

Competition, Board Independence and Governance Regulation: Evidence from a quasi-natural experiment

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Abstract

Using industry-specific exogenous changes in product market competition, I test whether firms optimally respond to changes in the demand for board independence. I find that firms decrease their level of board independence by 5.52 percentage points in response to an increase in product market competition. Moreover, by exploiting the 2003 NYSE and NASDAQ rulings, I show that constraint on firm's ability to adjust its board structure in response to changes in competition has negative consequences on its performance, suggesting that this decrease in board independence is in the interest of shareholders. Firms constrained by the regulation experience 6.98 percentage points lower return on assets (ROA) compared to unconstrained firms. By showing that regulation may actually harm some firms, the analysis sheds light on the costs of "one size fits all" governance regulations.

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1 Introduction

A salient concern in the corporate governance literature is the impact of boards on performance. However, answers to some of the first order questions remain contested. Does board independence matter for firm performance?² Are board structures reflective of shareholder interests³ or are they a result of CEO entrenchment?⁴ Is regulating board composition value enhancing?⁵ Even in the absence of consensus on the answers to these questions, since early 2000s, activist institutional investors and regulators have pressed for greater board independence, under the assumption that independent directors are better monitors of managers. For instance, the Sarbanes-Oxley Act of 2002 introduced independence requirements and the rules implemented by Securities and Exchange Commission (SEC), National Association of Securities Dealers (NASD) and New York Stock Exchange (NYSE) in 2003 mandated boards to have a majority of independent directors. If firms choose their board structures to maximize firm value or if greater board independence is not always beneficial, such “one size fits all” regulations may have negative consequences.

In this paper, I shed light on these fundamental questions by making use of an exogenous change in product market competition which alters the competitive landscape of the firm. Product market competition arguably serves as a significant governance mechanism in disciplining managers.⁶ Therefore, firms may offset the increased monitoring due to an increase in competition by decreasing internal monitoring such as board independence. I find that when firms are allowed to adjust their board structure, firms reduce their board independence in response to an increase in competition.

However, is this reduction in board independence really in the interest of shareholders? If the governance structures are captured by managers, this decrease in board independence might not be reflective of reduced monitoring needs, but rather the result of managers opting for lower monitoring to indulge in unethical behavior or to enjoy quiet life.⁷ To test whether this decrease in board independence is indeed in the interest of shareholders, I analyze a setting in which some firms are constrained in their ability to reduce their

²There seems to be a lack of consistency in the empirical findings for the effect of board independence on firm value. Some studies have found positive associations (Rosenstein and Wyatt, 1990; Krivogorsky, 2006; Hossain et al., 2001; Black et al., 2006) while some found negative or non significant effect (Hermalin and Weisbach, 1991; Agrawal and Knoeber, 1996; Dalton et al., 1998; Bhagat and Black, 2001; Adjaoud et al., 2007; Pham et al., 2011).

³See, for instance, Demsetz and Lehn (1985); Hermalin and Weisbach (1998); Raheja (2005); Harris and Raviv (2008).

⁴See, for instance, Bebchuk and Cohen (2005); Bebchuk et al. (2008).

⁵While some studies find an overall positive effect of governance regulations on firm value (Chhaochharia and Grinstein, 2007), others debate their efficacy (Romano, 2004; Coles et al., 2008; Duchin et al., 2010; Ahern and Dittmar, 2012).

⁶(Alchian, 1950; Stigler, 1958; Fama, 1980; Hart, 1983).

⁷Shleifer (2004) highlights the dark side of competition where due to increased competition, managers may feel the pressure to enhance short term performance. For instance, they may manipulate the earnings to influence the stock prices (Datta et al. (2013) or indulge in tax evasion (Cai and Liu, 2009).

board independence in response to a change in competition. If this reduction in board independence is due to decreased monitoring needs by the firm, then a restriction in the ability of the firms to determine the level of monitoring given their environmental setting may reflect negatively in firm profitability. I find that constrained firms fare worse in terms of firms performance than unconstrained firms when faced with an adverse shock to competition.

To analyze the effect of product market competition on board independence, I exploit a quasi-natural experiment in the form of large tariff reductions as an exogenous increase in the product market competition. These tariff reductions occurred between 1972 - 2005 in the U.S. manufacturing sector (Feenstra, 1996; Feenstra et al., 2002; Schott, 2010). Using imports data, I extend this dataset and identify tariff reductions for the years 2006-2015. I match this data with board data for the sample period 1980-2015. To estimate the effect of increased competition on board independence, I use a difference-in-difference approach with firm, year and 2-digit SIC-year fixed effects. Thus, for my identification, I compare changes in board independence of firms belonging to the industry that received tariff reduction (treated firms) to the changes in board independence of the firms that did not receive tariff reduction (control firms) in the same 2-digit SIC. I find that firms react to competition by decreasing board independence. In particular, a large tariff reduction event leads to a 2.9 percentage points decrease in the board independence in firms affected by the event relative to unaffected firms in the same 2-digit SIC. These results show the average effect of competition on board independence over three decades.

However, in response to corporate scandals and other corporate governance failures, various regulations were passed in early 2000s which were aimed at increasing board independence. Hence, they effectively set up a lower bound that may limit the reduction in board independence of the firms in response to increased competition. In order to abstract from these confounding effects, I carry out the analysis for the relevant sample i.e. for the years prior to 2002. I obtain a stronger negative effect of 5.52 percentage points decrease in board independence for this sample period. This effect reflects a 12% decrease in board independence for a firm with average board independence. These results suggest the importance of boards as firms adjust their board composition in response to exogenous variation in the demand for board independence.

A decrease in proportion of board independence could be due to simply firing (not re-electing) the independent directors, or hiring of non-independent directors or due to replacing the independent directors with non-independent directors. I analyze the change

in board composition to show that the decrease in board independence is partly due to a decrease in the number of independent directors and partly due to an increase in the non-independent i.e. employee and linked directors. These results are consistent with the notion that in light of a significant increase in product market competition, complex and strategic decisions need to be made on how to respond to the new competitive environment. Hence, increase in competition may not only render the monitoring role of the directors less relevant but may also enhance the need of an insider in the board for their superior advising capabilities.⁸ These results support the view that firms trade off the strengths and weaknesses of inside and outside directors in advising and monitoring so as to maximize shareholder value.

I provide numerous tests in support of the validity of results. First, I assess the evolution of board independence before and after the tariff reduction event to show evidence in favor of parallel trends assumption underlying the difference-in-differences approach. Second, to show that the treatment and control firms do not systematically differ along any important dimension, I show that the firms that got tariff reduction were very similar in levels as well as trends in firm characteristics, including board independence, prior to the tariff reduction. Third, I show that average board independence of the industry does not predict tariff reduction events. I also provide evidence that other average firm or board characteristics at industry level do not predict tariff reductions either.

Furthermore, I show that firms' reactions to competition depends on the level of exposure to competition. A stand-alone firm which operates in a single product market may (focused) be exposed to intensified pressure from foreign competitors much more than a highly diversified firm which operates in numerous product markets. Similarly, firms that sell a large fraction of their production abroad (exporting firms) may be less affected by the increased pressure from foreign rivals. I find that the effect is mainly driven by focused and non-exporting firms.

However, is this reduction in board independence really in the interest of shareholders? If the governance structures are captured by managers, this decrease in board independence might not be reflective of reduced monitoring needs, but rather the result of managers opting for lower monitoring to indulge in unethical behavior or enjoy quiet life. To shed light on the motivation behind this decrease in boards independence, I analyze a setting in which some firms are unable to reduce their board independence in response to a change

⁸See, for instance, [Baysinger et al. \(1991\)](#); [Hermalin and Weisbach \(1991\)](#); [Bhagat and Black \(2001\)](#); [Coles et al. \(2008\)](#); [Faleye et al. \(2011\)](#).

in competition due to regulatory restrictions. Specifically, I utilize the listing requirements by the NYSE and NASDAQ approved by the SEC in November 2003, which required majority of the board to be composed of independent directors. In conjunction with the exogenous shock to competition, these requirements pose constraints on some firms, but not all, in reducing board independence.⁹ If firms were structuring the boards in the interest of shareholders, constrained firms would end up with suboptimal board and hence lower firm performance.

I analyze how a change in competition affects constrained firms differently from unconstrained firms. I define my group of “constrained” firms as firms with lower than 60% board independence at the time they received a tariff reduction.¹⁰ Since firms were constrained only after the law was passed (2003), I carry out the diff-in-diff analysis for years 2003 onwards. I find that tariff reduction affects return on assets (ROA) of constrained firms significantly negatively (-0.065) compared to unconstrained firms. This effect is economically large as it corresponds to more than one-third standard deviations decrease in ROA.

However, being constrained is dependent on firm’s board independence level at a specific point in time. While I show that the two groups (constrained and unconstrained) do not differ systematically in observables, board independence is still being endogenously determined by the firms. Therefore, we may be concerned that the very fact that these groups have different levels of board independence indicates that these two group are systematically different from each other. However, what is pertinent for identification is that the two groups do not differ in their response to competition i.e. the change in competition affects constrained and unconstrained¹¹ firms in the same way even in the absence of law. Triple differences (DiDiD) analysis allows me to address this potential concern.

DiDiD not only allows me to capture the effect of this inability to freely reduce board independence on firm performance, but also allows for the effect of competition on the

⁹ For example, consider two firms listed in NYSE; one with 55% of its board as independent while another having board independence of 85%. Both firms are in compliance with the regulations imposed by the exchange. Now suppose there is a significant tariff reduction increasing the product market competition for both firms. Results from the first part show that firms would want to decrease board independence in response to this change. However, one of the firms (with 55% board independence) is constrained compared to the other (with 85%) in its ability to reduce independence due to the listing requirements by NYSE and NASDAQ.

¹⁰The results are robust to alternate definitions of constrained, i.e. using both stricter (55%) as well as lenient (65%) thresholds of board independence.

¹¹note that firms were not really constrained before the law. The terms constrained and unconstrained here are being used to refer to firms with certain level of board independence i.e. below and above 60% respectively.

profitability of these two distinct groups in the absence of being constrained to be different.¹² The results show that change in competition affects firm profitability of constrained firms significantly negatively compared to unconstrained firms post law. In particular, being constrained results in 0.0698 lower return on assets (ROA) compared to unconstrained firm which correspond to a quarter of a standard deviations decrease in ROA for a firm with average ROA.

I provide numerous tests in support of the validity of the DiDiD. First, I show that the constrained and unconstrained firms do not systematically differ along important observables. Second, I show that the evolution of board independence for constrained and unconstrained firms was similar prior to the law. Lastly, I provide evidence in favor of parallel trends assumption by showing that the constrained and unconstrained firm did not differ in their firm performance prior to the law.

Results are robust to alternate thresholds to define tariff reduction and exclusion of any specific industry or year. To ensure that tariff reduction events are not systematically correlated with some unobserved firm characteristics, I carry out placebo regressions where I randomly assign significant tariff reduction (treatment) to the industries. I find no effect of competition reassuring that the results do not reflect systematic differences among the firms in the sample. Results are also robust to alternate thresholds to define “constrained”, using varying sample periods and using Tobin’s Q as a measure of firm performance.

I contribute to the ever growing literature on the importance of board independence for firm outcomes. The findings suggest that board independence matters. Not only do firms alter their board structure in response to an exogenous shock, the constraint on the ability to do so has negative implication for firm performance.

I also contribute to the research that purports that product market competition is a substitute for corporate governance. Earlier studies that have examined the relation between product market competition and corporate governance have either used endogenously determined measures of governance or competition¹³ or have analyzed the effect of governance on firm performance, moderated by a given level of competition¹⁴ to imply the substitution between competition and governance. By directly analyzing the effect of an

¹² The three dimensions of treatment are; pre- and post-tariff reduction, pre- and post-law and constrained versus unconstrained.

¹³ See, for instance, [Cremers et al. \(2008\)](#); [Chou et al. \(2011\)](#). These studies analyze the relation between competition and external governance structures, specifically, market for corporate control, using Herfindahl Index (HHI) for industry competition as a measure of industry competition.

¹⁴ See, for instance, [Giroud and Mueller \(2010, 2011\)](#); [Chhaochharia et al. \(2016\)](#).

exogenous increase in competition in decreasing board independence, the paper provides a causal evidence that competition and board monitoring are substitutes.

Moreover, I contribute to the debate on the optimal versus entrenched boards. While some researchers argue that board structure arises as an optimal outcome to the given environment of a firm (Hermalin and Weisbach, 1998; Raheja, 2005), another strand of literature supports the entrenchment view according to which the boards may be captured by the managers who seek to indulge in rent seeking behavior (Gompers et al., 2003; Chhaochharia and Grinstein, 2007). I present evidence in favor of the former view by showing that changes in board composition caused by an exogenous increase in competition increase shareholder value, in the sense that profits fall less for firms that lower board independence than for those who cannot do so.

Finally, I contribute to the research on the costs of corporate governance regulation (Coles et al., 2008; Duchin et al., 2010)¹⁵ by explicitly showing that constrained firms fare worse than unconstrained firms when faced with an adverse shock to competition. By highlighting that greater board independence may actually harm some firms, I emphasize the negative consequences of regulations with one-size-fits-all approach.

2 Product Market Competition and Board Independence

Product market competition arguably serves as a significant governance mechanism in disciplining managers (Alchian, 1950; Stigler, 1958; Fama, 1980; Hart, 1983). If managers continue to engage in wasteful behavior, the firm would be incapable to compete and would have to eventually declare bankruptcy. Hence, the threat of liquidation and bankruptcy induces managers to exert greater effort (Allen et al., 1999). Moreover, greater competition results in increased information availability for monitoring the managers (Hart, 1983). Several empirical studies highlight the substitution between product market competition and corporate governance of firm by analyzing the effect of governance on firm performance, moderated by a given level of competition (Giroud and Mueller, 2010, 2011; Chhaochharia et al., 2016).

¹⁵Coles et al. (2008), for instance, document that ‘complex’ firms with greater advising requirement benefit more from larger boards with outsider directors. However, firms in need of greater firm-specific knowledge of the directors would benefit more from insider directors. Duchin et al. (2010) assert that cost of information is an important factor determining whether increased board independence as a result of these regulations would be beneficial for the firm or not. When cost of acquiring information is low, addition of outsiders to the board increased firm performance while when the cost is high, addition of outsiders to the board worsens the performance.

If indeed competition serves as a monitoring mechanism, then an increase in competition would reduce the benefits of monitoring accrued to a firm using internal governance structures. If so, do firms adjust their governance mechanisms accordingly in response to a change in competition?

On the one hand, firms may reduce their board independence as competition increases. Not only would increased competition decrease monitoring needs of the firm, but also managers need to make complex decisions for which they require greater authority and discretion (Kole and Lehn, 1997). They can do so better with less independent boards composed more of insiders who understand the specific workings of the firm rather than outsiders who may hinder this process.¹⁶

However, on the other hand, another strand of research has provided counter view of competition as a disciplining mechanism. Shleifer (2004) highlights the dark side of competition where due to increased competition, managers may feel the pressure to enhance short term performance. For instance, they may manipulate the earnings to influence the stock prices or indulge in tax evasion. Indeed, Datta et al. (2013) document that more competitive industries are associated with greater earnings manipulation. Similarly, firms in more competitive environments are shown to engage in more tax avoidance activities (Cai and Liu, 2009). Other studies argue that competitive pressure may increase managerial shirking (Scharfstein, 1988). Golan et al. (2015) argue that due to difficulty in inferring managerial actions, the cost of inducing effort by the manager increases, leading to an increase in managerial slack.

Therefore, to account for the increased managerial shirking and to counter for these manipulative behaviors by the managers, firms may increase their board independence in response to an increase in competition. Whether firms increase their board independence in response to an increase in competition or decrease it remains an empirical question. While earlier studies have argued for the substitution between product market competition and corporate governance or provided indirect evidence, I contribute to this literature by providing a causal evidence of this substitution by analyzing whether product market competition reduces board independence of a firm.

¹⁶Randøy and Jenssen (2004), using publicly traded Swedish firms, find that board independence reduces firm performance in highly competitive industries. Hence, suggesting that firms in competitive industries should have lower board independence.

2.1 Data and Sample

To understand how competition affects board independence, the main challenge is to find a measure of competition at the industry level that is exogenous to corporate policies. To account for potential endogeneity of product market competition, I use a quasi-natural experimental setting that produces exogenous increases in competition in some industries but not in others. Specifically, I exploit reductions in import tariffs to identify the effect of variations in competition on firm's board independence.¹⁷

Import tariffs represent significant amount of trade costs. Hence, over past few decades, U.S. trade authorities have gradually removed this important barrier to trade. In the U.S. manufacturing sector, average tariff has seen a reduction of about 75% in thirty years (Frésard and Valta, 2015). This reduction in import tariffs facilitates the entry of foreign rivals to domestic U.S. markets, thus increasing the product market competition.¹⁸

I gather industry-level imports data compiled by Feenstra (1996); Feenstra et al. (2002); Schott (2010). This data is available for manufacturing firms for the years 1972-2005. To be able to extend the analysis to most recent years, I extend tariff reduction data until 2015 using the data on imports provided by Peter Schott on his website.¹⁹

Any product imported into the U.S. is categorized through a 10-digit HS (Harmonized System) code. Feenstra (1996) and Schott (2009) have developed concordance tables that allow the mapping of each HS product code onto four-digit SIC codes. Using this, for each industry-year, I compute the ad valorem tariff rate as the duties collected at U.S. Customs divided by the Free-On-Board custom value of imports. To ensure that I capture significant events, I only consider large tariff reductions. Specifically, following Valta (2012) and Frésard and Valta (2015), I compute the average tariff change for each industry and characterize tariff reductions in a given industry as the deviations in the yearly change in tariff rates from the same industry's average (absolute) change. Tariffs fluctuate very often and a usual tariff change from one year to another can be very small. To ensure that I capture significant events which would actually affect the competitive landscape of the firms in that industry, I consider tariff reductions only when the tariff reduction in an industry year is three times larger than the average (absolute) change in the same industry across years and only when the tariff rate is at least 1% or higher. The results remain

¹⁷Recently, several studies have used tariff reduction as an exogenous change in product market competition (Trefler, 2004; Frésard, 2010; Guadalupe and Wulf, 2010; Valta, 2012; Flammer, 2015; Frésard and Valta, 2015).

¹⁸Reduction of trade barriers gives rise to a significant increase in competition from foreign rivals (Balassa, 1966; Edwards, 1993).

¹⁹http://faculty.som.yale.edu/peterschott/sub_international.htm

robust even after employing thresholds of two and four times larger than the industry average tariff change. Moreover, similar to [Frésard and Valta \(2015\)](#), I exclude tariff cuts when they are followed by equivalently large increases in tariff rates over three subsequent years. This is to ensure that we are not capturing transitory changes.

The variable of interest is board independence calculated as the proportion of independent directors on the board. Therefore, I merge tariff data with the data on boards from Institutional Shareholder Services (formerly Risk Metrics) for the years 1980-2015²⁰. For industries with multiple events,²¹ I use the first large event as the shock to competition. [Figure 1](#) shows the distribution of tariff reduction events from 1980-2015. The figure shows that the tariff reductions occur throughout the sample period. This alleviates the concern that the identification may be driven by a time-specific event concentrated in a given year. We observe a large peak in 1995. This corresponds to the adoption of North American Free Trade Agreement (NAFTA) in 1994 which resulted in a trilateral trade block between U.S, Canada and Mexico.

After merging, I have a total of 120 unique 4-digit SIC with 1475 firms in the sample. There are 76 events corresponding to 55 distinct four-digit industries in 346 firms during the time period 1981-2015.

[Table I](#) shows the descriptive statistics of the tariff, firm and board variables. Panel A shows the descriptive statistics for the 4-digit SIC level tariffs from 1981 to 2015. The average tariff in the manufacturing industries during the period is 2.13%. There is significant in the tariff rate among industries, ranging from 0% to 27.6%. The change in tariff during this time period is negative and corresponds to an average decrease of 0.11 percentage points per year. 2.2% of 4-digit SICs witnessed a significant tariff reduction. Panel B shows the firm characteristics. The average firm in the sample has a ROA of 2.2%. Panel C shows the board and governance variables. The average board independence during the sample period is 63.6% and average board has around 7 members. Variable definitions [and data sources are provided in the Appendix](#).

²⁰In ISS, the data on board composition is only available for years 1996 onwards. To avoid losing more than half of the events, I collect information on board independence using the individual profile of the directors from Boardex from 1980-1996.

²¹I have 15 industries with multiple events over these 35 years; 10 industries with 2 events, 4 industries with 3 events and 1 industry with 4 events.

2.2 Empirical Methodology

I exploit the difference in timing of the events across industries by using a difference-in-difference strategy to estimate the effect of significant tariff reduction on board independence. In particular, I estimate the following:

$$board_independence_{jikt} = \beta tariff_reduction_{ikt} + \alpha_j + \alpha_t + \alpha_{it} + X'_{jikt-1}\Gamma + u_{jikt}, \quad (1)$$

where $board_independence_{jikt}$ is the proportion of independent directors in the board of firm j which belongs to 2-digit SIC i and 4-digit SIC k in the year t . $tariff_reduction_{ikt}$ is a binary variable equal to one for all years after t for a 4-digit SIC, k , that got a significant tariff reduction in year t . X_{jikt-1} are one year lagged firm-specific factors such as firm performance, firm size, leverage, cash, investment and R&D that may impact board independence. It also includes one-year lagged board controls such as board size, gender and ethnic composition and average age of the board.

α_j controls for firm fixed effects. This term accounts for all time-invariant factors such as the firm location, industry, firm mission statement or long-term vision and policy. Hence, I rely only on within firm variation for my estimation. I include year fixed effects, α_t , to controls for factors which impact all firms similarly in a year. The macroeconomic and business cycle fluctuations which are common to all firms as well as aggregate governance trends are accounted by this term.

Moreover, the trends in board independence in different industries might be evolving at a different rate. In order to account for this, I include 2-digit SIC specific time-varying fixed effects, α_{it} . Hence, the term α_{it} non-parametrically allows for differential trend in board independence among firms belonging to different 2-digit SIC. To understand this better, consider two 2-digit industries “20: Food and Kindred Products” and “21: Tobacco Products”. While both of these are within manufacturing sector, these two groups of industries are very different from each other and hence might have very different board structures. For instance, average board independence for “21: Tobacco Products” is 75.3% while it is only 51.5% for “20: Food and Kindred Products”. Now, for instance, in our sample, a 4-digit industry “2024: Ice Cream and Frozen Deserts” receives a tariff reduction in 2000 hence making it “treated” while “2121: Cigars” doesn’t which makes it “control”. Therefore, when we compare this “treated” firms with “control” firms, we may be comparing two groups which not only differ in their treatment but also in various other aspects. By including 2-digit SIC specific time-varying fixed effects, I am able to compare firms which at least belong to the same major group and hence are much alike except for

their treatment status.

Together, the estimation relies only on within firm variation in board independence within a 2-digit SIC to estimate β . That is, I compare changes in the board independence in a firm in a 4-digit SIC which was affected by a tariff reduction with changes in another firm within the same 2-digit SIC which was not affected by a tariff reduction in that year. The identification assumption for β to estimate the causal impact of tariff reduction on board independence is given by: $E(u_{jikt}|\alpha_j, \alpha_t, \alpha_{it}) = 0$. That is, the unobserved factors that affect board independence are uncorrelated with the tariff reduction conditional on firm fixed effects, year fixed effects and 2-digit time-varying fixed effects.

2.3 Results

Table II presents the estimation of Equation 1. The standard errors are clustered at the 2-digit SIC level to allow for arbitrary correlation among firms within the same 2-digit SIC across years. We see a clear negative and significant impact of tariff reduction event on board independence. Board independence decreases by 3.37 percentage points after the tariff reduction compared to firms that did not face a significant tariff reduction (Column 1). The magnitude is economically significant. The effect corresponds to a 0.14 standard deviations decrease in the board independence. In other words, the effect reflects a 5.5% decrease in board independence for a firm with average board independence. The magnitude of the coefficient slightly reduces to 3.1 percentage points once I include firm and board controls but the effect of increase in competition remains negatively significant (Column 3).

My sample spans over 1981 to 2015. Hence the result shows the average effect of competition on board independence over three decades. However, in response to corporate scandals and other corporate governance failures, various regulations were passed in early 2000s targeted towards the composition of the boards such as SOX in 2002 and rules implemented by exchanges such as NASDAQ and NYSE in 2003. These regulations aimed at increasing board independence and hence may confound the effect I obtain. However, the coefficient, if anything, would be underestimated as these regulations would result in an opposite effect on board independence to the one I hypothesize. In order to abstract from these confounding effects, I carry out the analysis for the relevant sample i.e. for the years prior to 2002. Results are presented in Table III. I obtain a stronger negative effect of competition on board independence for this sample period. In particular, after controlling for firm and year fixed effects, 2-digit SIC industry specific trends, firm characteristics

along with governance factors, I find that firms reduce their board independence by 5.53 percentage points, or 0.21 standard deviations in response to an increase in competition.²² This effect reflects a 12% decrease in board independence for a firm with average board independence.

2.3.1 Board Composition

The results in the previous section show a clear decrease in proportion of independent directors in the board as a response to increased competition. In this section I test whether the decrease in proportion of board independence is due to simply firing the independent directors, or hiring of insider and linked directors or due to replacing the independent directors with employee or linked directors.²³ If a firm simply fires independent directors without replacing them with other directors such as insider or linked directors, we should see a decrease in board size due to firing of independent directors and no change in the number of insider and linked directors. Instead, if a firm hires new non-independent directors to the board, we should see an increase in the number of non-independent board members and subsequently the board size. On the other hand, if a firm replaces independent directors with insiders or linked directors, we should see an increase in the number of directors belonging to these two categories. The board size, however, can increase, decrease or remain unchanged depending on the replacement rate between the independent directors.²⁴ I have this information on the type of director only after 1996. Therefore, this analysis is restricted to the years 1997-2002.

Table IV shows the results. Column 1 shows that the number of independent directors decrease after the tariff reduction. Tariff reduction event decreases the number of independent directors in the board by 13.87%. This corresponds to a decrease of 0.65 ($-0.1387 \cdot 6137 \cdot 7.664239 = -0.652$) independent directors for an average board. Column 2 and 3 test whether the decrease in the number of independent directors is met by an increase in the other directors. We see that there is a significant increase in the number of both employee and linked directors after the event. Tariff reduction event increases the number of employee directors in the board by 11% and linked directors in the board by 20%. This implies an increase of around 0.20 ($0.11 \cdot 228 \cdot 7.66$) and 0.25 ($0.2027 \cdot 157 \cdot 7.66$)

²²Results are robust to clustering the standard errors at firm level, 3-digit and 4-digit SIC level.

²³IRRC considers any director to be linked who is a “former employee; is a service provider, supplier, customer; is a recipient of charitable funds; is considered an interlocking or designated director; or is a family member of a director or executive”.

²⁴For instance, a firm can fire two independent directors and hire two insider directors, thus keeping board size unchanged. On the other hand, the firm can also replace the two fired independent directors with one (hence, decreasing board size) or three (increasing board size)).

for employee and linked directors for an average board, respectively. There is no significant change in overall board size (column 4). These results are consistent with the notion that in light of a significant increase in product market competition, complex and strategic decisions need to be made on how to respond to the new competitive environment. Hence, as argued above, increase in competition may not only render the monitoring role of the directors less relevant but may also enhance the need of an insider in the board for their advising capabilities.

2.3.2 Exposure to Competition

Firms face varying level of exposure to competition depending on various factors. For instance, a stand-alone firm which operates in a single product market may be exposed to intensified pressure from foreign competitors much more than a highly diversified firm which operates in numerous product markets, only one of which belongs to the affected industry. Following [Frésard and Valta \(2015\)](#), using Compustat’s Business Segment files, I 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.

I also distinguish exporting firms from non-exporting ones. Firms that sell a large fraction of their production abroad may be less affected by the increased pressure from foreign rivals or may even be positively affected if the importing country experiences reduction in tariff. Using Compustat’s Geographic Segment files I classify a firm as “exporting” if it realizes positive sales abroad in a given year ([Denis et al., 2002](#)).

At the industry-level, I use Herfindahl-Hirschman Index (HHI) to distinguish firms already operating on competitive environment from those operating in less competitive environment. A large value of the HHI indicates a high industry concentration (i.e. less competitive industry).

Table [V](#) reports the difference-in-difference estimates. Column 1 shows that board independence decreases after the tariff reduction, however, this effect is not statistically significant for diversified firms. Focused firms, on the other hand, reduce their board independence by 0.055 in response to an increase in competition, as shown in column 2. Hence, the effect of competition on board independence is driven by these focused firms. Similarly, we see no significant effect on board independence of exporting firms, however, non-exporting firms decrease their board independence by 0.066 after the event. We also find a strong significant reaction to competition by firms operating in industries with high HHI i.e. in

less competitive industries. Column 5 shows that firms in industries with high HHI reduce their board independence by 0.059 in response to an increase in competition while we see no statistically significant effect of competition for firms operating in industries with low HHI (column 6). The results highlight that exposure to competition determines how firms adjust their board independence.

3 Competition, Regulation and Firm Performance

Board independence has been in the spotlight for past few years with regulators and institutional investors pushing for more independent directors on the boards. Independent directors are assumed to be more effective monitors and therefore considered synonymous to good governance.

In 2002, Securities Exchange Commission (SEC) pressured the exchanges to improve their governance listing standards (Chhaochharia et al., 2016). Therefore, in August 2002, NYSE proposed that majority of the board has to be composed of independent directors followed by similar proposal by NASDAQ in October 2002. SEC approved these proposals in November 2003 and firms had until 2004 to comply with the regulation. Specifically, they had to comply by either the first annual shareholder meeting of the listed issuer or 31st October 2004, whichever came earlier. .

This law sets a minimum threshold of independence for all firms irrespective of the environment they operate in. However, as analyzed above, firms may find it beneficial to reduce their board independence in response to an increase in external governance via increased competition.

However, is this reduction in board independence indeed reflecting the needs of the firm? Could the counter-factual have been more beneficial for them i.e. would they have been better off by not reducing the monitoring in response to competition. One may argue that the managers are the ones who choose the board and hence this decrease in independence is reflective of their preferences to empire build, shirk or enjoy quiet life rather than in the interest of shareholders.

To corroborate that this reduction in board independence is indeed in the interest of shareholders, I analyze a setting in which firms are unable to reduce their board independence in response to a change in competition due to regulatory restrictions. If this

reduction is indeed a response to decreased monitoring (and potentially increased advising) needs by the firm, then a restriction in the ability of the firms to determine a level of monitoring given their environmental setting may reflect in firm profitability. In this section. to identify the effect of regulatory restrictions, I use 2003 NYSE and NASDAQ listing requirements which required majority of the board to be composed of independent directors.

3.1 Identification and Results

For my analysis, I exploit the regulation in conjunction with the quasi-natural experiment of tariff reductions. I am interested in firms which were constrained at the time they received tariff reduction. Firms which had board independence slightly higher than 50% after the law are unable to remove an independent director as a result of the tariff reduction shock because they will fall below the 50% board independence mark once they do so. I define my group of “constrained” firms as firms with lower than 55% board independence at the time they received a tariff reduction. Similarly, “unconstrained” are defined as firms with greater than 55% board independence at the time of tariff reduction. I choose 55% board independence because the results from previous section reveal that, on average, a significant tariff reduction decreases board independence by 12% for an average firm. Hence, firms with 55% board independence just before the tariff reduction shock would clearly fall below the minimum allowed board independence mark if they react optimally to the tariff reduction. I consider alternate definitions of constrained and unconstrained firms, both stricter (50%) as well as more lenient (60%), and show that the results remain robust.²⁵

To identify the effect of the ruling passed by NASDAQ and NYSE (hereafter referred to as “law”) in conjunction with the change in competition, I compare changes in firm profitability for firms that are constrained by the law at the time of tariff reduction once the law is implemented with firms which are unconstrained by the law. As none of the firms were constrained before the law, I carry out the analysis for years 2003 and onwards. I use a difference-in-difference strategy and estimate the following:

$$ROA_{jikt} = \beta_1 post_tariff_{ikt} + \beta_2 constrained_j * post_tariff_{ikt} + X'_{jikt-1} \Gamma + \alpha_j + \alpha_t + \alpha_{it} + u_{jikt}, \quad (2)$$

²⁵Depending on the definition of constrained, the number of observations change. Number of firms with significant tariff reduction and board independence lower than 50%, 55%, 60% and 65% are 41, 41, 46 and 61 (out of 102 firms) respectively.

Where ROA_{jikt} represents ROA for firm j in the year t operating in 2-digit SIC i and 4-digit SIC k . In the base line case, I define constrained equal to one if the firm at the time of tariff reduction has board independence equal to 55%. $post_tariff_{ikt}$ is a binary variable equal to one for all years after t for a 4-digit SIC, k , that got a significant tariff reduction in year t . As before, I include the firm fixed effects and 2-digit SIC specific time-varying fixed effects.

Table VI presents the results. Column1 shows that tariff reduction affects ROA of constrained firms significantly negatively compared to unconstrained firms. Once firm and board controls are included in the estimation (column3), the magnitude of this effect of being constrained increases to 10.12 percentage points. This effect is economically large as it corresponds to more than one-third (0.36) standard deviations decrease in ROA in response to tariff reduction of constrained firms compared to unconstrained firms.

However, being constrained is dependent on firm's board independence level at a specific point in time. While I show that the two groups (constrained and unconstrained) do not differ systematically in observables, board independence is still being endogenously determined by the firms. Hence, one may be concerned that the very fact that these groups have different levels of board independence indicates that these two group are systematically different from each other. In such a case, we cannot rely on a simple diff-in-diff analysis. However, what is pertinent for my identification is that the two groups do not differ in their response to competition i.e. the change in competition affects constrained and unconstrained²⁶ firms in the same way even in the absence of law. Then, the difference observed could be attributable to the effect of being constrained imposed by the passing of the law. Triple difference analysis allows me to address this potential concern.

For example, suppose there are two firms. Firm1 has board independence of 55% while firm 2 has board independence of 80%. If both receive tariff reduction in year 1999, both would be able to reduce their board independence freely in response to the change in competition as the law has not been passed yet. Change in competition then should not affect their profitability differentially. However, if they receive tariff reduction, say, in 2005, firm 1 doesn't have as much leeway as firm 2 to reduce the board independence. Triple-diff not only allows me to capture the effect of this inability to freely reduce board independence on firm performance, but also allows me to estimate the effect of competition

²⁶note that firms were not really constrained before the law. The terms constrained and unconstrained here are being used to refer to firms with certain level of board independence i.e. below and above 55% respectively.

on the profitability of these two distinct groups in the absence of being constrained. Hence, I compare the changes in performance of constrained firms to the changes in performance of the unconstrained firms in response to tariff reduction pre and post the law using the following estimation.

$$\begin{aligned}
ROA_{jikt} = & \alpha_j + \alpha_t + \alpha_{it} + \beta_1 post_tariff_{ikt} + \beta_2 constrained_j * post_law_t + \\
& \beta_3 constrained_j * post_tariff_{ikt} + \beta_4 post_law_t * post_tariff_{ikt} + \\
& \beta_5 constrained_j * post_law_t * post_tariff_{ikt} + X'_{jikt-1} \Gamma + u_{jikt},
\end{aligned} \tag{3}$$

Where ROA_{jikt} represents ROA for firm j in the year t operating in 2-digit SIC i and 4-digit SIC k . As before, in the base line case, I define constrained equal to one if the firm at the time of tariff reduction has board independence equal to 55%. $post_tariff_{ikt}$ is a binary variable equal to one for all years after t for a 4-digit SIC, k , that got a significant tariff reduction in year t . $post_law_t$ is dummy equal to one for all years since 2003. As before, I include the firm fixed effects and 2-digit SIC specific time-varying fixed effects. In the base line analysis, I use a total of 17 years as the sample period with 8 years before and 8 years after 2003 i.e. when the law was passed. The results are robust to varying sample periods.

The parameter β_3 reports the differential effect of tariff reduction on constrained firms before the law was passed. However, pre-law, firms were technically not constrained in reducing their board independence. Hence, we should expect β_3 to be statistically insignificant. The main parameter of interest is β_5 , which gives us the differential effect of tariff reduction on ROA for constrained firms over unconstrained post-law in comparison to pre-law. If reducing board independence in response to an increase in competition is an optimal decision for firms, then firms which are unable to do so would suffer as a consequence. Hence, we expect β_5 to be negative.

Table VII presents the results. Column1 shows that there is no difference in the ROA of constrained and unconstrained firms once they receive tariff reduction pre law (i.e. β_3 is statistically insignificant), however, the triple diff coefficient is significantly negative. Change in competition affects ROA of constrained firms significantly negatively compared to unconstrained firms post law. Once firm and board controls are included in the estimation (column3), the magnitude of this effect is 10.45 percentage points which is economically significant as it corresponds to approximately 0.4 standard deviations decrease in ROA in response to tariff reduction of constrained firms compared to unconstrained firms.

4 Validity and Robustness

4.1 Validity of DiD

4.1.1 Do Industry Factors Predict Tariff Reductions?

To estimate the causal effect of tariff reductions on board independence, tariff reduction events should not be systematically aimed at industries with specific characteristics. It is most important to rule out the possibility that industry-level tariff cuts are targeted towards industries with specific board independence levels. While this is implausible, I provide evidence that average board independence of the industry does not predict tariff reduction events. I collapse all the firms variables at the industry level and estimate the following equation.

$$tariff_reduction_{ikt} = \alpha_i + \alpha_t + \beta board_independence_{ikt-1} + X'_{ikt-1}\Gamma + u_{ikt}, \quad (4)$$

Table VIII presents the results. Column 1 shows that even without controlling for any other factors, lagged average industry board independence doesn't predict tariff reduction in that industry. After controlling for industry fixed effects (Column2), industry controls (Column3) and other board characteristics at industry level (Column4), there is still no relation between industry board independence and tariff reduction events.

An additional concern could be that rather than the board independence of industry, it might be some other industry characteristics that predict tariff reduction events. For instance, if tariff reductions are targeted towards industries with low profitability (industry ROA) or high leverage. F-Test results show that the industries which receive tariff reductions are not systematically different across either industry characteristics or industry board characteristics even at 10% significance level.

4.1.2 Testing Parallel Trends

I use a difference-in-difference strategy to estimate the causal impact of tariff reduction on the board independence. DiD strategy relies on the crucial parallel trends assumption. That is, in the absence of the tariff reduction event, board independence in the treated firms should have changed in the same way as board independence in the control firms. This assumption, by definition, is not directly testable as we do not observe the counter-factual. However, we can study the pre-trends in the board independence in the treated firms

relative to the control firms to provide evidence in favor of the parallel trends assumption. If we observe that the board independence was changing at the same rate in the treated firms and the control firms prior to the tariff reduction event, it is reasonable to believe that they would have been similar had the event not taken place.

To assess the validity of this identification strategy, I first assess the evolution of board independence before and after the tariff reduction event. I set the year before tariff reduction event as the base year. I run the following regression:

$$board_independence_{jikt} = \beta_1 T_{ikt}^{-5} + \beta_2 T_{ikt}^{-4} + \dots + \beta_9 T_{ikt}^{+4} + \beta_{10} T_{ikt}^{+5} + \alpha_j + \alpha_t + \alpha_{it} + X'_{jikt-1} \Gamma + u_{jikt}, \quad (5)$$

Figure 2 shows that the board independence was evolving at the same rate in the treated firms and control firms prior to the tariff reduction. There is no statistically or economically significant difference in changes in board independence in treated and control firms in the five periods prior to the event. The tariff reduction results in a sudden large decrease in the board independence. The difference in the board independence of treated and control firms persists even 3 periods after the event.

4.1.3 Balancing Test

To show that the treatment and control firms do not systematically differ along any important dimension, I show that the firms that got tariff reduction were very similar in levels as well as trends in firm characteristics, including board independence, prior to the tariff reduction.

Table IX shows the differences in firm characteristics between firms affected by the tariff reduction (treated firms) relative to firms that are not affected by the tariff reduction (control firms). Panel A shows the differences in treated and control firms in levels. The treated firms have higher levels of cash, investment and R&D and lower levels of dividends. Since, I include firm fixed effects, these differences in levels are absorbed by the firm fixed effects and hence do not affect the estimates. Moreover, treated and control firms have similar level of board independence, board size and board composition as shown in Panel C.

Panel B and D of Table IX shows the differences in trends among treated and control firms. Treated and control firms have similar trend in firm profitability, and other corporate policies. We see a significant difference in size of the firms, with treated firms being slightly

bigger by 0.0193,²⁷ however, I always control for firm size in all the estimations along with other firm controls. These results show that the firms affected by the tariff reduction are not systematically different from firms not affected by the reduction. These results strengthen our confidence that the differences in treated and control firms after the tariff reduction can be associated to the event rather than pre-existing differences among firms.²⁸

4.2 Validity of DiDiD

4.2.1 Balancing Test

To ensure the validity of identification strategy, it is important that the two groups of firms, constrained and unconstrained, do not systematically differ along any important dimension. Table X shows the differences in firm characteristics between constrained and unconstrained firms in the first two years of the sample. We can see some differences between constrained and unconstrained firms when we look at levels. Constrained firms tend to be larger, more profitable with lower levels of investment and cash holdings as can be seen in Panel A. However, these differences in levels are absorbed by the firm fixed effects and hence do not affect the estimates. More importantly, the two groups of firms should be similar in their trends across various characteristics. Constrained and unconstrained firms have similar trend in firm profitability, and other corporate policies as shown in Panel C and D of Table X. This alleviates the concern that the differences in constrained and unconstrained firms after the regulation can be associated the pre-existing differences among firms.

4.2.2 Testing Parallel Trends

As I am analyzing the effect of law in conjunction with an exogenous change in competition on firm performance, it is pertinent to show that the firm performance (ROA) was changing at the same rate in the constrained and unconstrained firms pre-law. ?? plots the results, We see that the constrained and the unconstrained firms had similar ROA prior to the law. These two group of firms diverge after the law. There is a slight decrease in ROA of constrained firms one year after the law, however, it is statistically not significant. The difference in ROA for the two groups becomes statistically significant two years after the law is passed with the constrained firms having lower ROA relative to the unconstrained

²⁷Although this number is statistically significant, it is economically irrelevant in magnitude. 0.0193 corresponds to a difference of 0.009 standard deviation of $\log(\text{assets})$ or only 0.36% of the mean.

²⁸As a robustness check, I repeat the main analysis using a matching procedure based on Mahalanobis distance to ensure that the two groups of firms are similar across various important dimensions. The results remain robust.

firms.

Moreover, as we are focusing on board changes as a result of tariff reduction and the constraints of the ability to alter the board composition, it is important to establish that the constrained firms do not have different board dynamics relative to unconstrained firms. In order to see whether the constrained and unconstrained firms have similar or different trend in board independence prior to the law, I carry out analysis akin to parallel trends, where I allow for different trend in board independence between constrained and unconstrained firms every year. If constrained and unconstrained firms have similar dynamics in board independence and the regulation prevents constrained firms from decreasing board independence in response to a tariff reduction, while unconstrained firms are unaffected, we should expect to see the constrained and unconstrained firms to have similar trend prior to the regulation and the have a different trend after the regulation.

Figure 4 plots the results. We see that the constrained and the unconstrained firms had similar internal governance dynamics prior to the law. These two group of firms diverge after the law, with the constrained firms having a higher trend in board independence relative to the unconstrained firms after the law. Since, constrained firms are impacted by the law and may not be able to decrease board independence in response to a tariff reduction, we see that the board independence in constrained firms increases with respect to unconstrained firms. The average board independence for constrained firms was around 40.9%, while average board independence for unconstrained firms was around 53.5% in 1997. The difference in average board independence between the set of constrained and unconstrained firms remained the same until 2001 i.e. prior to the law. By 2005, this difference decreased steadily to less than 5 percentage points. The difference in average board independence between the two groups of firms decreased to less than 1 percentage points by 2009.

4.3 Robustness Tests

4.3.1 Alternate thresholds to define tariff reduction event

In the first analysis, following prior literature, I consider a tariff reduction event only if the tariff reduction in an industry-year is three times larger than the average change in the same industry across years. I check the robustness of the effect of increase in product market competition on board independence by changing the threshold used to define a tariff reduction event. Specifically, I use a threshold of 2x and 4x larger than the average

change in the same industry as well as 2x, 3x, and 4x larger than the median change in the same industry.

Baseline results is the one obtained in the main analysis using a cutoff of 3x larger than the average in an industry. We see a negative and significant effect regardless of the threshold used. The effect is lower in magnitude with looser threshold (2x) and higher with stricter threshold (4x). When using median instead of average industry change, we obtain stronger results than the baseline, and robust to the threshold used. The results highlight that the effect obtained is not driven by the arbitrary choice of threshold used to define competition change.

4.3.2 Placebo test

In order to show that tariff reduction events are not systematically correlated with some unobserved firm characteristics, I carry out placebo regressions. I randomly assign significant tariff reduction (treatment) to the industries and estimate the Equation 1 1,000 times. If there are some unobserved differences among firms driving the results, the distribution of estimates would reflect those differences. If the distribution of placebo estimates is centered around zero and much smaller than the results obtained above, this would re-assure us that the results obtained in the main analysis do not reflect some systematic differences among firms in the sample.

Figure 5 shows the results from the placebo regressions. Panel A shows that the distribution is centered around zero. The mean placebo estimate is -0.00015 , with a standard deviation of 0.0153 . The minimum and maximum placebo estimates are -0.047 and 0.055 respectively. These extreme values are lower than the coefficient obtained earlier (-0.0552). This means that randomly assigning tariff reduction to some firms relative to the others can not result in such a large and precise estimate as obtained in the above analysis.

Panel B of Figure 5 shows the CDF of t-values of the coefficients from the placebo regressions. If there are no systematic differences among the firms in the sample, we should get the absolute value of t-value to be greater than 1.96 only 5% of the times. In fact, this is what we find. In addition, the t-value obtained in the main analysis lies far away from distribution of the placebo t-values. These results from placebo estimates reassure that the results I find do not reflect systematic differences among the firms in the sample.

4.3.3 Alternate thresholds to define “Constrained”

I use alternate definitions to define the group of constrained and unconstrained firms. In the main analysis, a firm is categorized as constrained if it has a board independence of 55% or lower at the time of tariff reduction. I provide estimates using both, stricter (50%) and lenient (60%), thresholds to define the group of constrained firms. First 3 columns in Table XII report results with varying definitions of constrained while keeping the sample period constant. The result remains robust to the varying definition of constrained.

4.3.4 Alternate sample period

For the base analysis, I utilize eight years before and after the law was passed (i.e. 2003). However, I alter the sample period using 6, 10 and 12 years before and after the law to ensure that the findings are not sensitive to the sample period. Table XII, columns 3, 4 and 5 show that results are robust to varying sample periods.

5 Conclusion

Having independent directors in the boards is considered a corporate governance “best practice” with institutional investors, regulators and exchanges such as NASD and NYSE vouching for greater board independence for all firms. This pressure for greater board independence stems from the assumption that independent directors are better monitors. However, boards have two main functions; monitoring and advising the senior management. Hence, firms’ monitoring needs as well as advising requirements determine the optimal level of board independence for a firm.

An increase in product market competition reduces the monitoring needs of the firm and potentially increases the advisory requirements of the firm, hence leading firms to reduce their board independence. Using changes in import tariff rates to identify exogenous changes in product market competition, I provide evidence that firms substantially adjust their board independence in response to increased competition. In particular, after controlling for firm and year fixed effects, 2-digit SIC industry specific trends, firm characteristics along with governance factors, I find that firms reduce their board independence by 5.52 percentage points, or 0.21 standard deviations in response to an increase in competition. This effect reflects a 12% decrease in board independence for a firm with average board independence.

Using listing requirements by NYSE and NASDAQ, which required majority of the board to be composed of independent directors, in conjunction with the exogenous shock to competition, I carry out a triple diff estimation. I show that firms that are constrained in their ability to reduce board independence at the time of tariff reduction fare worse in term of firm profitability compared to unconstrained firms. In particular, being constrained results in 6.98 percentage points lower return on assets (ROA) compared to unconstrained firms which correspond to 23.5% standard deviations decrease in ROA for a firm with average ROA.

This paper provides evidence of substitution between the internal and external governance of firms by showing that firms adjust their monitoring intensity accordingly when their competitive environment changes. Moreover, the results highlight that a forced increase in monitoring level, for instance by mandating a certain level of board independence, may actually harm some firms. These results shed light on the cost of regulations that do not take into account heterogeneity in firms' environments and apply one size fits all criteria.

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Figure1: Distribution of Tariff Reduction Events

This figure shows the distribution of tariff reduction events from 1980-2015. Ad-valorem tariff rate is computed as the duties collected at U.S. Customs divided by the Free-On-Board custom value of imports. Tariff reduction is considered an event when the reduction in an industry year is three times larger than the average tariff change in the same industry. The criterion used to define an event is explained in detail in the text in section 2.1.

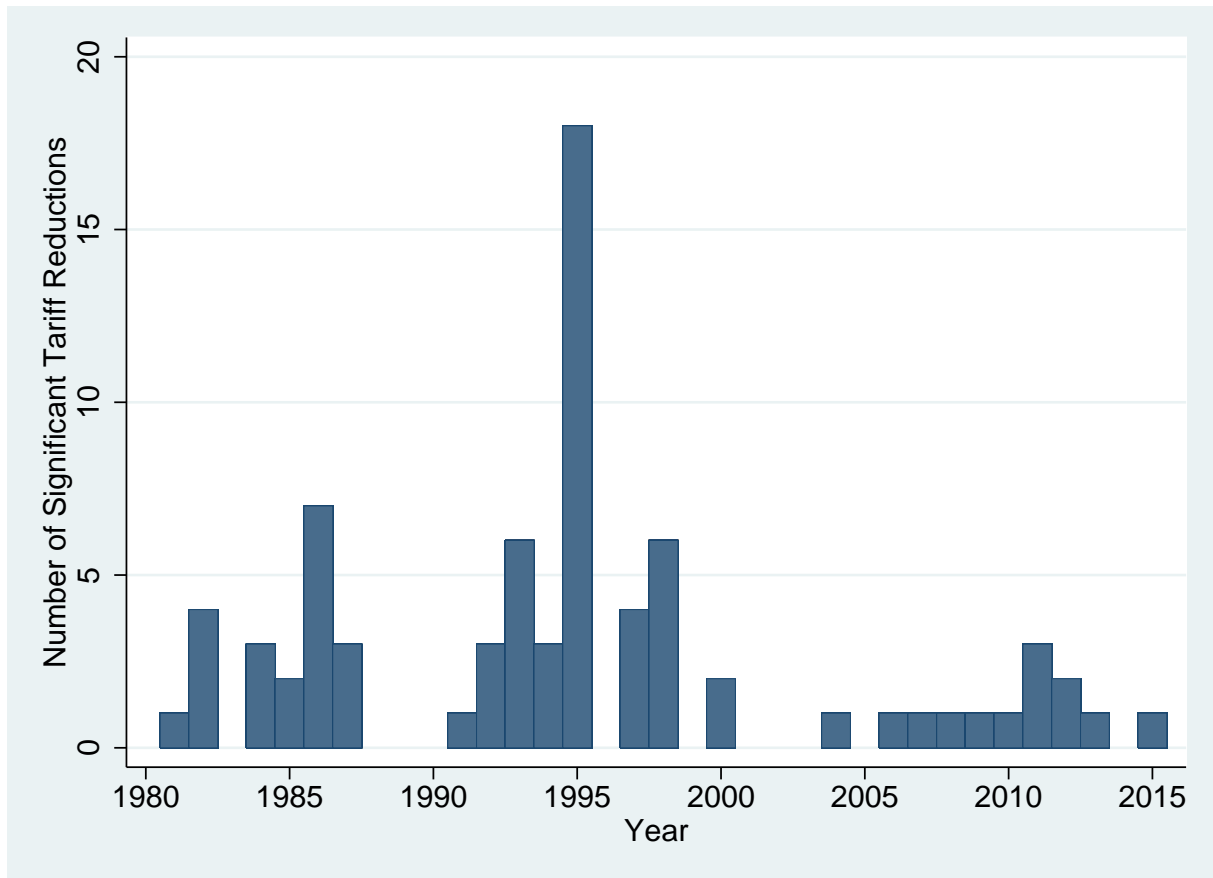


Figure2: Parallel Trends

This figure plots the evolution of the impact of tariff reduction on board independence. Board independence is measured as the proportion of independent directors in the board. Tariff reduction is equal to one for all firms which ever receive tariff reduction. I set the year before tariff reduction event as the base year and run the following regression:

$$brd_ind_{jikt} = \beta_1 T_{ikt}^{-5} + \beta_2 T_{ikt}^{-4} + \dots + \beta_9 T_{ikt}^{+4} + \beta_{10} T_{ikt}^{+5} + \alpha_j + \alpha_t + \alpha_{it} + X'_{jikt-1} \Gamma + u_{jikt},$$

where brd_ind_{jikt} is the proportion of independent directors in the board of firm j which belongs to 2-digit SIC i and 4-digit SIC k in the year t . T_{ikt}^{+n} equals one for firms n th year after they receive tariff reduction and zero otherwise and T_{ikt}^{-n} equals one for firms n th year before they receive tariff reduction and zero otherwise. $\alpha_j, \alpha_t, \alpha_{it}$ are firm, year and SIC2-year fixed effects and $X'_{jikt-1} \Gamma$ are one year lagged firm and board controls. Definitions of variables are provided in the Appendix.

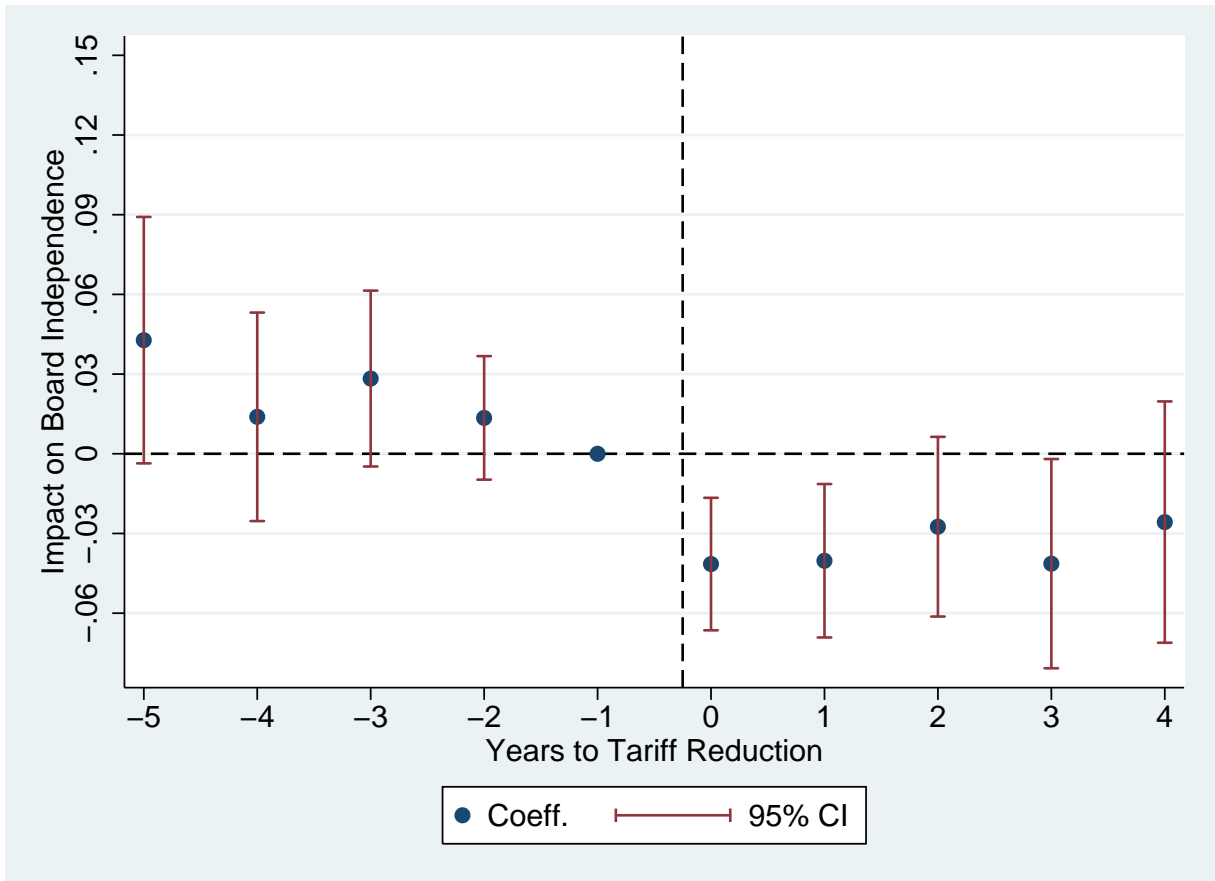


Figure3: Difference in trends in Firm Performance Pre and Post-regulation

This figure plots the evolution of differences in firm performance of constrained and unconstrained firms. Constrained is defined as equal to one if firm had board independence of 60% or less at the time of tariff reduction.

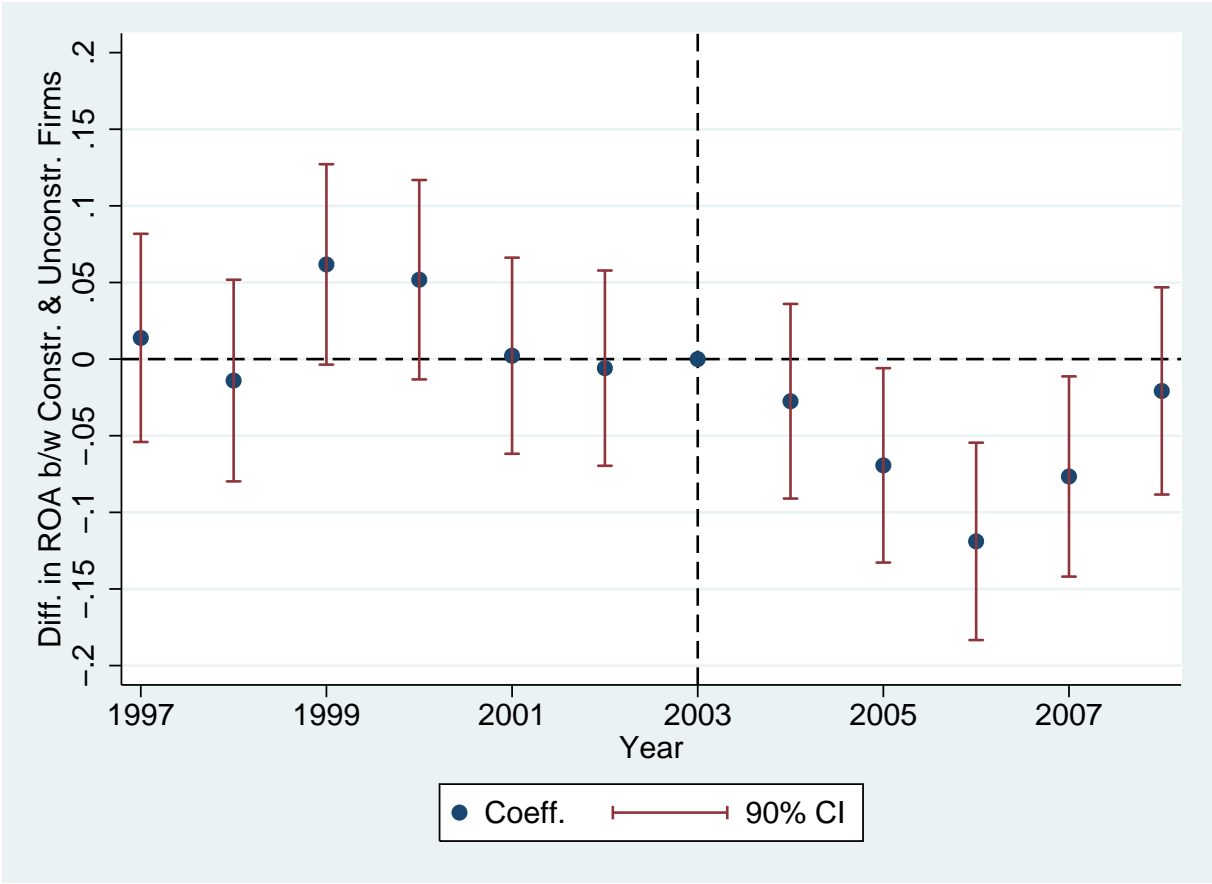


Figure4: Difference in trends in Board Independence Pre and Post-regulation

This figure plots the evolution of differences in board independence level of constrained and unconstrained firms. Constrained is defined as equal to one if firm had board independence of 60% or less at the time of tariff reduction.

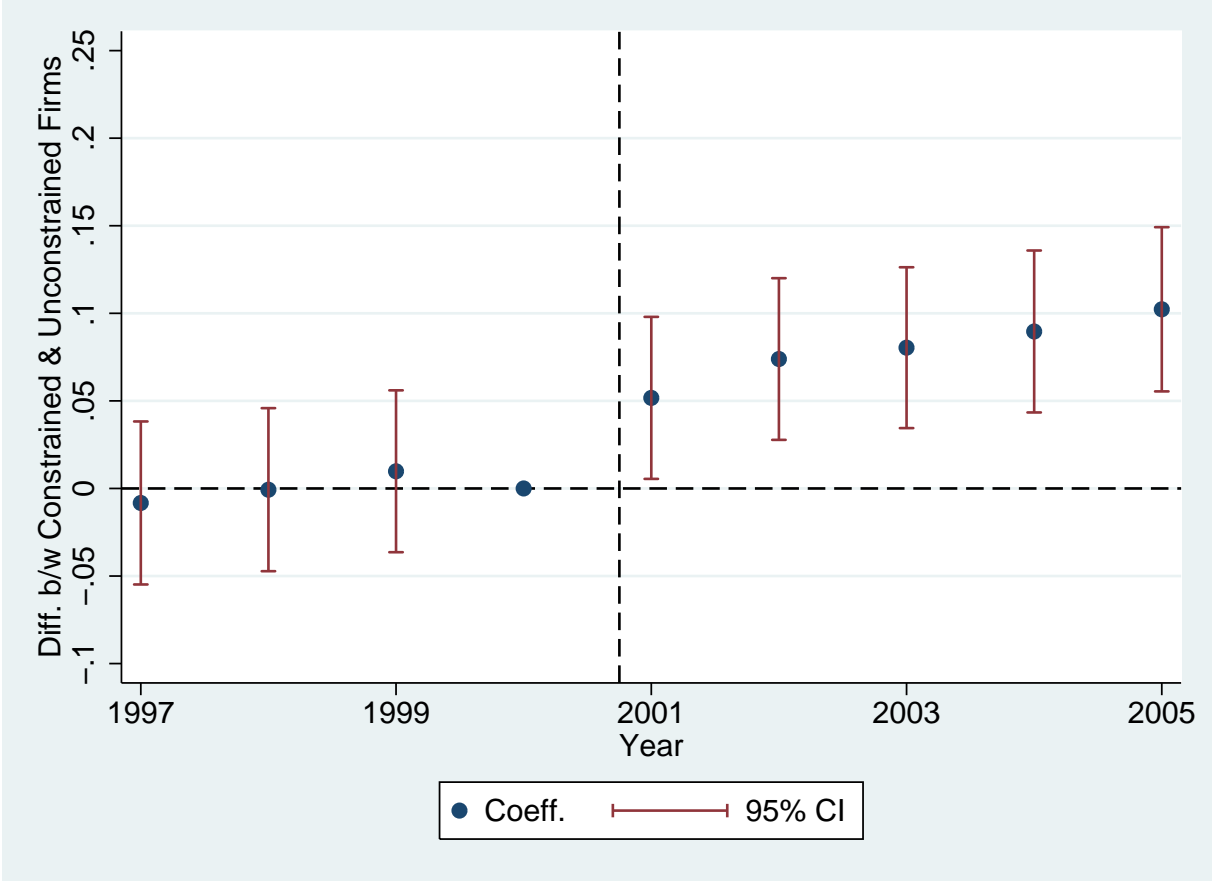
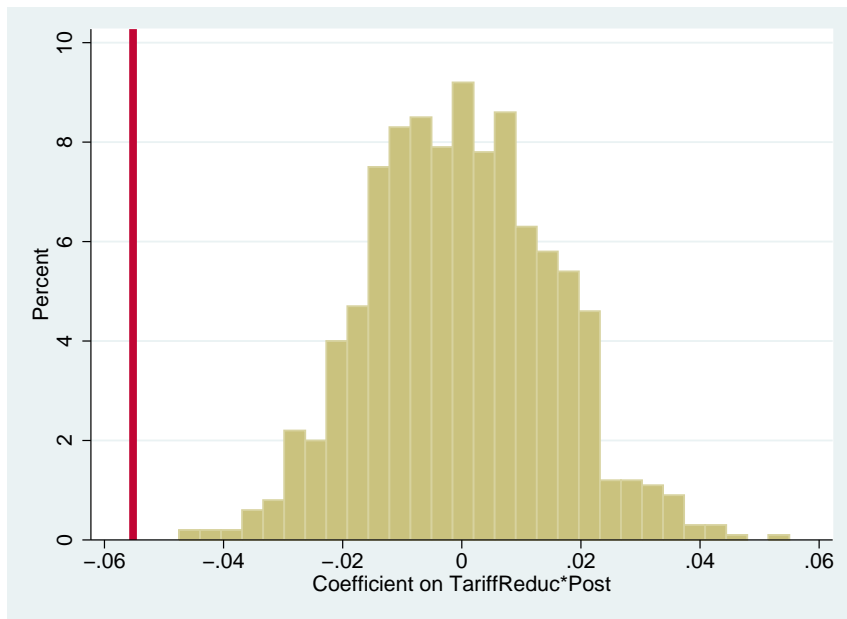


Figure5: Placebo Estimates

This figure plots the estimates from the placebo regressions. These estimates are obtained from randomly assigning significant tariff reduction (treatment) to the industries and estimating the impact of product market competition on board independence 1,000 times. Panel A plots the coefficients. The bold red line represents the coefficient obtained earlier (with the actual tariff reduction events rather than randomly assigned events). Panel B shows the Cumulative density function of t-values of the coefficients from placebo regressions. The bold red line indicates the t-value of the coefficient obtained earlier.

Panel A: Coefficients



Panel B: CDF of t-values of the coefficients

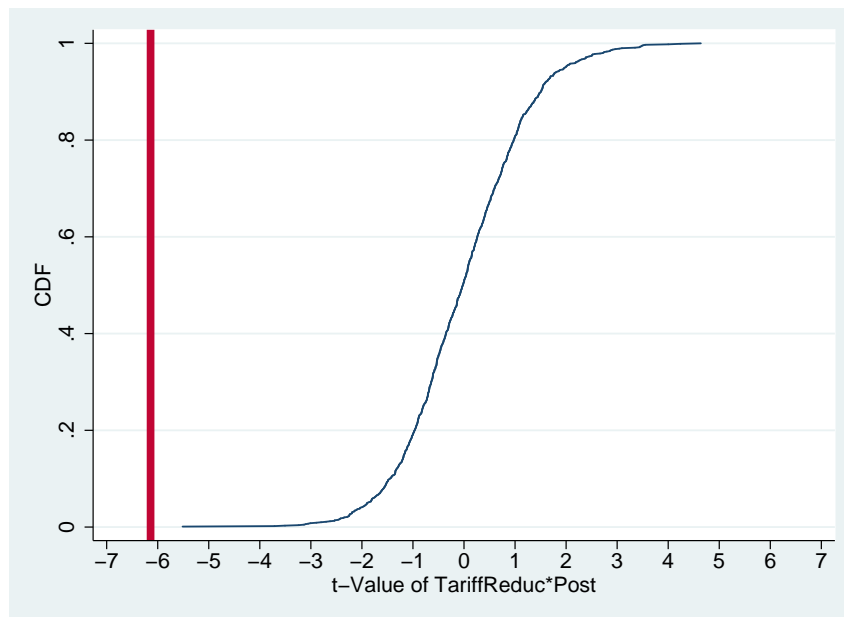


Table I: Descriptive Statistics

The table reports the descriptive statistics of the variables used. Number of observations, mean, standard deviation, median, minimum and maximum values of the variables are provided. Panel A contains the descriptive statistics of tariff variables. Panel B reports the summary statistics for the main corporate variables. Lastly, Panel C reports descriptive statistics of the main board variables and governance controls used in the analysis.

	N	Mean	Std Dev	Median	Minimum	Maximum
<hr/> Panel A: Tariff Variables <hr/>						
Tariff	3307	2.133	2.917	1.150	0.000	27.612
Change in Tariff	3212	-0.112	0.361	-0.010	-1.786	1.117
Tariff Reduction	3446	0.022	0.147	0.000	0.000	1.000
<hr/> Panel B: Firm Controls <hr/>						
ROA	23803	0.022	0.282	0.105	-1.305	0.394
Log(Assets)	23824	5.403	2.133	5.218	1.068	10.605
Cash	23819	0.259	0.258	0.171	0.000	0.956
Leverage	23796	0.179	0.193	0.131	0.000	0.940
Investment	23734	0.272	0.198	0.215	0.014	0.947
R\&D	23827	0.104	0.163	0.047	0.000	0.955
Dividends	23803	0.010	0.024	0.000	0.000	0.179
<hr/> Panel C: Board & Governance Controls <hr/>						
Board Ind.	23827	0.636	0.246	0.667	0.000	1.000
Board Size	23827	6.804	2.708	7.000	1.000	21.000
Proportion of females in the board	23827	0.062	0.097	0.000	0.000	1.000
Mean board age	23824	58.087	5.868	58.625	29.000	80.600
pct.american	23826	0.565	0.334	0.600	0.000	1.000
G Index	3905	8.942	2.663	9.000	1.000	17.000
Inst. Ownership	21417	0.376	0.364	0.304	0.000	1.000
Inst. Conc.	21417	0.353	0.391	0.125	0.000	1.000

Table II: Product Market Competition and Board independence

This table reports the estimated relation between board independence and increase in product market competition using OLS estimation. The sample contains firm-year observations from 1980-2015. The dependent variable, board independence, is measured as the proportion of independent directors in the board. Tariff reduction is equal to one for all firms which ever receive tariff reduction. Post equals one for all the years after tariff reduction takes place. Firm controls include lagged ROA, log(assets), cash, investment, leverage, R&D, dividends. Board controls include lagged board size, age and gender and ethnic composition. Standard errors, clustered at 2-digit SIC level, are reported in parenthesis. Coefficients marked with *, **, and *** are significant at the 10%, 5%, and 1% level, respectively.

VARIABLES	(1) Board Ind.	(2) Board Ind.	(3) Board Ind.
Tariff Reduction * Post	-0.0337* (0.0162)	-0.0331* (0.0165)	-0.0311* (0.0153)
Observations	23,783	23,783	23,783
R-squared	0.6786	0.6789	0.6814
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry x Year FE	Yes	Yes	Yes
Firm Controls	No	Yes	Yes
Board Controls	No	No	Yes

Table III: Product Market Competition and Board independence - Prior to 2002

This table reports the estimated relation between board independence and increase in product market competition using OLS estimation. The sample contains firm-year observations from 1980-2001. The dependent variable, board independence, is measured as the proportion of independent directors in the board. Tariff reduction is equal to one for all firms which ever receive tariff reduction. Post equals one for all the years after tariff reduction takes place. Firm controls include lagged ROA, log(assets), cash, investment, leverage, R&D, dividends. Board controls include lagged board size, age and gender and ethnic composition. Standard errors, clustered at 2-digit SIC level, are reported in parenthesis. Coefficients marked with *, **, and *** are significant at the 10%, 5%, and 1% level, respectively.

VARIABLES	(1) Board Ind.	(2) Board Ind.	(3) Board Ind.
Tariff Reduction * Post	-0.0606*** (0.0096)	-0.0601*** (0.0096)	-0.0553*** (0.0091)
Observations	10,036	10,036	10,036
R-squared	0.6994	0.6996	0.7026
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry x Year FE	Yes	Yes	Yes
Firm Controls	No	Yes	Yes
Board Controls	No	No	Yes

Table IV: Product Market Competition and Board Composition

This table reports the estimated relation between an increase in product market competition and various measures of board composition using OLS estimation. Dependent variables in column 1, 2 and 3 are the number of independent, number of employee and number of linked directors in the board respectively. Dependent variable in column 4 is board size measured as log of total number of directors in the board. The sample contains firm-year observations from 1996-2001. Tariff reduction is equal to one for all firms which ever receive tariff reduction. Post equals one for all the years after tariff reduction takes place. Firm controls include lagged ROA, log(assets), cash, investment, leverage, R&D, dividends. Board controls include lagged board size, age and gender and ethnic composition, and whether board is classified or has a poison pill provision. Presence of institutional investors and their concentration is also included in the controls. Standard errors, clustered at 2-digit SIC level, are reported in parenthesis. Coefficients marked with *, **, and *** are significant at the 10%, 5%, and 1% level, respectively.

VARIABLES	(1) Log(Ind Dir)	(2) Log(Emp Dir)	(3) Log(Link Dir)	(4) Log(Brd Size)
Tariff Reduction * Post	-0.1387** (0.0662)	0.1100* (0.0620)	0.2027** (0.0961)	0.0105 (0.0333)
Observations	1,373	1,373	1,373	1,373
R-squared	0.9099	0.8021	0.7764	0.9253
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry x Year FE	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes
Board Controls	Yes	Yes	Yes	Yes

Table V: Varying Exposure to Competition

This table reports the estimated relation between board independence and increase in product market competition for different sub-samples of the data, depending on their exposure to competition. Column 1, 2, 3 and 4 contain subsamples of diversified, focused, exporting and non-exporting firms respectively. Column 5 contains subsample of firms in low competitive industries (high HHI) and column 6 contain subsample of firms in high competitive industries (low HHI). The sample contains firm-year observations from 1980-2001. The dependent variable, board independence, is measured as the proportion of independent directors in the board. Tariff reduction is equal to one for all firms which ever receive tariff reduction. Post equals one for all the years after tariff reduction takes place. Diversified (Focused) is equal to one if it reports operations in more than one (only one) industry (4-digit SIC code) in a given year. Exporting is equal to one if a firm realizes positive sales abroad in a given year and non-exporting is equal to one if no sales abroad are realized in a given year. Firm controls include lagged ROA, log(assets), cash, investment, leverage, R&D, dividends. Board controls include lagged board size, age and gender and ethnic composition. Standard errors, clustered at 2-digit SIC level, are reported in parenthesis. Coefficients marked with *, **, and *** are significant at the 10%, 5%, and 1% level, respectively.

Dependent Variable	Board Independence					
	Diversified	Non-Diversified	Exporting	Non-Exporting	High HHI	Low HHI
Tariff Reduction * Post	-0.0208 (0.0365)	-0.0553*** (0.0157)	-0.0174 (0.0231)	-0.0656*** (0.0121)	-0.0590*** (0.0158)	-0.0460 (0.0706)
Observations	2,189	7,574	2,368	7,479	2,119	1,988
R-squared	0.8343	0.7308	0.7313	0.7439	0.6717	0.7398
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry x Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Board Controls	Yes	Yes	Yes	Yes	Yes	Yes

Table VI: Competition, Regulation and Firm Performance - DiD

This table reports the DiD estimation. The dependent variable is firm performance measured by firm ROA. The sample contains firm-year observations from 2003-2015. Tariff reduction is equal to one for all firms which ever receive tariff reduction and zero otherwise. Post equals one for all the years after tariff reduction takes place and zero otherwise. Constrained is equal to one if the firm has board independence of 55% or lower at the time of tariff reduction. Firm controls include lagged ROA, log(assets), cash, investment, leverage, R&D, dividends. Board controls include lagged board size, age and gender and ethnic composition. Presence of institutional investors and their concentration is also included in the controls. Standard errors, clustered at 2-digit SIC level, are reported in parenthesis. Coefficients marked with *, **, and *** are significant at the 10%, 5%, and 1% level, respectively.

VARIABLES	(1) ROA	(2) ROA	(3) ROA
Post Tariff	0.2100*** (0.0000)	0.0291 (0.0789)	0.2018** (0.0607)
Constrained * Post Tariff	-0.0603*** (0.0000)	-0.1230** (0.0335)	-0.1012*** (0.0146)
Observations	253	253	253
R-squared	0.8803	0.8943	0.8960
Sample	2003-2015	2003-2015	2003-2015
Constrained Definition	0.55	0.55	0.55
Firm Controls	No	Yes	Yes
Board Controls	No	No	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry x Year FE	Yes	Yes	Yes

Table VII: Competition, Regulation and Firm Performance - DiDiD

This table reports the DiDiD estimation. The dependent variable is firm performance measured by firm ROA. The sample contains firm-year observations for eight years before and after the law was passed i.e. 2003. Tariff reduction is equal to one for all firms which ever receive tariff reduction and zero otherwise. Post equals one for all the years after tariff reduction takes place and zero otherwise. Constrained is equal to one if the firm has board independence of 55% or lower at the time of tariff reduction. Post Law equals one for all years after the passage of law i.e. 2003 and onwards. Firm controls include lagged ROA, log(assets), cash, investment, leverage, R&D, dividends. Board controls include lagged board size, age and gender and ethnic composition. Presence of institutional investors and their concentration is also included in the controls. Standard errors, clustered at 2-digit SIC level, are reported in parenthesis. Coefficients marked with *, **, and *** are significant at the 10%, 5%, and 1% level, respectively.

VARIABLES	(1) ROA	(2) ROA	(3) ROA
Post Tariff	0.0062 (0.0527)	0.0173 (0.0452)	0.0188 (0.0449)
Constrained * Post Law	0.0229 (0.0192)	-0.0026 (0.0297)	0.0125 (0.0334)
Constrained * Post Tariff	0.0498 (0.0401)	0.0262 (0.0316)	0.0269 (0.0314)
Post Nasdaq * Post Tariff	0.0333 (0.0500)	0.0407 (0.0384)	0.0524 (0.0416)
Constrained * Post Law * Post Tariff	-0.1442*** (0.0515)	-0.0877** (0.0337)	-0.1045*** (0.0361)
Observations	7,533	7,533	7,532
R-squared	0.6270	0.6560	0.6561
Sample	+/- 8	+/- 8	+/- 8
Constrained Definition	0.55	0.55	0.55
Firm Controls	No	Yes	Yes
Board Controls	No	No	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry x Year FE	Yes	Yes	Yes

Table VIII: Do Industry Board Independence Predict Tariff Reduction Events

This table reports the estimated relation between tariff reduction and lagged average industry board independence using OLS estimation. The sample contains industry-year observations from 1980-2015. The dependent variable, tariff reduction, is equal to one for the year in which an industry receives tariff reduction. Board independence at the industry-level is measured as the average board independence of all the firms in that industry. Industry controls include lagged industry level-ROA, log(assets), cash, investment, leverage, R&D and dividends. Industry board controls include lagged industry-level board size, age and gender and ethnic composition. Standard errors, clustered at 2-digit SIC level, are reported in parenthesis. Coefficients marked with *, **, and *** are significant at the 10%, 5%, and 1% level, respectively.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Tariff Reduc	Tariff Reduc	Tariff Reduc	Tariff Reduc	Tariff Reduc	Tariff Reduc
Board Independence t-1	0.0078 (0.0097)	0.0137 (0.0142)	0.0167 (0.0149)	0.0142 (0.0149)	-0.0044 (0.0099)	-0.0038 (0.0124)
Observations	3,299	3,299	3,299	3,299	865	865
R-squared	0.0406	0.0613	0.0634	0.0614	0.1431	0.1536
Industry Financial Controls	No	No	Yes	No	No	Yes
Industry Governance Controls	No	No	No	Yes	No	Yes
Industry Lobbying Controls	No	No	No	No	Yes	Yes
Industry FE	No	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
F-Test: Industry Lobbying Controls = 0						
F-Test: Industry Governance Controls = 0				0.194	0.232	0.224
F-Test: Industry Financial Controls = 0			1.192			0.724
						1.013

Table IX: Differences between Treated and Control Firms

This table shows the differences in firm and board characteristics between firms affected by the tariff reduction (treated firms) relative to firms that are not affected by the tariff reduction (control firms). Panel A and B show the differences in treated and control firms in levels, while Panel C and D show the differences in trends for treated and control firms. Standard errors, clustered at 2-digit SIC level, are reported in parenthesis. Coefficients marked with *, **, and *** are significant at the 10%, 5%, and 1% level, respectively.

Panel A - Differences in Levels for Firm Variables

	ROA	Log(Assets)	Cash	Leverage	Investment	R&D	Dividends
Tariff Reduction	-0.0240 (0.0251)	0.1249 (0.2077)	0.0660** (0.0287)	-0.0194 (0.0119)	0.0280 (0.0171)	0.0304** (0.0135)	-0.0022** (0.0009)
Constant	-0.0437* (0.0252)	5.0845*** (0.1445)	0.2848*** (0.0275)	0.1893*** (0.0106)	0.2885*** (0.0142)	0.1225*** (0.0140)	0.0104*** (0.0008)
Observations	1,475	1,475	1,475	1,475	1,475	1,475	1,475
R-squared	0.2715	0.1672	0.3811	0.1225	0.1574	0.3404	0.2011

Panel B - Differences in Levels for Board Variables

	Board Ind.	Board Size	Prop. Female	Avg. Age	Prop. American
Tariff Reduction	0.0128 (0.0117)	-0.0238 (0.1098)	0.0104** (0.0043)	0.2304 (0.3103)	-0.0050 (0.0218)
Constant	0.6631*** (0.0111)	7.0719*** (0.0813)	0.0571*** (0.0035)	57.6745*** (0.2424)	0.5088*** (0.0167)
Observations	1,475	1,475	1,475	1,475	1,475
R-squared	0.0468	0.0894	0.0675	0.0218	0.0310

Panel C - Differences in Trends for Firm Variables

	ROA	Log(Assets)	Cash	Leverage	Investment	R&D	Dividends
Tariff Reduction	0.0052 (0.0035)	0.0193* (0.0110)	-0.0009 (0.0031)	0.0029 (0.0023)	-0.0012 (0.0032)	-0.0009 (0.0019)	-0.0001 (0.0005)
Constant	-0.0108*** (0.0033)	0.0563*** (0.0089)	-0.0082*** (0.0029)	0.0081*** (0.0019)	-0.0183*** (0.0024)	0.0048** (0.0019)	0.0003 (0.0003)
Observations	1,472	1,472	1,472	1,471	1,472	1,472	1,472
R-squared	0.0068	0.0123	0.0175	0.0253	0.0127	0.0036	0.0024

Panel D - Differences in Trends for Board Variables

	Board Ind.	Board Size	Prop. Female	Avg. Age	Prop. American
Tariff Reduction	-0.0032 (0.0023)	-0.0098 (0.0209)	-0.0006 (0.0007)	0.0128 (0.0449)	-0.0022 (0.0015)
Constant	0.0169*** (0.0019)	-0.0471** (0.0200)	0.0039*** (0.0006)	0.6155*** (0.0343)	-0.0043*** (0.0011)
Observations	1,472	1,372	1,472	1,472	1,472
R-squared	0.0135	0.0116	0.0121	0.0186	0.0079

Table X: Differences between Constrained and Unconstrained Firms

This table shows the differences in firm and board characteristics between constrained and unconstrained firms where constrained is defined as equal to one if firm had board independence of 60% at the time of tariff reduction. Panel A and B show the differences in treated and control firms in levels, while Panel C and D show the differences in trends for treated and control firms. Standard errors, clustered at 2-digit SIC level, are reported in parenthesis. Coefficients marked with *, **, and *** are significant at the 10%, 5%, and 1% level, respectively.

Panel A - Differences in Levels for Firm Variables							
	ROA	Log(Assets)	Cash	Leverage	Investment	R&D	Dividends
(mean) constrained_at_tariffreduction	0.1083*** (0.0315)	0.3089** (0.1364)	-0.0733*** (0.0199)	0.0006 (0.0223)	-0.0659*** (0.0128)	-0.0308* (0.0158)	0.0024 (0.0019)
Constant	-0.1145*** (0.0272)	4.4326*** (0.0836)	0.3606*** (0.0227)	0.1744*** (0.0159)	0.3819*** (0.0120)	0.1690*** (0.0162)	0.0069*** (0.0007)
Observations	587	588	588	588	586	588	588
R-squared	0.1384	0.1254	0.2794	0.0251	0.1466	0.2203	0.0620

Panel B - Differences in Levels for Board Variables					
	Board Ind.	Board Size	Prop. Female	Avg. Age	Prop. American
(mean) constrained_at_tariffreduction	-0.1513*** (0.0200)	-0.0636 (0.1931)	0.0030 (0.0056)	0.6427 (0.4351)	0.0485** (0.0190)
Constant	0.5501*** (0.0098)	5.7281*** (0.1039)	0.0429*** (0.0029)	54.4067*** (0.2287)	0.5784*** (0.0161)
Observations	588	588	588	588	588
R-squared	0.1510	0.0818	0.0509	0.0541	0.0196

Panel C - Differences in Trends for Firm Variables							
	ROA	Log(Assets)	Cash	Leverage	Investment	R&D	Dividends
(mean) constrained_at_tariffreduction	0.0009 (0.0047)	-0.0287 (0.0226)	-0.0030 (0.0026)	-0.0045 (0.0044)	0.0107 (0.0089)	0.0003 (0.0033)	-0.0014* (0.0008)
Constant	-0.0043 (0.0034)	0.1605*** (0.0194)	-0.0034 (0.0026)	0.0082* (0.0042)	-0.0221*** (0.0055)	-0.0000 (0.0026)	0.0014** (0.0007)
Observations	516	516	516	516	515	516	516
R-squared	0.0099	0.0323	0.0248	0.0193	0.0382	0.0040	0.0076

Panel D - Differences in Trends for Board Variables					
	Board Ind.	Board Size	Prop. Female	Avg. Age	Prop. American
(mean) constrained_at_tariffreduction	0.0003 (0.0039)	-0.0109 (0.0453)	-0.0002 (0.0017)	-0.0523 (0.0629)	0.0051 (0.0036)
Constant	0.0252*** (0.0028)	0.0094 (0.0335)	0.0019 (0.0015)	0.7791*** (0.0433)	-0.0029 (0.0024)
Observations	516	490	516	516	516
R-squared	0.0543	0.0568	0.0170	0.0460	0.0204

Table XI: Product Market Competition and Board independence - with alternate thresholds to define tariff reduction events

This table reports the estimated relation between board independence and increase in product market competition using OLS estimation. Each column uses a different cut-off to define tariff reduction event mentioned in the last row of each column. The sample contains firm-year observations from 1980-2001. The dependent variable, board independence, is measured as the proportion of independent directors in the board. Tariff reduction is equal to one for all firms which ever receive tariff reduction. Post equals one for all the years after tariff reduction takes place. Firm controls include lagged ROA, log(assets), cash, investment, leverage, R&D, dividends. Board controls include lagged board size, age and gender and ethnic composition. Standard errors, clustered at 2-digit SIC level, are reported in parenthesis. Coefficients marked with *, **, and *** are significant at the 10%, 5%, and 1% level, respectively.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Board Ind.	Board Ind.	Board Ind.	Board Ind.	Board Ind.	Board Ind.
Tariff Reduction * Post	-0.0552*** (0.0090)	-0.0322*** (0.0091)	-0.0605*** (0.0105)	-0.0625*** (0.0149)	-0.0614*** (0.0201)	-0.0841*** (0.0190)
Observations	10,063	10,063	10,063	10,063	10,063	10,063
R-squared	0.7018	0.7011	0.7016	0.7021	0.7020	0.7033
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Board Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry x Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Tariff Cut	Baseline	>2	>4	>3 Mdn	>2 Mdn	>4 Mdn

Table XII: Competition, Regulation and Firm Performance - with alternate definitions of constrained and alternate sample periods

This table reports the DiDiD estimation for the effect of competition and regulation on firm performance measured by firm ROA. First three columns use alternate definitions of constrained while keeping the sample period constant. Columns 4, 5 and 6 provide results obtained using different sample periods while keeping constant the definition of constrained. Tariff reduction is equal to one for all firms which ever receive tariff reduction and zero otherwise. Post equals one for all the years after tariff reduction takes place and zero otherwise. Post Law equals one for all years after the passage of law i.e. 2003 and onwards. Firm controls include lagged ROA, log(assets), cash, investment, leverage, R&D, dividends. Board controls include lagged board size, age and gender and ethnic composition. Presence of institutional investors and their concentration is also included in the controls. Standard errors, clustered at 2-digit SIC level, are reported in parenthesis. Coefficients marked with *, **, and *** are significant at the 10%, 5%, and 1% level, respectively.

VARIABLES	Alternate thresholds			Alternate sample periods		
	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(5) ROA	(6) ROA
Post Tariff	0.0188 (0.0449)	0.0195 (0.0449)	0.0208 (0.0455)	0.0229 (0.0327)	0.0441 (0.0657)	0.0119 (0.0327)
Constrained * Post Law	0.0125 (0.0334)	0.0126 (0.0334)	0.0183 (0.0338)	-0.0231 (0.0239)		
Constrained * Post Tariff	0.0269 (0.0314)	0.0259 (0.0315)	0.0286 (0.0299)	-0.0097 (0.0241)	-0.0264 (0.0219)	-0.0041 (0.0272)
Post Nasdaq * Post Tariff	0.0524 (0.0416)	0.0511 (0.0419)	0.0461 (0.0411)	0.0290 (0.0436)	-0.0850** (0.0308)	0.0175 (0.0544)
Constrained * Post Law * Post Tariff	-0.1045*** (0.0361)	-0.1033*** (0.0364)	-0.1025*** (0.0360)	-0.0562** (0.0264)	-0.0399** (0.0168)	-0.0927* (0.0517)
Observations	7,532	7,532	7,532	8,443	2,140	9,054
R-squared	0.6561	0.6560	0.6559	0.6589	0.7724	0.6317
Sample	+/- 8	+/- 8	+/- 8	+/- 10	+/- 6	+/- 12
Constrained Definition	.55	.5	.6	.55	.55	.55
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Board Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry x Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table XIII: Competition, Regulation and Tobin's Q

This table reports the DiDiD estimation for the effect of competition and regulation on firm performance. The dependent variable is Tobin's Q. First three columns use alternate definition of constrained while keeping the sample period constant to eight years before and after the law is passed. Columns 4, 5 and 6 provide results obtained using different sample periods while keeping constant the definition of constrained. Tariff reduction is equal to one for all firms which ever receive tariff reduction and zero otherwise. Post equals one for all the years after tariff reduction takes place and zero otherwise. Post Law equals one for all years after the passage of law i.e. 2003 and onwards. Firm controls include lagged ROA, log(assets), cash, investment, leverage, R&D, dividends. Board controls include lagged board size, age and gender and ethnic composition. Presence of institutional investors and their concentration is also included in the controls. Standard errors, clustered at 2-digit SIC level, are reported in parenthesis. Coefficients marked with *, **, and *** are significant at the 10%, 5%, and 1% level, respectively.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q
Post Tariff	0.1685 (0.2614)	0.1685 (0.2614)	0.1321 (0.2622)	0.3911* (0.2075)	-0.4697 (0.8577)	0.2409 (0.1612)
Constrained * Post Law	0.9094*** (0.2978)	0.9094*** (0.2978)	0.9188*** (0.2976)	0.6209* (0.3564)	0.8035* (0.4588)	0.5029 (0.3131)
Constrained * Post Tariff	0.1405 (0.2075)	0.1405 (0.2075)	0.1995 (0.1900)	-0.4761 (0.3181)	0.7683 (0.6096)	-0.4645* (0.2533)
Post Nasdaq * Post Tariff	0.5041** (0.1931)	0.5041** (0.1931)	0.5545** (0.2088)	0.2395 (0.2062)	0.1846 (0.4570)	0.1675 (0.1934)
Constrained * Post Law * Post Tariff	-1.0901*** (0.2443)	-1.0901*** (0.2443)	-1.1542*** (0.2528)	-0.7173** (0.3527)	-1.1788** (0.5027)	-0.5348* (0.2695)
Observations	7,079	7,079	7,079	7,931	1,962	8,540
R-squared	0.5656	0.5656	0.5657	0.5670	0.6077	0.5679
Sample	+/- 8	+/- 8	+/- 8	+/- 10	+/- 6	+/- 12
Constrained Definition	.55	.5	.6	.55	.55	.55
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Board Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry x Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Appendix

Variable Definitions and Data Sources

Panel A: Tariff Variables (from Peter Schott's website)

Tariff	Duties collected at U.S. Custom divided by the Free-On-Board custom value of imports at the four-digit SIC industry
Tariff Reduction	Dummy variable equal to one if the reduction in the tariff rate is more than 3 times larger than the average tariff reduction in the industry, and zero otherwise.

Panel B: Firm Controls (from Compustat)

ROA	Ratio of operating income before depreciation (OIBDP) to firm's total assets (AT).
Log(Assets)	Logarithm of total assets (AT)
Cash	Ratio of Cash and short term investments (CHE) to firm's total assets(AT).
Leverage	Ratio of the book value of total debt (DLC+DLTT) to firm's total assets (AT)
Investment	Ratio of capital expenditure (CAPX) to total net property, plant, and equipment (PPENT).
R\&D	Ratio of research and development expense (XRD) to firm's total assets (AT).
Dividends	The ratio of cash dividends (DV + DVP) to firm's total assets.

Panel C: Board & Governance Controls (from ISS and 13F)

Board Ind.	Proportion of independent directors in the board
Board Size	Number of directors in the board
Log(Ind Dir)	Logarithm of the number of Independent directors in the board
Log(Emp Dir)	Logarithm of the number of non-independent directors in the board which are employees of the firm
Log(Link Dir)	Logarithm of the number of non-independent directors in the board which are linked to the firm
pct.american	Proportion of directors in the board with listed nationality as "American"
pct.female	Proportion of female directors in the board
Inst. Ownership	Proportion of total shares outstanding held by the institutional investors (From 13F)
Inst. Conc.	The concentration index (HHI) of institutional ownership (between 0 and 1)

Panel D: Other Variables (from Compustat's Geographic Segment files)

Exporting	Dummy variable equal to one if a firm realizes positive sales abroad, and zero otherwise
Non-Exporting	Dummy variable equal to one if a firm realizes zero sales abroad, and zero otherwise
Focused	Dummy variable equal to one if a firm reports only one business segment, and zero otherwise
Diversified	Dummy variable equal to one if a firm reports more than one business segment, and zero otherwise
