the two groups. We note that the treated and matched firms are also similar on dimensions that are not used in the matching algorithm.

[13] For each treated firm *i*, we find a matched firm *j* such that the Mahalanobis distance between the *i*'s and *j*'s covariates (matching variables) is the smallest. The Mahalanobis distance is given by: $\|X_i - X_j\| = ((X_i - X_j)'W_X^{-1}(X_i - X_j))^{1/2}$, where X is a k-dimensional vector of covariates and W_X^{-1} is the inverse of the covariance matrix of the covariates. In a robustness test we also use a propensity score matching estimator and obtain very similar results.

[14] Similar matching procedures have recently been used by Villalonga (2004), Lemmon and Roberts (2010), or Almeida, Campello, Laranjeira, and Weisbenner (2010) among others.

[15] This heterogeneity guarantees that our estimates are not driven by specific links between treated and matched industries. To make sure that treated and matched firms are truly from unrelated industries, we have used the 1992 input-output tables from the Bureau of Economic Analysis and computed inter-industry relatedness following Fan and Lang (2000). Our results are not changed if we remove from the matching sample industries that are related to treated industries (relatedness coefficient larger than 10%).

To properly isolate the effect of competition on corporate policies, our empirical design needs to meet two requirements. First, the events (changes in tariff rates) should bring *relevant* changes in the competitive nature of industries. Second, the events should be *exogenous* to corporate policies. Appendix C provides evidence that supports both requirements. In particular, the average tariff rate drops from 4.59% (3.33%) one year prior to the event to 2.36% (2.73%) one year after the event in the treated (matched) industries. This average tariff rate decrease spurs a non-trivial increase in import penetration by 2.84% in the treated industries (from 15.17% to 18.01%), compared to 1.14% in the matched industries (from 18.51% to 19.65%). Using aggregate industry data from the NBER-CES database, we estimate that the average aggregate capital investment falls by 6.2% (from $870 million to $819 million) in industries hit by a tariff rate reduction while it increases by 6.9% in unaffected industries (Figure C.3). Further supporting the relevance of our competitive shocks, we observe that aggregate employment decreases by 0.24% in affected industries, but increases by 0.60% in other industries (Figure C.4).

Although the exogeneity of tariff rate reductions to corporate policies is inherently not testable, we believe that is difficult to argue that tariff rate reductions are granted in *anticipation* of changes in firms' investment and financing choices. While a skeptic could content that trade policy is dictated by the corporate sector via an active lobbying activity, Appendix C provides several economic arguments to support the exogeneity of tariff rate reductions to firms' investment and financing decisions. In particular, while lobbying activity and political capture usually aims at protecting influential import-competing industries (Krugman, Obsfeld, and Melitz (2012)), there is no obvious reason why import-competing industries would lobby to reduce trade protection. In addition, we estimate that firms' investment and financing choices have no statistical power in predicting the dynamics of import tariffs. Moreover, we find no evidence that tariff reductions concentrate in declining industries, on which politicians are "giving up". These ancillary analyses dispel the potential concerns about the endogeneity of tariff rate reductions to the major variables used in the following analysis.

Note that our methodology shares the usual caveats inherent in quasi-natural experiments. As noted by Roberts and Whited (2011), we face the trade-off between identification and extrapolation.

Although our empirical strategy lessens concerns over reverse-causality, it makes it more difficult to extrapolate our findings outside our sample. Yet, we believe that this limitation is at least partially counterbalanced by the better confidence we have in our estimates.

4. The real effects of competitive pressure

We start by presenting our main difference-in-differences results. We then provide several tests that confirm the validity of our inference and support the identification strategy.

4.1. Main results

We examine the behavior of the treated and matched firms around the reductions of import tariff rates. For each corporate policy variable we compute the average change from one year before to one year after the tariff rate reduction for our treated firms (the treated difference) and matched firms (the matched difference), and the difference between treated and matched differences (difference-in-differences).[16] We focus on the mean difference-in-differences estimates and report the associated *t*-statistics.

Table 2 presents the main results. We observe that reductions in import tariff rates have substantial effects on corporate policies. In Panel A, we observe that firms respond to a tariff rate reduction by decreasing investment. For firms in the treated group, the ratio of capital expenditures to assets drops by 1.10%. In contrast, for matched firms, capital expenditures increase by 0.10%. The difference-in-differences estimate is -1.20% and statistically different from zero (with a *t*-statistic of 4.88). While Akdogu and MacKay (2008) document that competition is associated with lower investment speeds, our estimate reveals that increased competition materially reduces the *level* of investment. As such, firms significantly cut capital spending in the face of more intense competition. The effect is economically non-trivial. The drop represents more than 17% of the pre-event level of capital expenditures (which is 7% of total assets) or $9.88 million. The observed decline in investment supports the idea that strengthened competition generally shrinks firms' investment opportunities by

[16] We focus on the short-term effects of tariff rate reductions on firms' financial choices. Moving further away from the event could allow other confounding factors to influence financial choices and threaten the internal validity of the identification strategy.

increasing uncertainty about the future payoffs of potential projects (e.g. Grenadier (2002)). We find similar patterns for other forms of investment, i.e. R&D and acquisition expenses. The difference-in-differences estimates indicate that the ratio of R&D to assets decreases by 0.83% (with a *t*-statistic of 2.43), whereas the ratio of acquisition expenses to assets falls by 0.41% (with a *t*-statistic of 1.70) after the tariff rate reduction.

[Insert Table 2 about here]

In parallel, the decrease in corporate investment is accompanied by a notable reduction of firms' fixed assets. The ratio of property, plant, and equipment to assets drops on average by 0.64% (or $5 million) after the reduction of tariffs. Together with the decline in investment and fixed assets, treated firms substantially boost their cash holdings. The difference-in-differences estimate reveals an increase in the ratio of cash to assets by 1.70% after the tariff rate reduction.[17] On average, firms appear to massively invest in liquid assets to cope with their new product market setting. Again, this change is economically important as the growth of liquid assets represents 9.4% of the pre-event cash levels (or $14 million). Despite the considerable changes in the asset mix, we observe no significant change in the size of assets. Although positive, the difference-in-differences in (the logarithm of) total assets (0.80 or $6.59 million) is not significant (*t*-statistic of 0.43). Unreported analysis also reveals that changes in other asset items such as trade credit and inventories show little response to the competitive shock.

Taken together, these first estimates indicate that the sudden intensification of competition triggered by the reduction of tariff rates pushes firms to alter the structure of their assets. On average, firms switch from productive assets (various forms of investment and fixed assets) to liquid assets. Remarkably, our findings indicate that firms are not dipping into their cash balances to maintain investment activity after the threat of more competition materializes. Instead, and consistent with

[17] Note that it does not matter that the difference-in-differences estimate of cash is mostly coming from the fact that matched firms *decrease* their cash holdings. Indeed, because we use a difference-in-differences methodology we do not have to control for cross-sectional and time-series effects that affect both tariff rate reductions and corporate policies (e.g., Roberts and Whited (2011) or Angrist and Pischke (2009)). For example, the 1.78% decrease in cash holdings for matched firms could be caused by a decrease in growth opportunities for all firms. However, cash holdings of treated firms decrease by only 0.08% because not only their growth opportunities decrease but the competition they face increases, so that the net effect is the difference (-0.08% - (-1.78%) =1.70%). In fact, the only really important estimate is the difference-in-differences estimate (which is the equivalent to an OLS estimate).

Haushalter, Klasa, and Maxwell (2007), they react to a competitive shock by hoarding more liquid resources.

Panel B of Table 2 reveals that changes in product market competition also modify the structure of firms' financing. Specifically, the ratio of net debt issuances to assets of treated firms decreases by 2.27% relative to matched firms (*t*-statistic of 3.75). This result confirms the existing negative association between competition and debt usage (MacKay and Phillips (2005), and Xu (2011)). Simultaneously, we observe a change in net equity issuances in the opposite direction. Treated firms increase equity issuances as a ratio to assets by 1.71% compared to matched firms. As a result, the total financing remains almost constant (decrease of 0.71% with a *t*-statistic of 0.68)

Looking at debt more closely, we also remark that increased competition induces firms to significantly reduce their ratio of long-term debt to assets (long-term leverage), which decreases by 2.29% (with a *t*-statistic of 4.15). In contrast, we observe no significant change in the ratio of short-term debt to assets (which increases by 0.28% with a *t*-statistic of 0.61). Similarly to what we observe on the asset side, the strengthening of competition prompts firms to substitute sources of external capital. On average, they tend to switch from debt to equity financing.

To further understand the connections between asset and financing adjustments, we examine whether the magnitude of the financing adjustment is related to the magnitude of the change in the asset mix. To do so, we double-sort the difference-in-differences estimates of net debt issues *and* net equity issues to form four partitions based on their respective medians and compute the mean difference-in-differences in capital expenditures, R&D, acquisitions, and cash holdings for each partition.[18]

Table 3 presents the results. Across all panels, we see clear linkages between financing and investment responses to the competitive shock. In particular, Panel A suggests that the adjustments in investment are largely related to the changes in net debt issuance activity. Capital expenditures only decline for the treated firms that also reduce their net debt issues after the competitive shock, i.e. when the difference-in-differences estimate of net debt issuance is below the median. The effect is

[18] To preserve space and clarity, we exclude fixed assets and short-term leverage from the rest of the paper. In unreported tests, we show that these variables are not very sensitive to changes in competitive pressure.

economically large. The decline in capital expenditures (difference-in-differences estimates) amounts to 2.60% if firms simultaneously reduce their debt issuances without increasing net equity issuances. Firms that reduce their debt issues but increase their equity issues also cut back capital expenditures (by 1.62%). These joint patterns suggest that firms do not (or cannot) issue equity to sustain their investment activity. Moreover, firms that do not decrease their net debt issuance activity seem to maintain their capital investment policy. Globally, we find no instances where firms strategically increase capital investment preemptively by raising extra funds externally (e.g., Gilbert and Lieberman (1987)). The results are roughly similar for R&D and acquisition expenditures. While acquisition expenses appear to decrease only when the change in net debt issuance is below the median, R&D expenses decline the most when firms decrease debt but increase equity. Whereas the observed reduction of debt issues corroborates the findings of MacKay and Phillips (2005) and Xu (2011), our results suggest that the effect of competition on debt is jointly accompanied by a reduction in corporate investment.

[Insert Table 3 about here]

Finally, Panel D indicates that the increase in cash holdings is also linked to adjustments on the financing side. The change in cash reserves is largely related to the augmentation of net equity issues. The increase in cash reserves is large (4.35%) for firms that increase net equity issues and reduce net debt issues after the intensification of competition. The observed dynamics suggest that, on average, firms that issue new equity simultaneously augment their cash balances (Kim and Weisbach (2006)). Notably, treated firms also increase cash reserves by 2.41% when firms increase both their equity and debt issues. The joint adjustment of financing and cash reserves triggered by increased competition is in line with Acharya, Almeida, and Campello (2007), who predict that cash holdings play an important hedging role when future investment opportunities and financing is uncertain. While the results from the double-sorts confirm that the change in the asset mix is tied to adjustments in the liability mix, they also reveal the existence of an important heterogeneity in firms' reactions to competitive shocks. Section 5 provides a detailed analysis of these heterogeneous responses.

In sum, this first set of findings confirms that product market competition has a non-trivial effect on several corporate policies. On average, firms respond to increased competitive pressure by

jointly altering their investment and financing choices. As such, our estimates indicate that competition has multifaceted effects on corporate policies and underline the complex dynamic interactions between the financing and the use of corporate resources.

4.2. Validity checks

In order to strengthen the interpretation of the results, we perform several robustness checks. First, we replicate the same experiment but modify the "dosage" of the competition increase triggered by tariff rate reductions. To do so, we use five different definitions of tariff cuts. Specifically, we define that a tariff cut occurs in a specific industry-year when a negative change in tariff rates is one (small change in competitive pressure), two, three, four, or five (large change in competitive pressure) times larger than its average (absolute) change (labeled Cut#1 to Cut#5).[19] Table 4 presents the results with different dosages of competitive shocks. For the most part, the changes in corporate policies are monotonically increasing in the intensity of the shocks. For example, while we find very small effects on capital expenditures (-0.35%), R&D (+0.16%), acquisitions (-0.18%), or cash holdings (-0.09%) for Cut#1 where the average tariff rate decreases by 1.23%, the effects are substantial for Cut#5 where the average tariff rate drops by 3.42%. In this latter case, capital expenditures fall by 1.22%, R&D by 1.00%, and cash holdings increase by 2.86%.

[Insert Table 4 about here]

Second, we check whether the outcome variables of treated and matched firms follow "parallel trends" prior to the tariff rate reduction. In our setting, the parallel trend test is important for two reasons. First, a key identification assumption behind our difference-in-differences strategy is that, in the absence of treatment, the observed difference-in-differences should be systematically zero. Yet, because our events occur at industry-level, a serious identification threat is that we compare the behavior of firms from industries that follow different latent trends (due to, for instance, different technological advancements or different phases of the product cycle). These unobserved industry differences could affect firms' corporate actions and explain part of the differential behavior we

[19] Previous results correspond to Cut#3 where changes in tariff rates are three times larger than average (absolute) changes (as defined in Section 3).

observe in the post-event window. Second, comparing the trends of the outcome variables *before* the event across treated and matched firms provides useful insights on whether reductions of tariff are anticipated. As a matter of fact, if tariff modifications are fully expected by the corporate sector, one would expect firms to adapt their financial choices already before tariff rates effectively change.

To verify whether the parallel trend assumption holds in our setting, we follow Roberts and Whited (2011) and compute the mean and median of the average growth rates in the outcome variables over the three years that precede the tariff rate reductions for both treated and matched firms. Table 5 reports these estimates, together with the *p*-values associated with the test statistics for differences in means (standard *t*-test) and in medians (Wilcoxon signed-rank test) across groups. In support for our identification strategy, for most of the variables, both *t*-tests and signed-rank tests highlight that the growth rates are indistinguishable across treated and matched firms in the pre-event period.[20] Hence, the outcome variables in the two groups follow very similar trends before the tariff reduction. These results mitigate concerns about the impact of different industry trends and also suggest that (treated) firms do not seem to anticipate tariff rate reductions. They do not behave differently than the matched firms in the pre-event period.

[Insert Table 5 about here]

Third, we repeat the baseline experiment during placebo periods that precede the reduction in tariff rates. We use years (-4) and (-3) relative to the actual event years to sort firms into treated and matched firms. We then examine the change in corporate policies from year (-4) to year (-2) and from year (-3) to year (-1). We perform these falsification tests using the exact same sampling criteria and matching variables. Table 6 outlines the results of these falsification tests. The estimated changes in corporate policies across treated and matched groups are negligible for placebo periods. These findings are internally consistent and confirm that the changes in corporate behavior really stem from the tariff rate reductions.

[Insert Table 6 about here]

[20] The only exceptions are R&D expense and net debt issuance. The first variable is often missing in the Compustat data base (we replace it by zero when missing) and heavily skewed, which could partly account for this poor fit. With both variables we remain careful when interpreting the results. Note also that we have excluded extreme observations in unreported tests to ensure that the parallel trends assumption holds for all variables. The estimation results are identical. In order to be conservative, we decided to keep the extreme observations in the analysis.

Finally, we alter the estimation in two ways. First, we change the matching methodology and use use a propensity score approach. Using all firms (treated and non-treated), we run probit regressions every year to estimate propensity scores, i.e. the probability of being treated over the next year (when the tariff reduction occurs). The set of covariates includes the exact same variables used in the non-parametric matching (market-to-book, size, cash flow, cash holdings, and long-term leverage). Next, we match each treated firm to a matched firm that has the nearest predicted propensity score.[21] Table 7 indicates that our results are not affected by this change in the matching procedure.

Second, we estimate difference-in-differences regressions for each of the eight policies using treated and matched firms before and after the decrease in tariff rates. We have one "before" and one "after" observation for each treated and matched firm. We use a constant term, a "Treated" dummy variable, an "After" dummy variable, an interaction term between the "Treated" and "After" dummies, as well as control variables (Market-to-book ratio, the logarithm of assets, and cash flow to assets).[22] The regression results in Table 8 (see coefficient "Treated × After") closely mirror the results in Table 2.

[Insert Tables 7 and 8 about here]

5. Cross-sectional variation in firms' response to competitive shocks

Competition in the product market matters for firms' corporate choices because it impacts future prospects and/or their risk, as well as the provision of incentives within the firm. As such, the extent to which firms react to competitive shocks is likely to depend on their position in the product market, their exposure to competitive threats, their access to financing, or their governance structure. This section exploits the cross-sectional dimension of the sample to further characterize the nature of the main results.

[21] Note that there is almost no overlap between the matched samples obtained by matching on the propensity scores or on the five matching variables (Mahalanobis). We only have 14 matched firms that are present in both samples.
[22] As in Bertrand, Duflo, and Mullainathan (2004) and Petersen (2009), the standard errors of the regression estimates are clustered within firm and robust to heteroskedasticity. By construction, the exclusion of the control variables delivers the same results as the (mean) difference-in-differences estimates reported in Table 2.

5.1. Exposure to competitive pressure

We start by examining whether the effects of competition are related to firms' position in the product market and the intensity with which they interact with industry rivals. Intuitively, firms face different exposures to competitive pressure. Some firms are better equipped to resist increased competition than others. For instance, the future prospects of an industry leader might not be threatened by competition to the same extent as those of industry followers. To examine this claim, we use three firm-level variables as proxies for firms' exposure to competitive pressure, and two variables measuring the intensity of competitive interactions among firms at the industry-level. At the firm-level, we use firms' market shares to identify whether a firm is a market leader. Leaders are firms whose sales account for a sizeable percentage of the total gross sales in their industries. Second, we separate firms according to their degree of diversification. Arguably, one could expect stand-alone firms to be more exposed to intensified pressure from foreign competitors than conglomerate firms that realize part of their sales in unaffected industries. Also, we distinguish firms based on their participation to the export market. Indeed, firms that sell a large fraction of their production abroad may be less affected by the increased pressure from foreign rivals.[23]

At the industry-level, we use the fitted Herfindahl-Hirschman Index (HHI) provided by Hoberg and Phillips (2010) and the number of firms per industry (e.g., Tirole (1988)) as proxies for firms' competitive exposure.[24] A large value of the HHI indicates a high industry concentration. Because the intensity of competition is probably not linear in the number of firms, we use the logarithm of the number of firms to capture the amount of interaction between firms.

[Insert Table 9 about here]

To assess whether firms facing a greater exposure to competition respond differently to the increased competition from foreign rivals, we classify (treated) firms into groups based on each of the five proxies during the year that precedes the tariff rate reduction and compute the mean difference-in-differences for each corporate policy and for each group. For market shares, industry concentration,

[23] We see two main reasons for this argument. First, firms that realize a large fraction of their sales abroad compete relatively less with foreign rivals on the domestic market. Second, because tariff reductions often occur in multi-lateral agreements, it could be that exporting firms benefit from lower tariff in their exporting markets.
[24] The fitted HHI data is available at: http://www.rhsmith.umd.edu/industrydata/index.html.

and the number of firms, we sort firms into terciles and keep the lower and upper partition. For the degree of diversification, we use Compustat's Business Segment files and define a firm as "diversified" ("focused") if it reports operations in more than one (only one) industry (4-digit SIC code) in a given year. Finally, using Compustat's Geographic Segment files we classify a firm as "exporting" if it realizes positive sales abroad in a given year (Denis, Denis and Yost (2002)).[25]

Table 9 reports the difference-in-differences estimates. Across all specifications, we observe a clear asymmetric reaction to reductions in import tariff rates that depends on firms' exposure to competitive pressure. Regarding firms' position in their product market, we notice that the financial choices of market leaders are virtually not affected by the intensification of competitive pressure. None of the difference-in-differences estimates are significant (except long-term leverage). In sharp contrast, the responses of followers are large in magnitude. These firms decrease capital expenditures by 2.24% and increase cash reserves by 4.92%. Also, they increase equity financing by 4.54%, thereby reducing their long-term leverage by 4.41%. Most of the differences between leaders and followers are significant. We find very similar patterns when we consider the diversification or export profile of treated firms. As expected, tariff rate reductions appear to only affect focused and non-exporting firms. We observe almost no adjustments across diversified firms and firms participating in export markets. Yet, due to the small number of firms in the "diversified" and "exporting" partitions, the differences between treated and matched firms are only weakly significant.

Turning to industry-level measures, the adjustments of financial policies concentrate primarily in more "competitive" industries. We observe virtually no change in investment and financing policies when the tariff rate reduction occurs in concentrated industries (high value for the HHI) or in industries populated by fewer firms. Again, the magnitude of the adjustments appears non-trivial in more competitive industries. For instance, the reduction of capital expenditures and long-term leverage amounts to 1.53% and 2.65%, respectively, in industries that have a low HHI. At the same time, cash holdings and net equity issuances increase by 3.37% and 3.19%, respectively. The adjustments are of the same magnitude when we consider industries that feature many firms. Overall,

[25] With these classifications, 29% of the treated observations are classified as "diversified" and 23% of treated observations are classified as "exporting" firms. This low fraction of exporting firms is in line with the fact that very few U.S. firms participate in international trade (e.g., Bernard, Jensen, Redding, and Schott (2007)).

Table 9 confirms that increased competitive pressure does not impact all firms in the same way, and that the degree of adjustment appears to be related to firms' position in the product market.

5.2. Financing risk

As discussed in Section 2, intense competition in the product market could exacerbate financing frictions and constrain firms' access to external finance (e.g. Bolton and Scharfstein (1990), or Hou and Robinson (2006), or Valta (2011)). As a result, the heightened competitive pressure generated by tariff rate reductions could significantly increase firms' financing risk, i.e. their ability to access external financing (now or in the future). To assess this possibility, we examine whether firms that are more exposed to financing risk react differently than firms that are more immune to this risk. We follow existing research and use four variables to proxy for firms' financing risk. We first use firms' size and payout policy. Following Hadlock and Pierce (2010), large firms enjoy a privileged access to external financing. Also, firms that do not pay dividends are more likely to face financing constraints (Fazzari, Hubbard, and Petersen (1988)). In addition, we use the Whited and Wu (2006) financial constraints index (WW). Firms with a high WW index are small firms that rely mainly on equity financing, exhibit low growth rates, and have low cash flows. For these three variables, we again sort (treated) firms into terciles based on each of these three proxies during the year that precedes the tariff rate reduction and compute the mean difference-in-differences estimates for each corporate policy. In addition, we also sort firms based on whether they have a public bond rating or not one year before the event (e.g., Almeida, Campello, and Weisbach (2004)).

[Insert Table 10 about here]

Table 10 presents the results. Several interesting patterns emerge. Across the different specifications, the investment and financing adjustments appear much larger for firms that are most exposed to financing risk. In particular, the change in investment policy is substantial for these firms. The estimated decline in capital expenditures ranges between 1.43% (low payout ratio) and 1.76% (firms without rating). We find little effect on capital expenditures for firms with better financing prospects. Similarly, the cash reserves of firms facing high financing risk increase between 1.91% and 3.63%, while the increase ranges between 0.00% and 1.17% (mostly insignificant) for the other firms.

The results are slightly more subtle on the financing side where the results indicate that firms' behavior is really distinct depending on the financing risk they face. Generally, firms that anticipate more financing difficulties sharply increase equity issues. The observed increases in equity issuance are large across the different proxies. They range between 3.41% (for firms without rating) and 4.43% (for small firms). While financially constrained firms also decrease net debt issues, the increase in equity is generally larger than the decrease in debt. In sharp contrast, firms facing low financing risk appear to mostly reduce net debt issuance and keep equity issue constant. The decline in net debt issuance goes from 0.62% (for firms with a rating) to 3.99% (for small firms). This pattern is consistent with Bolton and Scharfstein (1990) or Campello (2006) who argue that financially strong firms strategically reduce their debt to be in a better position to compete in the product market. Finally, we also sort treated firms based on the stage in the industry life cycle, measured as the market-to-book ratio at industry level. Complementing our previous findings, we find that the effects of a competitive shock are more pronounced in growth industries than in mature industries. This finding also attenuates concerns that we are capturing firms in declining industries.

Overall, the findings in Table 10 underline that financing risk seems to play an important role in explaining how firms react to increased competitive pressure. When financing risk is high, firms increase net equity issuance, augment cash reserves, and simultaneously reduce investment. These adjustments are in line with recent dynamic corporate finance models that feature financing risk (e.g., Bolton, Chen, and Wang (2011)). When financing risk is low, firms appear to maintain investment and rebalance their capital structure by switching from debt to equity financing. This asymmetric behavior underlines the importance of looking at how firms adjust on multiple dimensions to understand the real impact of competition on corporate policies. Additionally, the results confirm that competitive pressure matters in part because it exacerbates financing frictions.

5.3. Agency conflicts

Increased competitive pressure could also affect corporate policies because it disciplines managers and modifies the nature of agency conflicts (e.g., Hart (1983), Schmidt (1997), Giroud and Mueller (2010a, 2010b), or Amore and Zaldokas (2011)). As such, competition may reduce

managerial slack and strengthen the alignment of interest between managers and shareholders. To examine whether the observed changes in corporate policies are associated with reduced agency conflicts, we investigate whether a firm's reaction depends on the strength of governance mechanisms that were in place prior to the competitive shock. To the extent that the effect of competition materializes through enhanced discipline of management, we should observe stronger effects for firms that have lower governance quality. To design this test, we follow the literature and use institutional ownership as a proxy for corporate governance (e.g., Ditmar and Mahrt-Smith (2007)).[26] We match institutional ownership data with our sample firms and compute the number of institutional investors and the proportion of common shares held by institutional investors. A larger number (higher proportion) indicates more oversight and hence better corporate governance. Due to data limitations, we only have 641 observations for these tests. We sort treated firms into terciles based on each of these proxies during the year that precedes the tariff rate reductions and compute the mean difference-in-differences estimates for each corporate policy. Table 11 displays the results.

[Insert Table 11 about here]

We observe that the investment and financing adjustments do not seem to depend systematically on governance quality. For instance, whereas capital expenditures decline more for firms with a low compared to firms with a high number of institutional investors (1.33% versus 1.05%), the decline is larger for firms with a higher proportion of institutional investors (1.61% versus 1.26%). Moreover, the differences between tercile 1 and tercile 3 are not statistically significant (*p*-values of 0.35 and 0.44). Concerning R&D and acquisition expenses, we note that the declines following the intensification of competition are slightly larger for well governed firms (although not significant). In addition, cash holdings appear to increase slightly more for firms with better governance (1.89% and 2.11%) than for firms with worse governance (0.08% and 1.40%).

Similarly, no clear pattern emerges on the financing side. Whereas the decreases in net debt issuances seem to be slightly larger for well governed firms, the increases in net equity issuances appear stronger for poorly governed firms. Yet, the differences are not significant. As such, these

[26] We also matched our data to the G-Index and E-Index data, but were able to match only a small number of firms. The reason for the poor match is our sample-period and the focus on manufacturing firms.

results should be interpreted with caution. In sum, the results in Table 11 do not identify any consistent link between firms' reaction to a changed competitive environment and corporate governance mechanisms. In our context, this link does not appear to be of first-order importance.

6. Performance and employment

To further characterize our results, we examine the impact of increased competition on firms' performance and employment. Specifically, we investigate the responses of firms' profit margins (operating profit over sales), return on equity, sales growth, and employment to changes in tariff rates using the matching framework discussed above. Table 12 presents the results. In Panel A, we report the changes in performance and employment from one year prior to one year after the decrease in tariff rates. We observe no significant differences in margins, return on equity, or sales growth across treated and matched firms in the short run. Margins and sales growth appear to decrease (-4.02% and -1.66%), but the difference-in-differences estimates are not significant (*t*-statistics of 0.77 and 0.75). While previous sections indicate that firms substantially reduce investment, increase cash balances, and reduce leverage in the aftermath of a competitive shock, they simultaneously manage to keep profitability and sales at similar levels as matched firms. It therefore seems that increased competition and the associated distortions of investment and financing choices do not have any immediate effect on firms' profitability.

In line with Revenga (1992), Panel A of Table 12 also reveals that the ratio of the number of employees to assets deceases by 0.06% (with a *t*-statistic of 2.32) following a large decrease in tariff rates. In terms of economic magnitude, this corresponds to an average diminution of 494 employees per firm. Mirroring the results on investment, firms appear to cut down (costly) factors of production in order to cope with competitive shocks.[27]

[Insert Table 12 about here]

[27] As suggested by Benmelech, Bergman, and Seru (2011), the observed decline in employment may have direct or indirect explanations. Firms may cut employment because the increase in competition constrains their ability to finance investment. Alternatively, due to the complementarities between labor and capital, employment is adjusted for the decline in capital.

To get a more complete picture about the effects of competition on performance and employment, we take a longer term perspective and compare the average three-year performance before with the three year performance after the competitive shock. Panel B of Table 12 displays the results. Over this longer horizon, we remark significant declines in profit margin, return on equity, and sales growth. This negative impact of increased foreign competition on performance is consistent with existing studies (Katics and Petersen (1994), or Pugel (1980)). The magnitude of these effects appears economically large. Compared to matched firms, the average profit margin of treated firms decreases by 12.65%. Similarly, return on equity and sales growth drop on average by 5.78% and 3.42%, respectively. Both differences are statistically significant (*t*-statistics of 1.81 and 2.21). We also note that the ratio of employment to assets declines by 0.08% over this longer perspective. Together, this evidence suggests that, on average, increased competitive pressure following tariff rate reductions indeed hurts corporate performance, but that the effect takes some time to materialize.

7. Conclusion

The main message of this paper is that product market competition has a significant influence on firms' corporate policies. Using changes in import tariff rates to identify shifts in competitive pressure, we provide evidence that firms substantially adjust investment and financing in response to increased competition. Following reductions of tariff rates, firms reduce capital expenditures, and simultaneously increase precautionary cash reserves. On the financing side, we observe a drop in net debt issuance, coupled with an increase in net equity issuance when competition intensifies. As a result of this substitution in financing sources, firms' leverage significantly drops. Importantly, these policy adjustments turn out to be magnified when firms occupy a weaker competitive position in their product market, when they are not diversified, and when they do not participate in the export market. Also, the analysis reveals that firms' reaction to competitive pressure largely depends on their ability to access external financing.

In a nutshell, this paper establishes important linkages between firms' competitive environment and their financial decisions. As such, the findings point to interesting avenues for future research, two of which we outline here. First, due to the nature of our identification strategy, we only

focus on the *short-term* policy adjustments triggered by increased competitive pressure. More generally, it will be interesting to take a longer-term perspective and examine whether increased competitive pressure is desirable or detrimental. For instance, this analysis could be done by looking at how the observed adjustments help explain firms' competitive success, industry productivity paths, and industry dynamics.

From a different perspective, the findings underscore that firms adjust simultaneously on several margins when their competitive environment suddenly changes. As such, the analysis calls our attention to the fact that examining how firms decide on *one* specific policy in isolation could potentially hide more complex economic mechanisms. Although the idea that firms jointly decide on several corporate dimensions appears natural and is central in many corporate finance models, it is fair to say that, so far, the empirical literature has largely overlooked the simultaneity of corporate decisions. We believe that our setting allows us to make a step in this direction. We leave these and other related questions to future research.

Appendix A. Definition of variables

Variable	Definition
Size	Logarithm of total assets (AT) (from Compustat).
Capital expenditures	Capital expenditures (CAPX) divided by total assets.
R&D	Research and Development expenses (XRD) divided by total assets.
Acquisitions	Acquisition expenses (AQC) divided by total assets.
Net PPE	Net property, plant, and equipment (PPENT) divided by total assets.
Cash holdings	Cash and short term investments (CHE) divided by total assets.
Net debt issuance	Current debt changes (DLCCH) plus long-term debt issuance (DLTIS) minus long-term debt reductions (DLTR) divided by total assets.
Net equity issuance	Sale of common and preferred stock (SSTK) minus purchase of common and preferred stock (PRSTKC) divided by total assets.
Total financing	Sum of Net debt issuance and Net equity issuance.
Long-term leverage	Long-term debt (DLTT) divided by total assets.
Short-term leverage	Short-term debt (DLC) divided by total assets.
Market-to-book	Total assets minus common equity (CEQ) plus the market value of equity (CSHO*PRCC_F) divided by total assets.
Cash flow	Income before extraordinary items (IBC) divided by total assets.
Tariff rate	Duties collected at U.S. Custom divided by the Free-On-Board custom value of imports at the four-digit SIC industry (from Peter Schott's website).
Cut# x	Dummy variable equal to one if the reduction in the tariff rate is more than x times larger than the average tariff reduction in the industry, and zero otherwise.
Import penetration	Total imports divided by the sum of total imports and domestic production minus total exports at the four-digit SIC industry.
Aggregate investment	Aggregate industry capital investment ($ million) (from the NBER-CES database).
Aggregate employment	Aggregate industry number of employees (Thousands) from the NBER-CES database).
Market share	Proportion of a firm's sales in the four-digit SIC industry.
Export	Dummy variable equal to one if a firm realizes positive sales abroad, and zero otherwise (from Compustat's Geographic Segment files).
HHI	The fitted Herfindahl-Hirschman Index provided by Hoberg and Phillips (2010).
Focused	Dummy variable equal to one if a firm reports only one business segment, and zero otherwise. (from Compustat's Business Segment files).

Credit rating	Dummy variable equal to one if a firm has a credit rating, and zero otherwise.
Payout ratio	The sum of common dividends (DVC), preferred dividends (DVP), and purchases of common and preferred stock (PRSTKC) divided by total assets.
WW-Index	Financial constraints index based on Whited and Wu (2006).
Profit margin	Income before extraordinary items (IB) + depreciation and amortization (DP) divided by sales (SALE)
Employment	Number of employees (EMP) divided by total assets.
ROE	Net income (NI) divided by shareholders' equity (CEQ).
# Institutional investor	Number of institutional investor holding the firm's shares (from 13F's provided by Thomson Reuters).
% Institutional investor	Fraction of shares held by institutional investors (from 13F's provided by Thomson Reuters).

Appendix B. 91 Industries (year) affected by tariff rate reductions

Year	SIC	$Tariff_{t-1}$	ΔTariff	Industry Description
1975	2834	-1.65%	4.30%	Pharmaceutical Preparations
1975	2084	-1.48%	9.86%	Wines, Brandy, and Brandy Spirits
1975	3334	-0.52%	3.26%	Primary Aluminum
1976	2511	-1.34%	5.66%	Wood Household Furniture
1976	3585	-1.20%	4.90%	Refrigeration and Heating Equipment
1976	3211	-1.93%	9.27%	Flat Glass
1976	3621	-1.02%	6.67%	Motors and Generators
1976	3357	-1.81%	7.54%	Nonferrous Wiredrawing and Insulating
1976	3931	-1.31%	11.25%	Musical Instruments
1976	3728	-0.88%	2.80%	Aircraft Parts and Equipment, Nec
1976	2522	-1.34%	5.66%	Office Furniture, Except Wood
1976	2531	-1.34%	5.66%	Public Building and Related Furniture
1976	2452	-2.75%	8.79%	Prefabricated Wood Buildings
1976	3851	-1.84%	15.02%	Ophthalmic Goods
1976	3944	-3.48%	14.84%	Games, Toys, and Children's Vehicles
1976	3949	-1.98%	9.57%	Sporting and athletic Goods, Nec
1976	2111	-12.62%	32.13%	Cigarettes
1978	2011	-0.75%	3.90%	Meat Packing Plants
1979	3541	-1.25%	9.03%	Machine Tools, Metal Cutting Type
1979	2891	-2.11%	8.07%	Adhesives and Sealants
1979	3272	-2.69%	11.67%	Concrete Products, Nec
1980	3823	-1.21%	7.86%	Process Control Instruments
1980	3829	-1.21%	7.86%	Measuring and Controlling Devices, Nec
1980	3433	-1.60%	5.48%	Heating Equipment, Except Electric
1980	3911	-3.23%	6.61%	Jewelry, Precious Metal
1980	2085	-1.72%	7.99%	Distilled and Blended Liquors
1980	3357	-1.22%	5.75%	Nonferrous Wiredrawing and Insulating
1980	3824	-1.21%	7.86%	Fluid Meters and Counting Devices
1980	3822	-1.21%	7.86%	Environmental Controls
1980	3564	-1.41%	4.23%	Blowers and Fans
1980	3221	-0.86%	4.35%	Glass Containers
1980	3728	-2.45%	2.69%	Aircraft Parts and Equipment, Nec
1980	2452	-1.59%	6.22%	Prefabricated Wood Buildings
1980	3825	-1.21%	7.86%	Instruments To Measure Electricity
1980	2084	-1.71%	7.75%	Wines, Brandy, and Brandy Spirits
1980	3721	-4.24%	4.25%	Aircraft
1980	3537	-0.56%	4.36%	Industrial Trucks and Tractors
1980	3724	-4.21%	4.37%	Aircraft Engines and Engine Parts
1981	3743	-4.13%	9.18%	Railroad Equipment
1981	3576	-0.91%	6.44%	Computer Communication Equipments

Year	SIC	$Tariff_{t-1}$	ΔTariff	Industry Description
1982	3452	-6.65%	10.80%	Bolts, Nuts, Rivets, and Washers
1982	2221	-2.07%	19.88%	Broadwoven Fabric Mills, Manmade
1982	3674	-1.28%	5.47%	Semiconductors and Related Devices
1982	2821	-1.16%	9.27%	Plastics Materials and Resins
1982	3713	-1.87%	3.81%	Truck and Bus Bodies
1983	3652	-1.11%	3.42%	Prerecorded Records and Tapes
1983	2771	-1.08%	5.48%	Greeting Cards
1983	3555	-0.82%	5.05%	Printing Trades Machinery
1984	3842	-2.05%	6.72%	Surgical Appliances and Supplies
1984	3949	-1.63%	4.69%	Sporting and athletic Goods, Nec
1984	2842	-1.16%	3.16%	Polishes and Sanitation Goods
1985	3559	-0.69%	4.29%	Special Industry Machinery, Nec
1986	2084	-1.13%	5.92%	Wines, Brandy, and Brandy Spirits
1986	3711	-1.35%	3.44%	Motor Vehicles and Car Bodies
1986	3674	-3.13%	4.15%	Semiconductors and Related Devices
1987	3672	-1.62%	9.39%	Printed Circuit Boards
1991	2835	-3.16%	6.44%	Diagnostic Substances
1992	3613	-1.16%	4.76%	Switchgear and Switchboard Apparatus
1992	3669	-0.79%	2.40%	Communications Equipment, Nec
1993	2761	-1.76%	2.77%	Manifold Business Forms
1993	2522	-0.88%	2.86%	Office Furniture, Except Wood
1993	2451	-1.25%	2.81%	Mobile Homes
1993	3715	-1.01%	1.94%	Truck Trailers
1994	3651	-0.65%	3.41%	Household Audio and Video Equipment
1994	3577	-1.09%	2.63%	Computer Peripheral Equipment, Nec
1994	3341	-10.31%	17.84%	Secondary Nonferrous Metals
1995	3555	-0.94%	2.35%	Printing Trades Machinery
1995	2834	-5.02%	5.02%	Pharmaceutical Preparations
1995	2835	-5.92%	7.44%	Diagnostic Substances
1995	3822	-1.33%	2.86%	Environmental Controls
1995	3944	-4.46%	4.58%	Games, Toys, and Children's Vehicles
1995	3011	-0.43%	2.91%	Tires and Inner Tubes
1995	3842	-1.44%	3.16%	Surgical Appliances and Supplies
1995	2842	-1.29%	2.71%	Polishes and Sanitation Goods
1995	3579	-0.96%	3.04%	Office Machines, Nec
1995	2844	-0.87%	3.79%	Toilet Preparations
1995	3942	-7.45%	7.45%	Dolls and Stuffed Toys
1995	2833	-4.16%	4.94%	Medicinals and Botanicals
1995	3559	-0.95%	3.00%	Special Industry Machinery, Nec
1995	3612	-1.37%	2.69%	Power, Distribution and Specialty Transformers
1995	3843	-1.40%	4.07%	Dental Equipment and Supplies
1995	3561	-0.61%	2.35%	Pumps and Pumping Equipment

Year	SIC	$Tariff_{t-1}$	ΔTariff	Industry Description
1997	3695	-1.20%	2.15%	Magnetic and Optical Recording Media
1997	3812	-0.31%	1.27%	Search and Navigation Equipment
1997	3578	-0.89%	1.97%	Calculating and Accounting Equipment
1997	3826	-1.33%	3.27%	Analytical Instruments
1997	3844	-0.42%	1.40%	X-ray Apparatus and Tubes
1998	3829	-1.27%	2.64%	Measuring and Controlling Devices, Nec
1998	3845	-1.04%	1.48%	Electromedical Equipment
1998	3089	-0.36%	3.07%	Plastics Products, Nec
1998	3663	-0.78%	1.51%	Radio and T.v. Communications Equipment

Appendix C. Validity of the identification strategy

To ensure that we can precisely identify the causal effect of competition on corporate policies, our empirical design needs to meet two requirements. First, the events we consider should bring *relevant* changes to the competitive nature of industries. Second, the events should be *exogenous* to corporate policies. We verify these requirements in turn.

The crux for using tariff cuts as a proxy for changes in competition rests on the idea that lower tariff rates make it less costly for foreign rivals to compete on domestic markets, thereby putting competitive pressure on U.S. firms. Figures C.1 and C.2 display the evolution of the average tariff rate and the penetration of imports on U.S. markets around tariff cuts across treated and matched firms. Following Bertrand (2004) and Irvine and Pontiff (2009) we compute import penetration for each industry-year as the total value of imports divided by the sum of imports and domestic production minus exports. This variable can be interpreted as the (aggregate) market share of foreign competitors. We remark that our events capture relatively large reductions in tariff rates. On average, tariff rates drop from 4.60% one year prior to the event to 2.35% one year after the event in the treated industries. By contrast, the average tariff rate slightly declines from 3.33% to 2.73% for the industries of the matched firms. In parallel, we observe a substantial increase in import penetration in treated industries around tariff rate reductions. Import penetration rises by 2.84% in the treated industries (from 15.17% one year prior to the event to 18.01% one year after the event), while it only increases by 1.14% in matched industries (from 18.51% to 19.65%). In line with related studies (e.g., Bernard, Jensen, Schott (2009), Lee and Swagel (1997), or Trefler (1993)), reductions of import tariff rates effectively increase the competitive pressure on domestic (treated) firms.

In complement, we also examine how tariff rate reductions affect aggregate industry variables. Figures C.3 and C.4 report the evolution of aggregate industry investment (capital expenditures) and employment based on data from the NBER-CES database. We observe that the average aggregate investment falls by 6.2% (from $870 million to $819 million) in industries hit by a tariff rate reduction while it increases by 6.9% in unaffected industries. Further supporting the relevance of our competitive shocks, we note that aggregate employment slightly decreases by 0.24% in affected industries, while it increases by 0.60% in unaffected industries.

Second, the source of variation that shifts competition should be *exogenous* to corporate policies. Indeed, our identification would be threatened if tariff rates are cut in anticipation of changes in corporate financing and investment policies. Arguably, a skeptic could contend that trade policy is driven by political factors associated with peculiar corporate policies. As such, trade protection may be granted or abandoned in industries featuring specific financing, investment, or performance patterns. Although the exogeneity condition is inherently not testable, the literature on international trade provides several arguments that support the validity of our experiment. First, while it is largely recognized that trade policy can be "captured" by diverse groups of interest, existing research emphasizes that this mainly occurs in the form of *protection* granted to influential import-competing industries (Krugman, Obsfeld, and Melitz (2011)). On this ground, there is no obvious reason why import-competing industries would lobby to dispose of trade protection. Second, most of the recent tariff changes occurred under the hospice of international institutions such as the General Agreement on Tariff and Trade (GATT) and more recently the World Trade Organization (WTO). Arguably, the rules of these institutions limit the ability of government officials to acquiesce to protectionist pressures (Krugman, Obsfeld, and Melitz (2011)). International institutions narrow elected officials' policy space by imposing rules and formal obligations that restrict their ability to respond to such pressures.

Note also that our matching procedure (Table 1) and the "parallel trend" tests (Table 5) guarantee that the corporate policies and the growth rates (or trends) of these policies are similar across treated and matched firms prior to the tariff rate reduction. Figures C.3 and C.4 further reveal that aggregate investment and aggregate employment are *growing* before industries experience a tariff cut. This finding indicates that large reductions of tariff rates are not concentrated in declining industries which politicians are "giving up". As an additional analysis, we follow Frésard (2010) and estimate several regressions linking tariff rate reductions to industries' (mean and median) financial choices. To be as general as possible, we use all the firms from Compustat with available data that can be matched to the tariff data. We expect financial choices to have no statistical power in predicting the dynamics of import tariff rates. Results are presented in Table C.1. Columns (1) and (2) report the results of OLS regressions of an indicator variable that identifies tariff cuts (as defined above) on

several one-year lagged financial policies, as well as year and industry fixed effects.[28] Reassuringly, we find no evidence that average and median industry financial policies can predict the occurrence of tariff rate reductions. In columns (3) and (4), we further examine whether industry financial variables can predict the dynamics of tariff changes. To do so, we regress the annual change in industry-level tariff rates on one-year lagged financial policies, year and industry fixed effects. Again, we note no systematic ability to predict trade policy. In an unreported analysis, we repeat the same tests but use two-year lags of financial policies and find similar results. Although reductions in import tariff rates are clearly not random events, our tests suggest that these events cannot be easily related to the financial policies of manufacturing firms. This finding further dispels part of the concern about the endogeneity of tariff rate reductions to the variables used in the analysis. Overall, while our identification strategy is not a "pure" controlled experiment, we believe that it takes an important step to address the problem of disentangling the causality between product market competition and corporate policies.

[28] We could estimate this specification with logit or probit, but these require additional assumption, e.g. about functional forms (which OLS does not require to be unbiased), without offering any obvious compensating advantage in our setting (see Angrist and Pischke (2009)).

Figure C.1. Tariff rates around tariff rate reductions

This figure shows the average tariff rate in event time for the sample of treated and matched industries. The sample comprises 91 treated industries that experience a tariff rate reduction between 1972 and 2005. Tariff rates are computed at the four-digit SIC industry level as duties collected at U.S. Custom divided by the Free-On-Board customs value of imports.

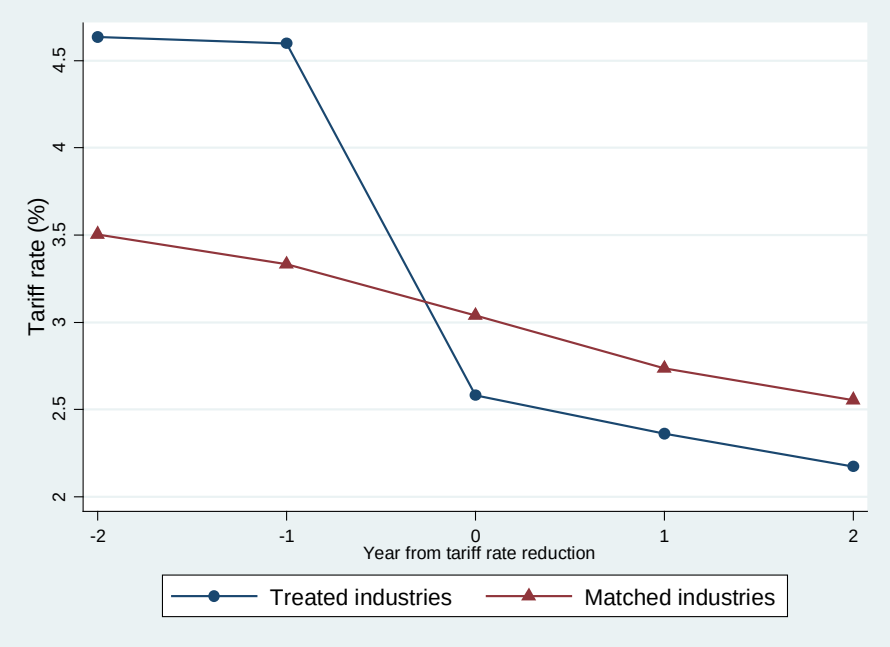

Figure C.2. Import penetration around tariff rate reductions

This figure shows the import penetration in event time for the sample of treated and matched industries. The sample comprises 91 treated industries that experience a tariff rate reduction between 1972 and 2005. Import penetration is computed at the four-digit SIC industry level as total imports divided by domestic production plus total imports minus total exports.

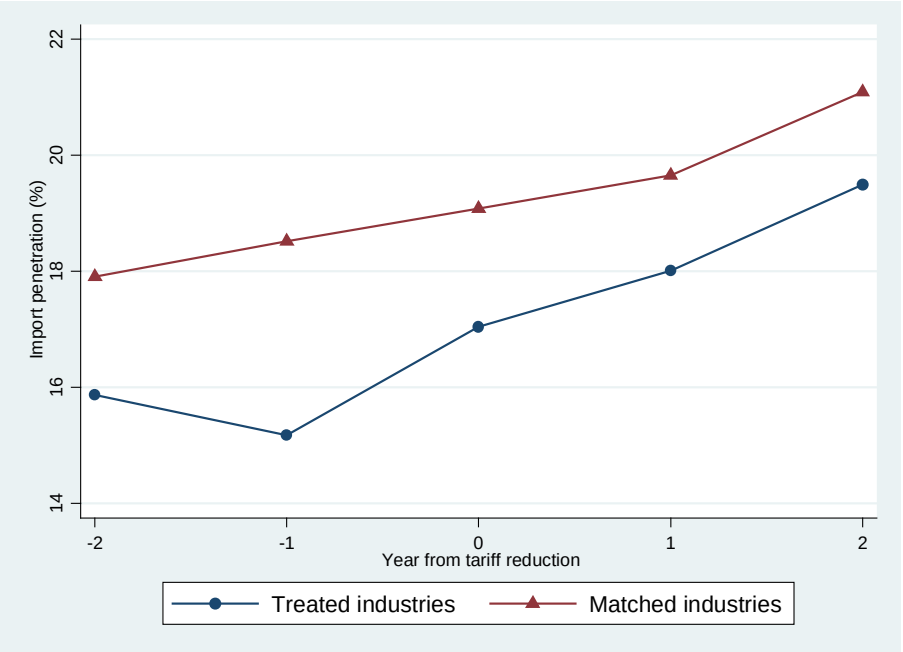

Figure C.3. Aggregate investment around tariff rate reductions

This figure shows the aggregate investment in event time for the sample of treated and matched industries. The sample comprises 91 treated industries that experience a tariff rate reduction between 1972 and 2005. Aggregate investment (in $ million) is obtained at the four-digit SIC industry level from the NBER-CES database.

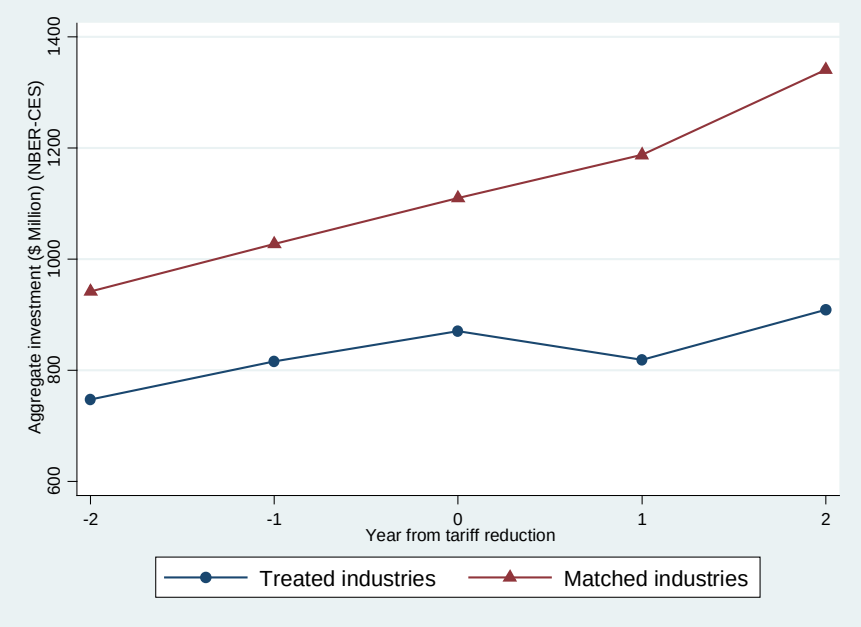

Figure C.4. Aggregate employment around tariff rate reductions

This figure shows the average tariff rate in event time for the sample of treated and matched firms. The sample comprises 91 treated industries that experience a tariff rate reduction between 1972 and 2005. Aggregate employment (in thousand employees) is obtained at the four-digit SIC industry level from the NBER-CES database.

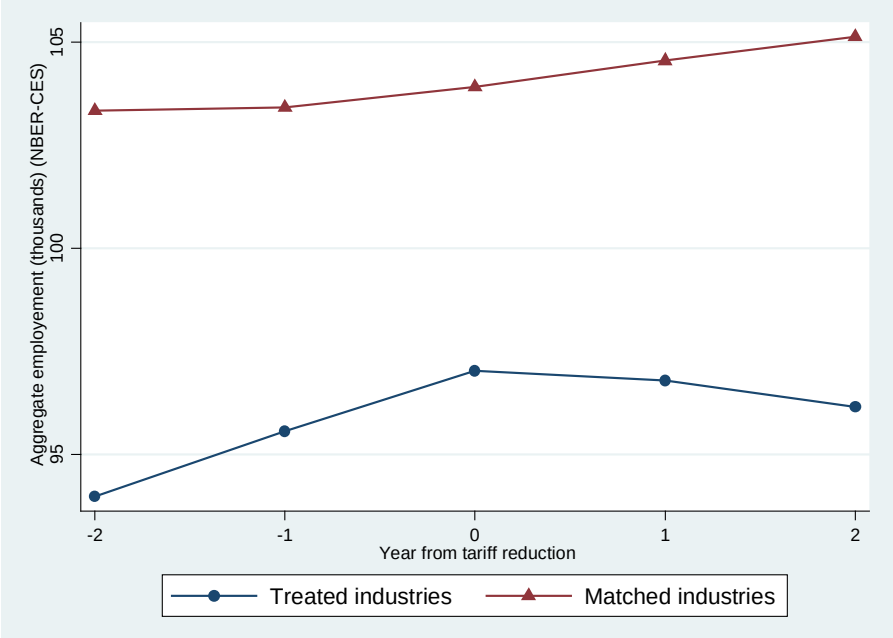

Table C.1. The effect of (lagged) firms' financial choices on trade policy

This table reports results of OLS regressions that explain variation in trade policy as a function of lagged industry (median and mean) variables. In columns 1 and 2, the dependent variable is a dummy that equals one if the industry experiences a tariff rate reduction and zero otherwise. In columns 3 and 4, the dependent variable is the annual variation in import tariff rates. The sample consists of all firms from Compustat that could be matched to the tariff data. All variables are defined in Appendix A. Estimations include year and industry fixed effects (four-digit SIC industry level). We cluster standard errors at the four-digit SIC industry level and report the corresponding *t*-statistics in parentheses below the estimates. a, b, and c indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Dependent variable			
	Tariff rate reduction		*ΔTariff rate*	
Variables	Median	Mean	Median	Mean
Ind. capital expenditures	0.145	0.265	-0.962	-0.911
	(0.76)	(1.32)	(0.66)	(0.65)
Ind. R&D	-0.090	0.234	-2.069	-4.484
	(0.30)	(1.17)	(1.15)	(2.65)[b]
Ind. acquisitions	0.178	0.168	1.265	0.766
	(0.56)	(0.71)	(1.02)	(0.58)
Ind. cash holdings	0.072	0.081	0.895	0.633
	(1.01)	(1.02)	(1.09)	(0.85)
Ind. log of total assets	-0.002	0.003	-0.062	-0.076
	(0.27)	(0.35)	(1.79)[a]	(1.84)[a]
Ind. net debt issuance	0.263	0.057	-0.033	-1.413
	(1.50)	(0.33)	(0.03)	(1.03)
Ind. net equity issuance	0.416	0.061	-1.165	-0.648
	(1.36)	(0.35)	(1.15)	(0.63)
Ind. total financing	-0.069	0.044	-0.003	0.744
	(0.49)	(0.29)	(0.00)	(0.64)
Ind. long-term leverage	-0.042	-0.008	0.358	0.399
	(0.76)	(0.13)	(1.39)	(1.11)
Ind. market-to-Book	0.004	0.002	0.138	0.008
	(0.36)	(0.22)	(1.56)	(0.25)
Ind. sales growth	-0.046	-0.019	0.308	0.013
	(1.28)	(0.61)	(0.87)	(0.06)
SP500 return	-0.085	-0.109	0.198	0.466
	(1.23)	(1.44)	(0.59)	(1.31)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
R^2	0.12	0.12	0.09	0.09
# Obs	2,431	2,431	2,431	2,431

References

Acharya, V., Almeida, H., Campello, M., 2007. Is cash negative debt? A hedging perspective on corporate policies. Journal of Financial Intermediation 16, 515-554.

Aggarwal, R., Samwick, A., 1999. The other side of the tradeoff: The impact of risk on executive compensation. Journal of Political Economy 107, 65-105.

Aghion, P., Bloom, N., Blundell, R., Griffith, R., Howitt, P., 2005. Competition and innovation: An inverted-U relationship. Quarterly Journal of Economics 120, 701-728.

Akdogu, E., MacKay, P., 2008. Investment and competition. Journal of Financial and Quantitative Analysis 43, 299-330.

Almeida, H., Campello, M., Weisbach, M., 2004. The cash flow sensitivity of cash. Journal of Finance 59, 1777-1804.

Almeida, H., Campello, M., Laranjeira, B., Weisbenner, S., 2010. Corporate debt maturity and the real effects of the 2007 credit crisis. Critical Finance Review, forthcoming.

Amore, M., Zaldokas, A., 2011. Corporate governance and international trade shocks. SSRN Working Paper.

Angrist, J., Pischke, J.-S., 2009. Mostly harmless econometrics. An empiricist's companion. Princeton University Press.

Baldwin, R., Murray, T., 1977. MNF tariff reductions and developing country trade benefits under the GSP. The Economic Journal 87, 30-46.

Banerjee, S., Dasgupta S., Kim, Y., 2008. Buyer-supplier relationships and the stakeholder theory of capital structure. Journal of Finance 63, 2507-2552.

Benmelech, E., Bergman, N., Seru, A., 2011. Financing Labor. HBS Working Paper.

Benmelech, E., Germaise, M., Moskowitz, T., 2005. Do liquidation values affect financial contracts? Evidence from commercial loan contracts and zoning regulation. Quarterly Journal of Economics 120, 1121-1154.

Bertrand, M., Mullainathan, S., 2003. Enjoying the quite life? Corporate governance and managerial preferences. Journal of Political Economy 111, 1043-1075.

Bertrand, M., 2004. From the invisible handshake to the invisible hand? How import competition changes the employment relationship. Journal of Labor Economics 22, 723-765.

Bernard, A., Jensen, B., Schott, P., 2006. Trade costs, firms, and productivity. Journal of Monetary Economics 53, 917-937.

Bloom, N., Draca M., Van Reenen J., 2011. Traded induced technical change? The impact of chinese imports on innovation, IT and productivity. LSE Working Paper.

Bloom, N., Sadun, R., Van Reenen, J., 2010. Does product market competition lead firms to decentralize? American Economic Review: Papers & Proceedings 100, 434-438.

Bolton, P., Scharfstein, D., 1990. A theory of predation based on agency problems in financial contracting. American Economic Review 80, 93-106.

Bolton, P., Chen, H., Wang, N., 2011. Market timing, investment, and risk management. SSRN Working Paper.

Brander, J., Lewis, T., 1986. Oligopoly and financial structure: The limited liability effect. American Economic Review 76, 956-970.

Campello, M., 2006. Debt financing: Does it boost or hurt firm performance in product markets? Journal of Financial Economics 82, 135-172.

Chambers, E. J., Smith, P. H., 2002. NAFTA in the new millennium. The University of California and The University of Alberta Press.

Cunat, V., Guadalupe, M., 2005. How does product market competition shape incentive contracts? Journal of the European Economic Association 3, 1058-1082.

Cunat, V., Guadalupe, M., 2009. Globalization and the provision of incentives inside the firm: The effect of foreign competition. Journal of Labor Economics 27, 179-212.

Denis, D. J., Denis, D. K., Yost, K., 2002. Global diversification, industrial diversification, and firm value. Journal of Finance 57, 1951-1979.

DeFond, M., Park, C., 1999. The Effect of Competition on CEO Turnover. Journal of Accounting and Economics 27, 35-56.

Dixit, A., 1980. The role of investment in entry-deterrence. Economic Journal 90, 95-106.

Faccio, M., 2006. Politically connected firms. American Economic Review 96, 369-386.

Fazzari, S., Hubbard, G., Petersen, B., 1988. Financing constraints and corporate investment. Brooking Papers on Economic Activity, 1, 141-206.

Feenstra, R., 1996. U.S. imports, 1972-1994: Data and concordances. Unpublished working paper. NBER.

Feenstra, R., Romalis, J., Schott, P., 2002. U.S. imports, exports, and tariff data. Unpublished working paper. NBER.

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

Gaspar, J.-M., Massa, M., 2006. Idiosyncratic volatility and product market competition. Journal of Business 79, 3125-3152.

Gilbert, R. J., Liberman, M. 1987. Investment and coordination in oligopolistic industries. Rand Journal of Economics 18, 17-33.

Giroud, X., Mueller, H., 2010a. Corporate governance, product market competition, and equity prices. Journal of Finance, forthcoming.

Giroud, X., Mueller, H., 2010b. Does corporate governance matter in competitive industries? Journal of Financial Economics 95, 312-331.

Grenadier, S., 2002. Option exercise games: An application to the equilibrium investment strategies of firms. Review of Financial Studies 15, 691-721.

Grullon, G., Michaely, R., 2007. Corporate Payout Policy and Product Market Competition. SSRN Working Paper.

Guadalupe, M., Wulf, J., 2011. The flattening firm and product market competition: The effect of trade liberalization on corporate hierarchies. American Economic Journal: Applied Economics 2, 105-127.

Hadlock, C., Pierce, J., 2010. New evidence on measuring financial constraints: Moving beyond the KZ Index. Review of Financial Studies 23, 1909-1940.

Hart, O., 1983. The market mechanism as an incentive scheme. Bell Journal of Economics 14, 366-382.

Haushalter, D., Klasa, S., Maxwell, W., 2007. The influence of product market dynamics on a firm's cash holding and hedging behavior. Journal of Financial Economics 84, 797-825.

Hoberg, G., Phillips, G., 2010. Real and financial industry booms and busts. Journal of Finance 65, 45-86.

Hoberg, G., Phillips, G., 2011. Text-based network industries and endogenous product differentiation. University of Maryland Working Paper.

Hou, K., Robinson, D., 2006. Industry concentration and average stock returns. Journal of Finance 61, 1927-1956.

Huang, S., Peyer, U., 2010. Governance adjustments, product market competition, and firm value. SSRN Working Paper.

Irvine, P., Pontiff, J., 2009. Idiosyncratic return volatility, cash flows, and product market competition. Review of Financial Studies 22, 1149-1177.

Khwaja, A. I., Mian A., 2005. Do lenders favor politically connected firms? Rent provision in an emerging financial market. Quarterly Journal of Economics 120, 1371-1411.

Leary, M., Roberts, M., 2010. Do peer firms affect corporate financial policy? SSRN Working Paper.

Lee, J. H., Swagel, P. 1997. Trade barriers and trade flows across countries and industries. The Review of Economics and Statistics 79, 372-382.

Lemmon, M., Roberts, M., 2010. The response of corporate financing and investment to changes in the supply of credit. Journal of Financial and Quantitative Analysis 45, 555-587.

Lyandres, E., 2006. Capital structure and interaction among firms in output market: Theory and evidence. Journal of Business 79, 2381-2421.

Katics, M., Petersen, B., 1994. The effect of rising import competition on market power: a panel data study of U.S. manufacturing. Journal of Industrial Economics 42, 277-286.

Kim, W., Weisbach, M., 2006. Motivations for public equity offers: An international perspective. Journal of Financial Economics 87, 281-307.

Kovenock, D., Phillips, G., 1997. Capital structure and product market behavior: An examination of plan exit and investment decisions. Review of Financial Studies 10, 767-803.

Krugman, P. R., Obsfeld, M., Melitz, M., 2010. International economics: Theory and practice. 9th Edition, Pearson Press.

MacKay, P., Phillips, G., 2005. How does industry affect firm financial structure? Review of Financial Studies 18, 1433-1466.

Matsa, D., 2010. Capital structure as a strategic variable: Evidence from collective bargaining. Journal of Finance 65, 1197-1232.

Ortiz-Molina, H., Phillips, G., 2010. Asset liquidity and the cost of capital. SSRN Working Paper.

Pugel, T.A., 1980. Foreign trade and U.S. market performance. Journal of Industrial Economics 29, 119-129.

Raith, M., 2003. Competition, risk, and managerial incentives. American Economic Review 93, 1425-1436.

Revenga, A. L., 1992. Exporting Jobs?: The Impact of Import Competition on Employment and Wages in U.S. Manufacturing. Quarterly Journal of Economics 107, 255-284.

Roberts, M., Whited, T., 2011. Endogeneity in empirical corporate finance. Handbook in the Economics of Finance 2.

Schott, P., 2010. U.S. Manufacturing exports and imports by SIC or NAICS category and partner country, 1972-2005.

Schmidt, K., 1997. Managerial incentives and product market competition. Review of Economic Studies 64, 191-213.

Shleifer, A., Vishny, R., 1992. Liquidation values and debt capacity: A market equilibrium approach. Journal of Finance 47, 1343-1366.

Simintzi, E., Vig V., Volpin, P. F., 2010. Labor and capital: Is debt a bargaining tool? SSRN Working Paper.

Spence, M. 1977. Entry, capacity, investment and oligopolistic pricing. Bell Journal of Economics 8, 534-544.

Tirole, J., 2006. The Theory of Corporate Finance. Princeton University Press.

Trefler, D., 1993. Trade liberalization and the theory of endogenous protection: An econometric study of U.S. import policy. Journal of Political Economy 101, 138-160.

Trefler, D., 2004. The long and short of the Canada-U.S. Free Trade Agreement. American Economic Review 94, 870-985.

Tybout, J., 2003. Plant- and firm-level evidence on “new” trade theories. Handbook of International Economics, Oxford.

Valta, P., 2011. Competition and the cost of debt. Journal of Financial Economics, forthcoming.

Villalonga, B., 2004. Diversification discount or premium? New evidence from the business information tracking series. Journal of Finance 59, 479-506.

Whited, T., Wu, G., 2006. Financial constraints risk. Review of Financial Studies 19, 531-559.

Xu, J., 2011. Product Market Competition and Capital Structure: Evidence from Import Penetration. Journal of Financial Economics, forthcoming.

Zingales, L., 1998. Survival of the fittest or fattest? Exit and financing in the trucking industry. Journal of Finance 53, 905-938.

Figure 1. Tariff rate reductions through time

This figure shows the number of tariff rate cuts by year for our sample firms. Tariff rates are computed at the four-digit SIC industry level as duties collected at U.S. Custom divided by the Free-On-Board custom value of imports. An industry experiences a tariff cut if the tariff rate reduction is three times larger than the average tariff rate reduction in that industry as defined in Section 3.2 in the text.

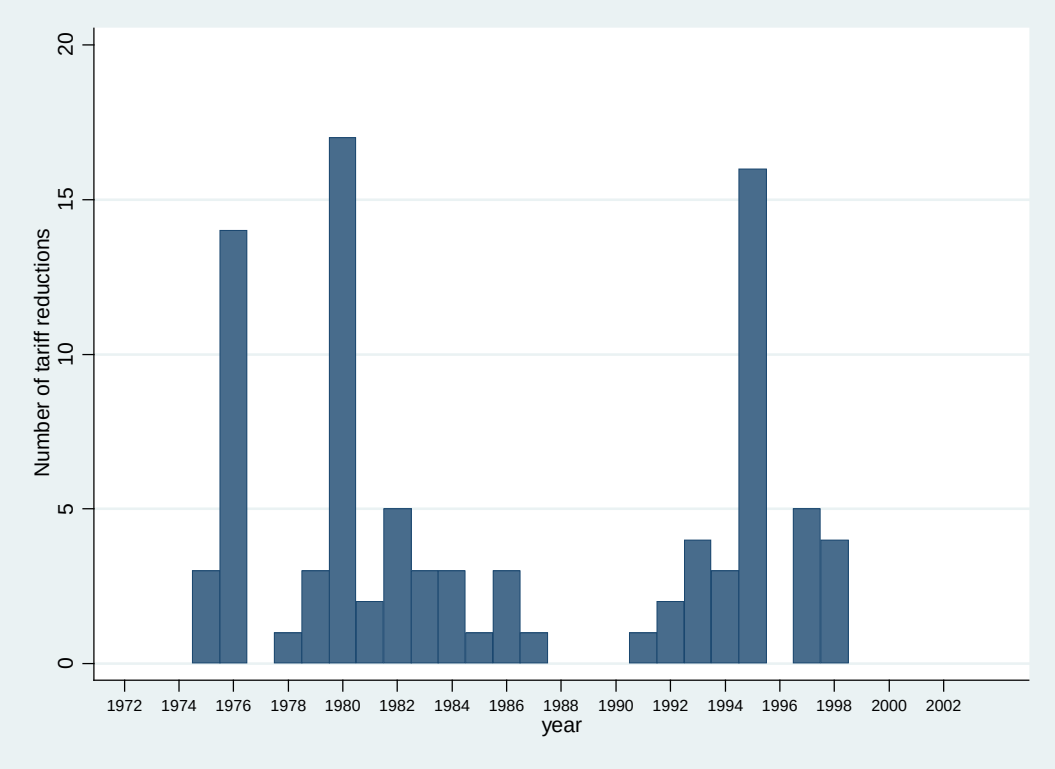

Table 1. Descriptive statistics for treated and matched firms

This table presents descriptive statistics that compare treated and matched firms. The sample comprises 1,108 treated firms that experience a significant import tariff rate reduction between 1972 and 2005, and the same number of matched firms. The firms are matched in the year *before* the tariff rate reduction by market-to-book ratio, logarithm of total assets, cash flow to total assets, long-term debt to total assets, and cash to total assets. Both groups of firms are publicly traded U.S. manufacturing firms. All variables are defined in Appendix A. The last column shows the *p*-value from a two-sample Kolmogorov-Smirnov test (*K-S* Test) for equality of distribution functions across treated and matched firms. The null hypothesis is that the distribution functions are equal. a, b, and c indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Matching variables		# Obs	Mean	25th %	Median	75th %	*K-S* Test
Market-to-Book	Treated	1,108	2.06	1.04	1.50	2.37	0.44
	Matched	1,108	1.98	1.03	1.43	2.25	
Log of total assets	Treated	1,108	4.05	2.69	3.76	5.16	0.95
	Matched	1,108	4.07	2.68	3.74	5.18	
Cash flow	Treated	1,108	-0.03	-0.02	0.05	0.09	0.23
	Matched	1,108	-0.02	0.00	0.05	0.09	
Cash holdings	Treated	1,108	0.18	0.03	0.09	0.25	0.23
	Matched	1,108	0.17	0.03	0.08	0.23	
Long-term leverage	Treated	1,108	0.14	0.01	0.10	0.22	0.86
	Matched	1,108	0.14	0.01	0.10	0.21	
Other variables		# Obs	Mean	25th %	Median	75th %	K-S Test
Capital expenditures	Treated	1,108	0.07	0.03	0.05	0.09	0.06[a]
	Matched	1,108	0.06	0.03	0.05	0.08	
R&D	Treated	1,108	0.08	0.01	0.04	0.10	0.01[c]
	Matched	1,108	0.06	0.00	0.02	0.08	
Acquisitions	Treated	1,108	0.01	0.00	0.00	0.00	0.99
	Matched	1,108	0.01	0.00	0.00	0.00	
Net PPE	Treated	1,108	0.23	0.13	0.22	0.32	0.01[c]
	Matched	1,108	0.26	0.13	0.24	0.36	
Net debt issuance	Treated	1,108	0.02	-0.02	0.00	0.04	0.01[c]
	Matched	1,108	0.01	-0.02	0.00	0.03	
Net equity issuance	Treated	1,108	0.08	0.00	0.00	0.02	0.99
	Matched	1,108	0.07	0.00	0.00	0.02	
Total Financing	Treated	1,108	0.10	-0.01	0.01	0.11	0.05[b]
	Matched	1,108	0.08	-0.01	0.01	0.09	
Short-term leverage	Treated	1,108	0.06	0.00	0.03	0.08	0.03[b]
	Matched	1,108	0.06	0.00	0.02	0.08	

Table 2. The effect of tariff rate reductions on corporate policies

This table presents the changes in corporate policies caused by reductions of import tariff rates. The sample comprises 1,108 treated firms that experience a significant import tariff rate reduction between 1972 and 2005, and the same number of matched firms. The firms are matched in the year *before* the tariff rate reduction by market-to-book ratio, logarithm of total assets, cash flow to total assets, long-term debt to total assets, and cash to total assets. Both groups of firms are publicly traded U.S. manufacturing firms. All variables are defined in Appendix A. For each policy variable, we compute the mean change from the year before the tariff reduction to the year after the tariff reduction for treated firms (average treated difference), the matched firms (average matched difference), and the difference between treated and matched firms (difference-in-differences). Panel A reports the variables related to investment, and Panel B reports the variables related to financing. We report *t*-statistics in parentheses below the estimates. a, b, and c indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Investment	Average treated difference	Average matched difference	Diff-in-diffs (treated vs. matched)
Capital expenditures	-1.10%	0.10%	-1.20%
	(6.26)[c]	(0.61)	(4.88)[c]
R&D	-0.35%	0.47%	-0.83%
	(1.50)	(1.69)[b]	(2.43)[b]
Acquisitions	-0.01%	0.40%	-0.41%
	(0.08)	(2.44)[b]	(1.70)[a]
Net PPE	-0.15%	0.49%	-0.64%
	(0.62)	(1.98)[b]	(1.94)[a]
Cash holdings	-0.08%	-1.78%	1.70%
	(0.20)	(4.09)[c]	(3.18)[c]
Total assets (log)	23.83	23.03	0.80
	(26.59)[c]	(16.35)[c]	(0.43)

Panel B: Financing	Average treated difference	Average matched difference	Diff-in-diffs (treated vs. matched)
Net debt issuance	-1.09%	1.18%	-2.27%
	(2.52)	(2.65)	(3.75)[c]
Net equity issuance	-1.02%	-2.73%	1.71%
	(1.43)	-4.17	(1.82)[a]
Total financing	-2.17%	-1.46%	-0.71%
	(2.77)	(2.05)	-0.68
Long-term leverage	-0.02%	2.27%	-2.29%
	(0.05)	(5.05)	(4.15)[c]
Short-term leverage	0.43%	0.15%	0.28%
	(1.28)	(0.42)	(0.60)

Table 3. The effect of tariff rate reductions on corporate policies by financing activity

This table presents the change in corporate policies caused by reductions of import tariff rates for subsamples based on firms' financing activity. The sample comprises 1,108 treated firms that experience a significant import tariff rate reduction between 1972 and 2005, and the same number of matched firms. The firms are matched in the year *before* the tariff rate reduction by market-to-book ratio, logarithm of total assets, cash flow to total assets, long-term debt to total assets, and cash to total assets. Both groups of firms are publicly traded U.S. manufacturing firms. All variables are defined in Appendix A. For each policy variable, we compute the difference in the mean change from one year before the tariff reduction to the year after the tariff reduction between treated and matched firms (difference-in-differences). We rank the sample firms into four groups based on whether the diff-in-diffs of net debt issuance or net equity issuance are above or below the sample median. We report *t*-statistics in parentheses below the difference-in-differences estimates. a, b, and c indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Capital expenditures

		Diff-in-Diffs of Net debt issuance	
		Below median	Above median
Diff-in-Diffs of Net equity issuance	Below median	-2.60% (6.10)[c]	0.02% (0.05)
	Above median	-1.62% (3.63)[c]	0.05% (0.08)

Panel B: R&D expenditures

		Diff-in-Diffs of Net debt issuance	
		Below median	Above median
Diff-in-Diffs of Net equity issuance	Below median	-0.40% (0.66)	-0.64% (1.28)
	Above median	-1.36% (1.78)[a]	-0.98% (1.09)

Panel C: Acquisition expenditures

		Diff-in-Diffs of Net debt issuance	
		Below median	Above median
Diff-in-Diffs of Net equity issuance	Below median	-1.71% (3.73)[c]	0.74% (1.60)
	Above median	-0.62% (1.27)	0.36% (0.66)

Panel D: Cash holdings

		Diff-in-Diffs of Net debt issuance	
		Below median	Above median
Diff-in-Diffs of Net equity issuance	Below median	1.46% (1.42)	-1.29% (1.45)
	Above median	4.35% (4.09)[c]	2.41% (1.82)[a]

Table 4. The effect of tariff rate reductions on corporate policies: The magnitude of the tariff reduction

This table presents the change in corporate policies caused by reductions of import tariff rates. The sample comprises 1,108 treated firms that experience a significant import tariff rate reduction between 1972 and 2005, and the same number of matched firms. The firms are matched in the year *before* the tariff rate reduction by market-to-book ratio, logarithm of total assets, cash flow to total assets, long-term debt to total assets, and cash to total assets. Both groups of firms are publicly traded U.S. manufacturing firms. All variables are defined in Appendix A. For each policy variable, we compute the difference in the mean change from one year before the tariff reduction to the year after the tariff reduction between treated and matched firms (difference-in-differences). We compute these difference-in-differences for different magnitudes of tariff reductions. Cut#1 is for tariff rate reductions that are larger than the average tariff rate reduction in an industry; Cut#2 is for tariff rate reductions that are larger than two times the average tariff rate reduction in an industry, etc. (see Section 4.2). We also report the mean change in tariff rates and import penetration by tariff cut. We report *t*-statistics in parentheses below the difference-in-differences estimates. a, b, and c indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Difference-in-differences (Treated vs. Matched)				
	Cut#1	*Cut#2*	*Cut#3*	*Cut#4*	*Cut#5*
Mean *Δ Tariff*	-1.42%	-1.81%	-2.23%	-2.93%	-3.42%
Mean *Δ Import Penetration*	1.23%	2.22%	2.83%	3.30%	3.27%
# Obs	2,221	1,762	1,108	615	445
Capital expenditures	-0.35%	0.05%	-1.20%	-1.03%	-1.22%
	(2.31)[b]	(0.29)	(4.88)[c]	(2.88)[c]	(2.89)[c]
R&D	0.16%	-0.70%	-0.83%	-1.08%	-1.00%
	(1.01)	(3.15)[c]	(2.43)[b]	(2.42)[b]	(1.76)[a]
Acquisitions	-0.12%	-0.15%	-0.41%	-0.27%	-0.44%
	(0.79)	(0.79)	(1.70)[a]	(0.89)	(1.30)
Cash holdings	-0.09%	0.65%	1.70%	2.38%	2.86%
	(0.29)	(1.78)[a]	(3.18)[c]	(3.55)[c]	(3.50)[c]
Net debt issuance	-0.41%	-1.52%	-2.27%	-2.42%	-2.73%
	(1.04)	(3.20)[c]	(3.75)[c]	(3.17)[c]	(3.04)[c]
Net equity issuance	-0.27%	0.56%	1.71%	1.78%	1.80%
	(0.56)	(0.89)	(1.82)[a]	(1.48)	(1.22)
Total financing	-0.61%	-1.06%	-0.71%	-0.78%	-1.20%
	(1.07)	(1.40)	(0.68)	(0.58)	(0.74)
Long-term leverage	-0.54%	-1.60%	-2.29%	-2.13%	-2.16%
	(1.29)	(4.01)[c]	(4.15)[c]	(3.15)[c]	(2.52)[b]

Table 5. Trends in corporate policies for treated and matched firms: Mean and median comparisons

This table reports the mean and median of the average growth rates for the corporate policy variables. The sample comprises 1,108 treated firms that experience a significant import tariff rate reduction between 1972 and 2005, and the same number of matched firms. The firms are matched in the year *before* the tariff rate reduction by market-to-book ratio, logarithm of total assets, cash flow to total assets, long-term debt to total assets, and cash to total assets. Both groups of firms are publicly traded U.S. manufacturing firms. All variables are defined in Appendix A. We compute the growth rate of each variable one and two years prior to the tariff reduction by scaling the change in the variables by lagged total assets. Next, we calculate the average growth rate for each variable during the two years preceding the tariff reduction. The table also reports *p*-values associated with test statistics for differences in means (standard *t*-test) and in medians (Wilcoxon signed-rank test) across subgroups. a, b, and c indicate statistical significance at the 10%, 5%, and 1% level, respectively.

		Avg. Growth	*t*-test (*p*-value)	Med. Growth	Signrank (*p*-value)
Capital expenditures	Treated	1.71%	0.15	0.70%	0.52
	Matched	1.41%		0.74%	
R&D	Treated	1.67%	0.01[c]	0.32%	0.00[c]
	Matched	1.14%		0.07%	
Acquisitions	Treated	0.72%	0.97	0.00%	0.44
	Matched	0.73%		0.00%	
Cash holdings	Treated	6.43%	0.50	0.41%	0.71
	Matched	7.14%		0.72%	
Net debt issuance	Treated	1.85%	0.06[b]	0.22%	0.10[b]
	Matched	1.03%		0.08%	
Net equity issuance	Treated	5.35%	0.76	0.00%	0.43
	Matched	5.70%		0.02%	
Total financing	Treated	10.60%	0.43	0.69%	0.59
	Matched	8.82%		0.61%	
Long-term leverage	Treated	2.73%	0.18	0.00%	0.12
	Matched	2.16%		0.00%	

Table 6. The effect of tariff rate reductions on corporate policies: Placebo tests

This table presents the difference-in-differences estimates for the corporate policies using placebo tests. The sample comprises 1,108 treated firms and the same number of matched firms. The sample period is from 1972 and 2005. The firms are matched *three* or *four* years before the actual tariff rate reduction by market-to-book ratio, logarithm of total assets, cash flow to total assets, long-term debt to total assets, and cash to total assets. Both groups of firms are publicly traded U.S. manufacturing firms. All variables are defined in Appendix A. We report *t*-statistics in parentheses below the difference-in-differences estimates. a, b, and c indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Year of match prior to actual tariff reduction	
	Year -3	**Year -4**
	Diff-in-diffs (treated vs. matched)	Diff-in-diffs (treated vs. matched)
Capital expenditures	-0.07% (0.27)	0.03% (0.10)
R&D	0.61% (1.72)[b]	-0.35% (1.02)
Acquisitions	-0.23% (0.84)	0.10% (0.38)
Cash holdings	0.06% (0.10)	-0.30% (0.50)
Net debt issuance	0.87% (1.35)	-1.36% (1.84)[b]
Net equity issuance	-0.49% (0.50)	0.56% (0.65)
Total financing	0.18% (0.16)	-0.72% (0.73)
Long-term leverage	-0.64% (1.12)	-0.42% (0.74)

Table 7. The effect of tariff rate reductions on corporate policies: Propensity score matching

This table presents the change in corporate policies caused by reductions of import tariff rates. The sample comprises 1,108 treated firms that experience a significant import tariff rate reduction between 1972 and 2005, and the same number of matched firms. The firms are matched in the year *before* the tariff rate reduction by market-to-book ratio, logarithm of total assets, cash flow to total assets, long-term debt to total assets, and cash to total assets. Both groups of firms are publicly traded U.S. manufacturing firms. All variables are defined in Appendix A. For each policy variable, we compute the mean change from the year before the tariff cut to the year after the tariff reduction for treated firms (average treated difference), the matched firms (average matched difference), and the difference between treated and matched firms (difference-in-differences). We report standard errors in parentheses below the estimates. a, b, and c indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Average treated difference	Average matched difference	Diff-in-diffs (treated vs. matched)
Capital expenditures	-1.09% (6.26)[c]	-0.54% (3.25)[c]	-0.55% (2.31)[b]
R&D	-0.35% (1.50)	0.56% (1.94)[a]	-0.91% (2.38)[b]
Acquisitions	-0.01% (0.08)	0.36% (2.12)[b]	-0.38% (1.50)
Cash holdings	-0.08% (0.20)	-1.29% (2.81)[c]	1.21% (2.03)[b]
Net debt issuance	-1.08% (2.52)[b]	1.25% (2.66)[c]	-2.34% (3.70)[c]
Net equity issuance	-1.01% (1.43)	-2.56% (4.14)[c]	1.55% (1.67)[a]
Total financing	-2.17% (2.77)[c]	-1.03% (1.38)	-1.14% (1.07)
Long-term leverage	-0.02% (0.06)	1.57% (3.81)[c]	-1.60% (2.84)[c]

Table 8. The effect of tariff rate reductions on corporate policies: Regression analysis

This table shows coefficient estimates of OLS regressions which examine the effect of large tariff rate reductions on corporate policies. In each row, the dependent variable corresponds to one corporate policy. The sample comprises treatment and matched firm observations one year before and one year after the tariff rate reduction between 1972 and 2005. The firms are matched in the year *before* the tariff rate reduction by market-to-book ratio, logarithm of total assets, cash flow to total assets, long-term debt to total assets, and cash to total assets. Both groups of firms are publicly traded U.S. manufacturing firms. All variables are defined in Appendix A. *Treated* is a dummy variable equal to one if a firm experiences a tariff shock, and zero otherwise. *After* is a dummy variable equal to one if the observation is after the tariff shock. *Treated* × *After* is the interaction term between the dummies *Treated* and *After*. The unreported control variables are the market-to-book ratio, logarithm of total assets, and cash flow to total assets. We report *t*-statistics adjusted for within firm clustering in parentheses below the estimates. a, b, and c indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Treat	After	Treat × After	controls	obs.	R^2
Capital expenditures	0.004	0.000	-0.013	Yes	4,414	0.04
	(1.55)	(0.15)	(4.68)[c]			
R&D	0.016	0.000	-0.004	Yes	4,414	0.43
	(4.41)[c]	(0.03)	(0.82)			
Acquisitions	0.002	0.003	-0.004	Yes	4,414	0.02
	(1.22)	(2.04)[b]	(1.68)[a]			
Cash holdings	0.004	-0.020	0.017	Yes	4,414	0.15
	(0.40)	(3.22)[c]	(2.24)[b]			
Net debt issuance	0.007	0.009	-0.021	Yes	4,414	0.03
	(1.61)	(2.03)[b]	(3.36)[c]			
Net equity issuance	0.000	-0.032	0.019	Yes	4,414	0.28
	(0.05)	(4.16)[c]	(1.78)[a]			
Total financing	0.009	-0.022	-0.004	Yes	4,414	0.29
	(1.02)	(2.73)[c]	(0.35)			
Long-term leverage	0.002	0.021	-0.021	Yes	4,414	0.05
	(0.32)	(3.88)[c]	(3.23)[c]			

Table 9. The effect of tariff rate reductions on corporate policies: Firms' competitive exposure

This table presents the difference-in-differences estimates for subsamples based on firm and industry characteristics. The sample comprises 1,108 treated firms that experience a significant import tariff rate reduction between 1972 and 2005, and the same number of matched firms. The firms are matched in the year *before* the tariff rate reduction by market-to-book ratio, logarithm of total assets, cash flow to total assets, long-term debt to total assets, and cash to total assets. Both groups of firms are publicly traded U.S. manufacturing firms. All variables are defined in Appendix A. We sort firms into terciles (groups) based on market share, export activity (positive or no export), diversification (more than one business segment), industry concentration, and number of firms in the industry one year before the tariff reduction occurs. We report *t*-statistics in parentheses below the difference-in-differences estimates. $t(\Delta)$ indicates whether the values from tercile 1 and tercile 3 are significantly different from each other. a, b, and c indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Market share			**Export orientation**			**Diversification**			**HHI**			**# of firms**		
	Low	High	$t(\Delta)$	No export	Export	$t(\Delta)$	Focused	Diversified	$t(\Delta)$	Low	High	$t(\Delta)$	Low	High	$t(\Delta)$
Capital expenditures	-2.24%	0.03%	3.85[c]	-1.53%	-0.50%	1.68[a]	-1.47%	-0.81%	1.16	-1.53%	-0.59%	1.61	-0.30%	-2.62%	3.68[c]
	(4.60)[c]	(0.09)		(5.21)[c]	(0.94)		(4.87)[c]	(1.67)[a]		(3.81)[c]	(1.43)		(0.72)	(5.60)[c]	
R&D	-2.34%	0.03%	2.45[b]	-0.87%	-0.94%	0.09	-0.94%	-0.78%	0.25	-1.83%	0.20%	2.35[b]	-0.10%	-2.09%	2.01[b]
	(2.44)[b]	(0.27)		(1.84)[a]	(2.35)[b]		(1.84)[a]	(2.17)[b]		(2.17)[b]	(1.07)		(0.44)	(2.19)[b]	
Acquisitions	-0.47%	-0.29%	0.31	-0.54%	0.07%	1.04	-0.46%	-0.21%	0.44	-0.76%	0.07%	1.32	0.04%	-1.42%	2.45[b]
	(1.22)	(0.75)		(1.82)[a]	(0.13)		(1.50)	(0.46)		(1.59)	(0.18)		(0.11)	(3.11)[c]	
Cash holdings	4.92%	-0.83%	4.15[c]	2.08%	0.98%	0.98	2.54%	0.19%	2.17[b]	3.37%	0.19%	2.48[b]	-0.52%	5.90%	4.53[c]
	(3.84)[c]	(1.58)		(2.92)[c]	(1.12)		(3.34)[c]	(0.24)		(2.99)[c]	(0.32)		(0.79)	(4.70)[c]	
Net debt issuance	-3.50%	-1.11%	1.66[a]	-3.20%	0.31%	2.55[b]	-3.16%	-0.41%	2.96[c]	-2.06%	-2.43%	0.25	-1.03%	-4.23%	2.02[b]
	(2.92)[c]	(1.38)		(4.27)[c]	(0.27)		(4.06)[c]	(0.38)		(1.89)[a]	(2.45)[b]		(1.06)	(3.40)[c]	
Net equity issuance	4.54%	-0.01%	1.82[a]	1.88%	2.09%	0.12	2.46%	0.79%	0.94	3.19%	0.75%	1.06	-0.74%	5.06%	2.37[b]
	(1.85)[a]	(0.02)		(1.44)	(1.89)[a]		(1.78)[a]	(0.72)		(1.52)	(0.79)		(0.79)	(2.24)[b]	
Total financing	0.39%	-0.86%	0.45	-1.52%	2.45%	1.89[a]	-0.96%	0.52%	0.70	1.17%	-1.64%	1.10	-1.74%	0.01%	0.63
	(0.15)	(1.08)		(1.09)	(1.53)		(0.65)	(0.34)		(0.52)	(1.37)		(1.44)	(0.01)	
Long-term leverage	-4.41%	-1.60%	2.05[b]	-3.14%	-0.50%	2.26[b]	-3.31%	-0.63%	2.32[b]	-2.60%	-1.01%	1.19	-0.89%	-4.39%	2.33[b]
	(3.74)[c]	(2.35)[b]		(4.30)[c]	(0.56)		(4.32)[c]	(0.74)		(2.66)[c]	(1.12)		(0.96)	(3.75)[c]	

Table 10. The effect of tariff rate reductions on corporate policies: Financing risk

This table presents the difference-in-differences estimates for subsamples based on firm and industry characteristics. The sample comprises 1,108 treated firms that experience a significant import tariff rate reduction between 1972 and 2005, and the same number of matched firms. The firms are matched in the year *before* the tariff rate reduction by market-to-book ratio, logarithm of total assets, cash flow to total assets, long-term debt to total assets, and cash to total assets. Both groups of firms are publicly traded U.S. manufacturing firms. All variables are defined in Appendix A. We sort firms into terciles (groups) based on firm's size, credit rating (no rating vs. rating), payout ratio, Whited and Wu (2006) financing constraints index, and market-to-book ratio one year before the tariff reduction occurs. We report *t*-statistics in parentheses below the difference-in-differences estimates. $t(\Delta)$ indicates whether the values from Tercile 1 and Tercile 3 are significantly different from each other. a, b, and c indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Size			**Credit rating**			**Payout ratio**			**WW-Index**			**M-B ratio**		
	Low	High	$t(\Delta)$	No rating	rating	$t(\Delta)$	Low	High	$t(\Delta)$	Low	High	$t(\Delta)$	Low	High	$t(\Delta)$
Capital expenditures	-1.67%	-0.73%	1.56	-1.76%	0.32%	2.58[c]	-1.43%	-0.45%	1.89[a]	-0.43%	-1.71%	2.10[b]	-0.06%	-1.87%	2.98[c]
	(3.35)[c]	(2.19)[b]		(5.04)[c]	(0.44)		(3.70)[c]	(1.31)		(1.27)	(3.39)[c]		(0.14)	(4.27)[c]	
R&D	-1.10%	-0.39%	0.83	-1.28%	-1.03%	0.26	-1.36%	-0.77%	0.77	0.01%	-1.60%	1.84[a]	0.16%	-1.88%	2.19[b]
	(1.38)	(1.46)		(1.95)[a]	(1.63)		(2.18)[b]	(1.86)[a]		(0.11)	(1.84)[a]		(0.92)	(2.05)[b]	
Acquisitions	0.00%	-1.17%	1.96[b]	-0.68%	-0.82%	0.12	-0.01%	-0.56%	1.04	-0.89%	-0.03%	1.44	0.11%	-0.65%	1.34
	(0.01)	(2.41)[b]		(1.56)	(0.84)		(0.03)	(1.40)		(1.93)[a]	(0.09)		(0.29)	(1.55)	
Cash holdings	1.91%	1.17%	0.59	3.20%	0.85%	1.44	3.16%	0.00%	2.71[c]	0.61%	3.63%	2.29[b]	-0.64%	3.64%	3.11[c]
	(1.73)[a]	(1.98)[b]		(3.17)[c]	(0.72)		(3.45)[c]	(0.01)		(1.18)	(3.00)[c]		(1.11)	(2.91)[c]	
Net debt issuance	-1.91%	-3.99%	1.39	-3.10%	-0.62%	1.04	-1.73%	-2.88%	0.87	-3.28%	-2.83%	0.30	0.17%	-4.05%	2.96[c]
	(1.66)[a]	(4.27)[c]		(3.07)[c]	(0.19)		(1.80)[a]	(3.15)[c]		(3.92)[c]	(2.30)[b]		(0.18)	(3.79)[c]	
Net equity issuance	4.43%	0.97%	1.54	3.41%	1.37%	0.98	3.42%	0.83%	1.28	0.53%	3.97%	1.39	-0.20%	3.41%	1.44
	(2.08)[b]	(1.34)		(2.16)[b]	(1.03)		(2.00)[b]	(0.77)		(0.91)	(1.66)[a]		(0.24)	(1.44)	
Total financing	2.15%	-3.15%	2.09[b]	0.33%	0.51%	0.05	1.26%	-2.03%	1.46	-2.79%	0.73%	1.29	0.02%	-0.83%	0.31
	(0.95)	(2.66)[c]		(0.19)	(0.21)		(0.68)	(1.55)		(2.60)[c]	(0.29)		(0.02)	(0.33)	
Long-term leverage	-2.76%	-3.13%	0.26	-3.43%	-0.01%	1.93[a]	-3.63%	-0.70%	2.44[b]	-1.80%	-4.02%	1.56	-0.48%	-3.27%	2.11[b]
	(2.37)[b]	(2.79)[c]		(3.54)[c]	(0.01)		(3.96)[c]	(0.92)		(2.34)[b]	(3.37)[c]		(0.67)	(2.98)[c]	

Table 11. The effect of tariff rate reductions on corporate policies: Agency conflicts

This table presents the difference-in-differences estimates for subsamples based on institutional ownership (internal corporate governance The sample comprises 1,108 treated firms that experience a significant import tariff rate reduction between 1972 and 2005, and the same number of matched firms. The firms are matched in the year *before* the tariff rate reduction by market-to-book ratio, logarithm of total assets, cash flow to total assets, long-term debt to total assets, and cash to total assets. Both groups of firms are publicly traded U.S. manufacturing firms. All variables are defined in Appendix A. We sort firms into terciles based on the number of institutional investors and the proportion of common shares held by institutional investors one year before the tariff reduction occurs. We report *t*-statistics in parentheses below the difference-in-differences estimates. $t(\Delta)$ indicates whether the values from low and high terciles are significantly different from each other. a, b, and c indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	# Institutional Investors			**Prop. held by inst. investors**		
	Low	High	$t(\Delta)$	Low	High	$t(\Delta)$
Capital expenditures	-1.33%	-1.05%	0.35	-1.26%	-1.61%	0.44
	(2.08)[b]	(2.33)[b]		(2.01)[b]	(3.41)[c]	
R&D	-0.26%	-1.00%	0.74	-0.28%	-0.82%	0.55
	(0.35)	(1.56)		(0.37)	(1.40)	
Acquisitions	0.57%	-0.93%	1.75[a]	-0.01%	-1.28%	1.47
	(1.03)	(1.42)		(0.01)	(1.94)[a]	
Cash holdings	0.08%	1.89%	1.14	1.40%	2.11%	0.40
	(0.07)	(1.74)		(1.06)	(1.86)[a]	
Net debt issuance	-1.13%	-2.74%	0.90	-3.40%	-3.91%	0.25
	(0.87)	(2.21)[b]		(2.28)[b]	(2.94)[c]	
Net equity issuance	1.71%	1.03%	0.26	1.73%	-0.06%	0.62
	(0.88)	(0.62)		(0.72)	(0.03)	
Total financing	0.65%	-1.61%	0.81	-1.71%	-3.78%	0.66
	(0.30)	(0.90)		(0.66)	(2.16)[b]	
Long-term leverage	-2.11%	-3.28%	0.71	-3.87%	-2.88%	0.54
	(1.70)[a]	(3.13)[c]		(2.71)[c]	(2.57)[b]	

Table 12. The effect of tariff rate reductions on corporate performance

This table presents the changes in corporate outcomes caused by reductions of import tariff rates. The sample comprises 1,108 treatment firms that experience a significant import tariff rate reduction between 1972 and 2005, and the same number of matched firms The firms are matched in the year *before* the tariff rate reduction by market-to-book ratio, logarithm of total assets, cash flow to total assets, long-term debt to total assets, and cash to total assets. Both groups of firms are publicly traded U.S. manufacturing firms. Profit margin is operating income before depreciation divided by sales; ROE is net income divided by shareholders' equity; Sales growth is the change annual sales; Employment is number of employees divided by total assets. All variables are defined in Appendix A. For each performance variable, we compute the mean change from the year (three-year average) before the tariff rate reduction to the year (three-year average) after the tariff rate reduction for treated firms (average treated difference), the matched firms (average matched difference), and the difference between treated and matched firms (difference-in-differences). We report *t*-statistics in parentheses below the estimates. a, b, and c indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: -1 to +1

	Average treated difference	Average matched difference	Diff-in-diffs (treated vs. matched)
Profit margin	-0.01%	3.88%	-4.02%
	(0.04)	(1.21)	(0.77)
ROE	-2.43%	-3.60%	1.16%
	(0.80)	(1.16)	(0.29)
Sales growth	-7.35%	-5.74%	-1.66%
	(4.22)[c]	(3.61)[c]	(0.75)
Employment	-0.24%	-0.18%	-0.06%
	(12.81)[c]	(9.99)[c]	(2.32)[b]

Panel B: three-year averages

	Average treated difference	Average matched difference	Diff-in-diffs (treated vs. matched)
Profit margin	-4.32%	8.34%	-12.65%
	(1.02)	(1.86)[b]	(2.02)[b]
ROE	-5.53%	0.24%	-5.78%
	(2.46)[b]	(0.10)	(1.81)[a]
Sales growth	-6.88%	-3.46%	-3.42%
	(6.33)[c]	(2.97)[c]	(2.21)[b]
Employment	-0.53%	-0.45%	-0.08%
	(18.08)[c]	(15.91)[c]	(2.25)[b]