CEO Duality, Competition, and Firm Performance

Tina Yang[a][*], Shan Zhao[b]

[a]School of Business, Villanova University, Villanova, PA USA
[b]Grenoble Ecole de Management, Cedex 01, France

Abstract

U.S. companies are under intense pressure to abolish CEO duality (the Chief Executive Officer holds the position of the Chairman of the Board). In early 1990s, more than 70% of U.S. firms have a dual leadership structure. Now the ratio is just over 50%. The trend towards separate leadership is unsettling, given the lack of convincing evidence on whether dual leadership is detrimental to firm performance. Using an exogenous shock that increased competition, we find that duality firms outperform non-duality firms by 3% when competition intensifies. The positive effect of having a dual leadership structure is larger when firms face higher information costs. The findings are robust to controlling for the impact of competition on managerial slack and a battery of other tests. Our results have important policy implications as the pressure on firms to have independent COB continues to mount and globalization and technology advancement bring about fiercer competition.

Corresponding author: Tina Yang, tianxia.yang@villanova.edu

1. Introduction

Whether to split the titles of the Chief Executive Officer (CEO) and the Chairman of the Board (COB) is one of the most contentious corporate governance issues in recent years. American companies have a long tradition of combining the titles (hereafter duality or dual leadership for brevity). Until early 1990s, more than 70% of U.S. firms have dual leadership. However, firms are under growing pressure to split, especially after the U.S. Securities and Exchange Commission (SEC) and the Dodd-Frank Act require listed firms effective 2010 to disclose the reasoning behind their board leadership structure.[1] Using RiskMetrics' board data, we calculate that only 54% of S&P1500 firms have dual leadership in 2010. The strong push towards abolishing duality is in stark contrast with the mixed evidence on the impact of board leadership structure on firm performance. Importantly, while we have a large body of literature analyzing the costs and benefits associated with each leadership model, we lack empirical evidence directly linking the costs and benefits to firm performance. A lack of knowledge on this subject makes the current, uniform push towards independent COB potentially dangerous.

We contribute to the literature by using an exogenous shock to study the impact of board leadership on firm performance when competition intensifies and identifying the channels through which board leadership drives firm performance. We believe that our research design is of particular relevance today as U.S. firms are facing increasing competition due to forces like globalization and technology advancement.

The exogenous shock is the implementation of the 1989 Canada-United States Free-Trade Agreement (FTA), which increased the competition of U.S. firms by eliminating all tariffs and other trade barriers between the U.S. and Canada. We hypothesize that dual leadership is superior to separate leadership (i.e., the Chairman of the Board is someone other than the CEO)

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[1] *See* the SEC's Proxy Disclosure Enhancements, *available at* http://www.sec.gov/rules/final/2009/33-9089.pdf)

in a competitive environment because it minimizes information costs and control costs. Consistent with our hypothesis, we find that, in industries where the FTA eliminates tariffs, duality firms outperform non-duality firms after the trade liberalization. We argue that competition increases the value of information, particularly the value of specific information, because information gives firms market power and information is costly to transfer, particularly specific information. We name this type of information costs *information specificity costs*. Dual leadership has lower *information specificity costs* because CEOs possess unparalleled firm-specific information. Consistent with this argument, we find that the performance impact of dual leadership is larger when firms spend more on R&D and advertisement. We argue that competition requires fast and frequent decision making because as competition intensifies information updates and obsoletes at a faster rate and the costs of lost opportunities become more severe. We name this type of information costs *information immediacy costs*. Dual leadership has lower *information immediacy costs* than separate leadership because it eliminates an extra chain of command. Consistent with this argument, we find that the performance impact of dual leadership is larger when firms have more intangible assets.

Conforming to a vast literature and the common wisdom that competition promotes efficiency, we find that those firms, which are under tariff protection before 1989, significantly reduce slack and improve productivity after the trade liberalization. However, the positive effect of dual leadership on firm performance far exceeds the performance contribution from reduction of slack. Our results are robust to additional consideration of an array of operating and governance variables and the possibility of survival bias.

We also study the impact of board size, board composition, and D&O ownership on firm performance. We find evidence, particularly strong for board size, that the relation between

governance variables and firm performance are conditional. For example, consistent with the existing literature (Yermack (1996)), we find that board size is significantly and negatively related to Tobin's Q. However, the relation between board size and Tobin's Q turns positive when competition intensifies. In addition, once we control for the interplay between competition and other governance controls, the positive effect of duality diminishes, which lends support to the "red herring" argument that independent COB is a red herring, since the spirit of independent board leadership can be achieved through other governance mechanisms.[2]

Our paper makes several contributions. First, although the literature on the efficacy of dual leadership is large, the evidence is mixed. We use an exogenous shock, thereby mitigating the endogeneity concern that plagues the governance research, to show that, when competition intensifies, duality firms experience a larger increase (about 3%) in Tobin' Q than non-duality firms. Second, although arguments both in favor of and in opposition to dual leadership are well developed, we lack empirical evidence explicitly linking the costs or the benefits of dual leadership to firm performance (Pozen (2006)). We identify two sources of cost savings associated with dual leadership and provide direct evidence linking them to firm performance. Third, we complement a growing body of literature that assesses the performance impact of board attributes. For example, Yermack (1996) finds that expanding an eight-member board by one director is associated with a 4% reduction in Tobin's Q. Faleye (1997) finds that having a classified board reduces Q by 13%.

Lastly, our results have important policy implications. In recent years, there has been a strong push to abolish dual leadership. Pozen (2006) notes that reports sponsored between 1992-2004 by national governments, major stock exchanges, or both in at least 16 countries outside of the U.S., have recommended splitting the titles of CEO and COB. In 2010, the U.S. Congress

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[2] *Knowledge@Wharton*, June 2, 2004, "Splitting Up the Roles of CEO and Chairman: Reform or Red Herring?"

introduced three proposals calling for separating the titles (Byrd, Fraser, Lee and Tartaroglu (2012)). However, U.S. firms have been dogmatically resistant to the change. Our results help explain the reluctance of U.S. firms and the low shareholder support for proposals calling for splitting the titles of CEO and COB.[3] Our results highlight that further research into the conditional relation between governance controls and firm performance is needed to ensure effective policy making.

The rest of paper is organized as follows: Section 2 summarizes related literature and develops the hypothesis; Section 3 describes the research design; Section 4 introduces the sample; Section 5 presents the empirical results; Section 6 reviews the time trend of dual leadership in relation to trends in competition intensity and board composition; Section 7 concludes.

2. Hypothesis development

2.1.Costs and benefits of duality

The arguments against dual leadership or alternatively in favor of separate leadership are largely based on the agency theory. CEOs of modern corporations have decision rights but not control rights of shareholder capital. As a result, CEOs have conflicting interests and do not always act to maximize shareholder value. Board of directors is the apex of the decision control system of modern corporations, which mitigates agency problems due to the separation of ownership and control (Fama and Jensen (1983)). Having CEOs lead this decision control hierarchy likely compromises the effectiveness of the control system and exemplifies the ultimate conflict of interest. Supporting this conflict-of-interest argument, empirical studies find

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[3] According to a 2007 survey from MacKenzie Partners, shareholders have rejected proposals requiring independent directors to serve as chairman approximately 97% of the time since such proposals began being introduced in 2002 (http://www.sec.gov/Archives/edgar/data/865436/000104746909000379/a2190055zdef14a.htm, http://www.pbi.org/resources/extras/7062_securities_4_12/Schulman.pdf).

that when the titles of CEO and COB are combined, CEO compensation is higher and the sensitivity of CEO turnover to firm performance is lower (Core, Holthausen and Larcker (1999) and Goyal and Park (2002)). Proponents of separate leadership also argue that this setup allows the CEO to focus on running the business, while the COB running the board. An independent and experienced COB can also be a valuable resource and a sounding board for the CEO (Dalton, Daily, Johnson and Ellstrand (1998)).

The arguments for dual leadership emphasize the unparalleled firm-specific knowledge of the CEOs and the benefits of strong stewardship. As CEOs "may often have the best specific knowledge of the strategic challenges and opportunities facing the firm (Fama and Jensen, (1992))," a CEO, who is also in charge of the board, should be able to coordinate board actions and implement strategies more swiftly, giving the firm the competitive edge particularly in tough business conditions (Brickley et al. (1997)). Consolidated power also provides streamlined chain of command and clarity regarding the leadership and direction of the firm, which promotes efficient decision-making and effective dealing with external parties (Dalton et al. (1998)). Additionally, the COB title is an integral part of CEO incentive contract. If the firm does not award the additional title of COB, CEOs may be less motivated to work hard and might even consider leaving the firm.[4] Separating the dual roles could also interfere with succession planning, i.e. the retiring CEO remains on the board as the COB and relinquishes the COB title to the new CEO only after the new CEO successfully passes the probationary period (Brickley et al. (1997) and Brickley, Coles and Linck (1999)). Dual leadership saves on certain costs that separate leadership creates. Extra compensation to COB can be sizable. Walt Disney paid $550,732 to its non-executive Chairman in the fiscal year of 2009. Installing a non-executive

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[4] The CEO of HSBC threatened to quit if he is not promoted to COB (Reuters, 9/22/2010).

chairman creates its own agency problems in the form of "monitoring the monitor" (Brickley et al. (1997)).[5]

In summary, the costs of dual leadership are as numerous as the benefits with matching importance, which underlines the complex nature of the decisions of choosing board leadership structure. As the costs and the benefits are likely firm and time specific, the relation between board leadership and firm performance are likely to vary with firm characteristics and business environment as well.

2.2.Mixed evidence on the relation between board leadership and firm performance

Pi and Timme (1993) study 112 U.S. banks from 1987 to 1990 and find higher return on assets for those with separate titles. Brickley et al. (1997) study 661 U.S. firms in the 1989 *Forbes* compensation survey and find that firms with separate leadership do not perform better. If anything, firms with dual leadership are associated with better accounting performance. Their event study yields corroborative evidence. To compare with Pi and Timme, Brickley et al. separately study 130 banks and thrifts and find no significant differences in performance across firms with different board leadership models.

Palmon and Wald (2002) study 157 announcements of board leadership changes from 1896 to 1996. Similar to Brickley et al., they find no significant announcement return for change in board leadership in either direction. However, when conditioning on firm size, they find that small firms experience negative abnormal returns when changing from dual to separate leadership, while large firms experience positive abnormal returns. They find insignificant abnormal returns for changing from separate to dual leadership for all firm sizes. The results of Palmon and Wald are in contrast with Faleye (2007), who find that Tobin's Q is higher when

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[5] In Appendix I, we give some examples of arguments that firms make to support their decisions of having a dual leadership structure, including that it promotes clarity regarding the leadership of the firm, facilitates succession planning, and enhances more effective business planning and execution.

complex firms have dual leadership, but lower when non-complex firms do the same. Dalton et al. (1998) conduct a meta-analysis of 31 studies, concluding that CEO duality does not affect performance and firm size does not moderate the duality-performance relation. Dahya and Travlos (2000) review ten studies on CEO duality and find mixed results.

Dey, Engel and Liu (2011) study performance consequence of combining or splitting the titles of CEO and COB from 2001 to 2009. They find that firms splitting the titles have lower announcement returns and poorer post-announcement performance. The result is stronger if firms split under investor pressure or if firms have higher predicted probability of combining the titles based on a determinants model of board leadership. They find that firms combining the titles have higher announcement return and better post-announcement performance. The post-announcement performance is more positive if firms have higher predicted probability of duality based on the determinants model. In 1992, the Cadbury Committee's Code of Best Practice calls U.K. firms to separate the titles of CEO and COB. Using this external shock, Dahya, Galguera-Garcia and Bommel (2009) test whether firm performance improved after the separation. They fail to find any performance improvement.

2.3. Hypotheses

Christie, Joye and Watts (2003) argue that firm value is maximized when knowledge transfer costs and control costs are minimized. We extend their arguments to board leadership structure and posit that competition magnifies the information benefits of dual leadership, while attenuating the control costs, resulting ultimately in better firm performance. As the costs of dual leadership are generally the benefits of separate leadership and vice versa, dual leadership is superior to separate leadership when competition is intense.

2.3.1. Information costs

Duality minimizes information costs in competitive environment for two reasons. First, competition increases the value of information, because information gives firms market power. Firms with an information advantage over their rivals in product technology, consumer demand, and market conditions outperform their rivals. Specific information as a function of competition increases greater in value than general information, because specific information is more costly to acquire and transfer and thereby generates more sustained information rents. CEOs possess unparalleled firm-specific information and face lower information acquisition and processing costs than non-CEO Chairmen. For easy tracking, we refer to this type of information cost as *information specificity cost*.

Second, competition requires fast and frequent decision-making, because information updates more rapidly and the consequence of lost opportunities due to delayed decisions becomes more severe in a competitive marketplace. Literature has found a positive relation between decision-making speed and organizational performance when competition is intense (see, e.g., Bourgeois and Eisenhardt (1987, 1988) and Judge and Miller (1991)). Duality is more conducive to fast and frequent decision-making than separate leadership, because the former eliminates an extra chain of command. No time and information are lost as information is being transmitted from the CEO to the COB or because decisions need to be ratified by the COB. For easy tracking, we refer to this type of information cost as *information immediacy cost*.

The organizational economics literature offers corroborating evidence for our arguments regarding information costs. This literature shows that firms decentralize when local managers have an information advantage over the headquarters (see, e.g., Jensen and Meckling (1992) and Acemoglu, Aghion, Lelarge, Van Reenen and Zilibotti (2007)) and that product market competition causes decentralization, because delegation enhances decision speed and minimizes

information processing and transmission costs (see, e.g., Bloom, Sadun, and Van Reenen (2010) and Guadalupe and Wulf (2010)). To the extent that hierarchies are a form of governance via which headquarters supervise local managers (Guadalupe and Wulf (2010)), a parallel exists between delegating authorities to local managers when competition is intense and combing the CEO and COB titles under similar conditions.

2.3.2. Control costs

Fama and Jensen (1983) argue that those firms, which can effectively control agency costs, excel in competition. The main advantage of separate leadership over dual leadership is the control benefits that come from independent monitoring. However, when competition intensifies, the control benefits of a non-CEO Chairman diminish because competition aligns CEOs' interests with shareholders' interests in two important ways. First, competition provides a sharper measure of CEO performance. One of the most important functions of the board of directors is to set performance criteria for CEOs, review their performance, and compensate them accordingly. Since CEOs' efforts and abilities are not directly observable and firm performance is measured with noise, evaluating CEO performance is costly and prone to errors. Competition provides information about CEO performance relative to his peers, thereby ameliorating measurement errors arising from unobserved managerial efforts and production shocks (Nickell (1996)).

Second, competition strengthens the link between firm performance and CEO welfare. CEO welfare depends on the performance of the current employer and the perception of future employers of the CEO's abilities relative to other mangers in the labor market. Competition provides more frequent ranking of the CEO in the labor market, which not only feeds into the performance evaluation at the current employer, but also influences his future job offers. In addition, when competition intensifies, sub-par performance causes more severe damage more

quickly, thereby accelerating the feedback between firm performance and CEO welfare. The extreme case is the extinction of the firm. When the firm fails, the CEO not only loses current employment and suffers immediate pecuniary loss, but his reputation in the managerial labor market is also tarnished, which negatively impacts his future employment and wage. In other words, intense competition forces CEOs to internalize certain agency costs. Consistent with this idea, Giroud and Mueller (2010) find that CEOs in non-competitive industries enjoy "quiet life," a form of agency costs due to lack of efforts.

To summarize, we argue that dual leadership is a superior board leadership structure to separate leadership when competition is intense, because dual leadership incurs lower information costs and control costs. Therefore, when an exogenous shock increases the level of competition, we expect duality firms to outperform non-duality firms.

3. Research design

3.1. The Canada-United States Free Trade Agreement of 1989

To test our hypotheses, we use the Canada-United States Free Trade Agreement of 1989 (FTA), which is an exogenous shock that increased the level of competition of U.S. firms by eliminating tariffs and other trade barriers between the U.S. and Canada. U.S. President Ronald Reagan and Canadian Prime Minister Brian Mulroney signed the FTA on January 2, 1988. To take effect, the FTA had to be approved by the U.S. Congress and the Canadian Parliament. While it passed the U.S. Congress smoothly, the FTA encountered strong opposition in Canada. Mulroney's Progressive Conservative Party controlled the House, but the Senate, which had a Liberal Party majority, refused to ratify the FTA until Canadians voted on the issue in a national election. Mulroney was forced to dissolve the Parliament and called a general election. Although more Canadians were against the FTA than in favor of it, Mulroney's Party won the election as

they benefitted from being the only party in favor of the agreement, while the opposition parties split the anti-free trade vote. The FTA took effect on January 1, 1989. Since the passage of the FTA was improbable and unexpected, it qualifies as an exogenous shock (Brander (1991); Thompson (1993); Guadalupe and Wulf (2010); Wikipedia).

The FTA offers other advantages as a natural experiment. The FTA has been shown to significantly impact the competitive environment of U.S. firms. The world's largest bilateral trade is between Canada and the U.S. Canadian imports represented an average of 20% of total U.S. imports at the time that the FTA was signed (Guadalupe and Wulf (2010)). As Appendix II shows, tariff reduction for certain U.S. industries on Canadian imports can be as high as 36%. In addition, Canada is similar to the U.S. in terms of industrial structure and standards of living and thus Canadian products are likely to compete directly with U.S. products. Clausing (2001) finds that the FTA significantly increases U.S. imports from Canada and that the increase is larger for goods undergoing greater tariff reduction. The FTA is also associated with substantial employment loss, labor productivity gains, and reduction in price-cost margin (Trefler (2004) and Guadalupe and Wulf (2010)). Collectively, these pieces of evidence suggest that the FTA increases competition for and brings new market opportunities to U.S. firms. In addition, the FTA is a relatively clean policy experiment, untainted by confounding events like macroeconomic shocks or financial crisis (Trefler (2004)).

3.2. Empirical method

We use the following baseline model to estimate the impact of board leadership structure on firm value:

$$\textit{Tobin's } Q_{it} = \gamma_1 tariff_i * post89 * dual_i + \gamma_2 tariff_i * post89 + \tau \mathbf{X}_{it} + d_t + d_i + \varepsilon_{it} \quad \ldots(1)$$

- i indexes firms
- d_t denotes time dummies, t=1979…1998
- d_i denotes firm fixed effects

- *tariff$_i$* is the average U.S. tariff rate on Canadian imports for firm *i* for 1986-1988
- *post89* = 1, if *t* >= 1989; zero otherwise
- *dual$_i$* is an indicator variable, which equals one if the firm has a stable board leadership structure of CEO being the COB and zero otherwise
- *X* are firm characteristics, e.g., firm size, ROA, capital structure, and risk
- ε_{it} is the error term

This *difference-in-difference* setup allows us to use the exogenous shock of the FTA to study the effect of an endogenous choice, board leadership structure, on firm performance when competition increases. Specifically, by benchmarking differences in firm performance between duality and non-duality firms that are affected by the trade liberalization against differences in firm performance between duality and non-duality firms that are *not* affected by the trade liberalization, we mitigate the potential effects due to unobserved heterogeneities between duality and non-duality firms, as well as any macro-economic trend that simultaneously affects duality and non-duality firms. If $\gamma_1 > 0$, then dual leadership increases firm value when business environment becomes more competitive.

While all tariffs were scheduled to go to zero after 1989 and some tariff reductions took effect immediately, others were to be phased out over ten years. This phase-out schedule is a potential source of endogeneity. To avoid this problem, we follow Guadalupe and Wulf (2010) and treat all industries equally regardless of their phase-out schedules, by exploiting the differential tariff rates during 1986-1988. Tariff data are assembled by Feenstra (1996) and have been aggregated from the commodity level to the four-digit-Standard-Industrial-Classification (SIC) level. To get firm-level tariff rates (*tariff*), we first obtain segment sales and 4-digit SIC codes associated with each segment from the Compustat Segments Database, then weigh the tariff rates at the 4-digit-SIC level by firms' segment sales and sum the weighted rates.[6]

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[6] Using segment sales and 4-digit SIC codes from the Compustat Segments Database to compute weighted tariff rates yields a more precise measure of the tariff rate that a firm faces than using tariff rates based on the 4-digit SIC from the Compustat North American Database. It is because the Compustat North America Database assigns the 4-

As firms endogenously choose board structure, board leadership can change in any given year. Additionally, Brickley et al. (1997) show that many instances of changes in board leadership are transient due to CEO succession planning. To mitigate this measurement problem, we focus on firms with stable board leadership structure surrounding 1989. Specifically, we require sample firms to exist before 1989 and to follow a stable board leadership model. We classify a firm as following a stable board leadership model, if it does not change board leadership (*dual*) for more than 80% of firm years for a minimum of four years from 1988 to 1998. For example, a sample firm with four years of board data is classified as following a stable board leadership model only if it has the same board leadership status in all sample years. For a firm with 5-9 years of board data, board leadership status can only be different in one of the sample years. For a firm with more than 10 years of board data, board leadership status can only be different in two of the sample years. We construct *dual* this way partially because of data availability. We only have board data starting 1988. d_t controls for economic-wide changes. d_i absorbs time-invariant industry and firm heterogeneity. We control for firm-level clustering in all regressions (Petersen (2009)).

While competition increases efficiency and productivity, it likely decreases profitability (Nickell (1996) and Giroud and Mueller (2010)). Therefore, Tobin's Q is our primary measure of firm performance, because it captures the net effect of changes in all aspects of firm performance. Nevertheless, for completeness, we also report the impact of duality on ROA, ROE, and market share. We control for other firm characteristics that might affect Q, including firm size (log of total book assets), current-year return on assets (ROA), one-year and two-year

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digit SIC to a firm based on the greatest value of product shipments for a product group. Therefore, if a firm produces two products, with 40% of its shipments in SIC 2046 and 60% in SIC 6519, the assigned SIC would be 6519. The tariff rate for SIC 2046 is 0.0448127 and for SIC 6519 is zero. Thus, using 4-digit SIC from the Compustat North America Database will yield a tariff rate of zero, while using segment sales and 4-digit SIC codes from the Compustat Segments Database will yield a tariff rate of 0.0179251 (0.0448127*0.4=0.0179251).

lagged ROA, growth opportunities (R&D spending over net sales), capital structure (long-term debt over total book assets), and risk (annualized daily stock return volatility). We define these and other variables and their computation in Table 1.

4. Sample

As noted earlier, the FTA was implemented in 1989, but had a phase-out schedule of ten years. Lileeva and Trefler (2010) report that, by 1996, the tariff was down to less than one-fifth of its 1988 level and by 1998 all tariffs were eliminated. Therefore, we choose 1979-1998 as our sample period to have equal number of years before and after 1989. To be selected into our sample, the firm cannot be a utility or a financial institution, has positive values of total assets and net sales, has daily stock returns for at least a quarter of the fiscal year, follows a stable board leadership model (as defined in 3.2), and has Compustat data before 1989. We obtain financial data from Compustat North America, segment sales from Compustat Segments, and stock returns from CRSP. Board and ownership data come from the SEC Compact Disclosure Database. As Disclosure starts its data coverage in 1988, we assume 1979-1987 board and ownership values to be the same as the 1988 values. The final sample consists of 1,927 unique firms (27,345 firm years) from 1979 to 1998, or 1,181 unique firms (17,345 firm years) that have stable dual leadership and 746 unique firms (10,000 firm years) that have stable separate leadership.

Table 2 Panel A reports summary statistics of key firm characteristics, partitioned by firms protected by U.S. tariff on Canadian imports and firms without such protection before 1989. Firms whose products are protected by tariffs are larger and more diversified than firms without tariff protection. Protected firms have higher ROA, but lower ROE likely due to less

utilization of debt. Protected firms have lower Tobin's *Q*, lower sales growth, and lower stock return volatility, but spend more on R&D.

Table 2 Panel B shows that protected firms have larger boards and higher fractions of outsiders on the board, which is consistent with Panel A results that protected firms are larger. The existing literature (see, e.g., Linck et al. (2008) and Lehn et al. (2010)) has established a positive relation between firm size and board size/board independence. Interestingly, fewer protected firms have a dual leadership structure. Linck et al. (2008) find that large firms are more likely to have dual leadership than small firms. Our finding likely reflects the substitution of monitoring function between corporate board and product market. Before the trade liberalization, firms with tariff protection face less competition. Given that firms endogenously choose governance structure in response to their competitive environment to maximize firm value and long-term survival (Fama and Jensen (1983)), the theory of optimal contracting suggests that firms in less competitive industries use more stringent monitoring to compensate for lower level of discipline from market competition. Also consistent with being larger, protected firms have lower D&O ownership, but higher institutional ownership.

5. Main results

5.1. Impact of duality on Tobin's *Q*

Figure 1 contrasts time trends of median values of Tobin's *Q* for firms with stable duality status against firms with stable non-duality status. We choose to report median values of *Q* to mitigate the problem of extreme outliers. For the entire sample of 27,345 firm-year observations, the mean value of *Q* is 1.73 and median is 1.31 with a standard deviation of 1.65. As we defined earlier, firms with stable duality (non-duality) status have CEOs (a director other than the CEO) as the COB for more than 80% of firm years for a minimum of four years from 1988 to 1998.

We report the time trends separately for firms impacted by the 1989 FTA (Panel A) and firms not impacted by the 1989 FTA (Panel B). A cursory inspection of Panel A suggests that, for firms impacted by the 1989 FTA, those with dual leadership have similar valuation as those with separate leadership prior to 1989. Post trade liberalization, Tobin's Q increases for firms of both types of leadership models, although the increase appears to be larger for duality firms. As Table I Panel B shows, for those firms not impacted by the 1989 FTA, those with dual leadership exhibit similar trends in Q as those with separate leadership. Further, duality firms consistently have higher Q than non-duality firms before and after 1989, which is in line with the stylized fact that better performing CEOs are rewarded the additional title of COB (Brickley et al. (1997)). Therefore, the initial evidence seems to support our hypothesis that duality firms outperform non-duality firms when competition intensifies.

Table 3 tests our hypothesis in a multivariate setting. Column (1) is the baseline model (Equation 1). The coefficient of the variable of interest, *tariff*post89*dual*, is significantly positive in Column 1, which supports our hypothesis that duality adds value when competition intensifies. The positive effect is also economically meaningful. The average tariff rate for the sample firms used in the regression (26,280 firm-year observations for 1979-1998) is 1.68%. Thus, a coefficient estimate of 1.61 suggests that, after the implementation of the FTA, duality firms have a Tobin's Q that is 2.74% ($e^{1.68\%*1.61}$-1) higher than do non-duality firms.

We add *post89*dual* to the baseline model in Column (2) to control for the possibility that other shocks contemporaneous with the FTA systematically affect firms with duality and non-duality firms. *tariff*post89*dual* is positive but insignificant, likely due to multicollinearity. *dual* lacks variation across time. Given that we already control for time and firm fixed effects, adding *post89*dual* to the regression introduces additional noise in estimating

tariff*post89*dual. Consistent with this idea, *p*-value of the Wald test is 0.007 for the joint significance of *tariff*post89*dual* and *post89*dual* and is 0.004 for the joint significance of *tariff*post89*dual, tariff*post89*, and *post89*dual*.

We use models in Column (3) and (4) to perform a validity test of our research design. In Column (3), we test the impact of *tariff*post89* on Tobin's *Q*. In Column (4), we replace *tariff*post89* with *tariff*post88*, where *post88* is a dummy variable that takes the value of one if the sample years are after 1988 and zero otherwise. If the 1989 FTA is an exogenous shock to competition as we have argued, then we should expect *tariff*post89* to be significantly related to Tobin's *Q* and *tariff*post88* to be insignificant. In other words, Column (4) performs a placebo test. Supporting our research design, *tariff*post89* is significant and *tariff*post88* is insignificant. Further, the positive sign of *tariff*post89* is consistent with the notion that competition promotes efficiency (Nickell (1996) and Bloom and Van Reenen (2007)).

Estimation results of our control variables are qualitatively similar to the existing literature. For example, Tobin's *Q* is negatively and significantly related to firm size and stock return volatility, similar to the findings in Anderson and Reeb (2003). Tobin's *Q* is positively and significantly related to R&D spending and ROA, similar to the findings in Yermack (1996) and Anderson and Reeb (2003).

As a robustness check, instead of using firm fixed effects, we use firm random effects, add duality dummies, and re-run the baseline regression. We obtain similar results. For example, the coefficient estimate of *tariff*post89*dual* is 1.391 with a *p*-value of 0.031.

5.2.Information specificity

We argue that dual leadership is superior to separate leadership in a competitive environment, because it minimizes information costs due to information specificity and

immediacy. To provide further support for our arguments, we study the impact of duality on firm performance conditioning on the level of information specificity costs and information immediacy costs.

We argue that competition increases the value of information, especially the value of specific information, because specific information generates more information rents and is more costly to transfer. Dual leadership reduces information specificity costs, because CEOs possess unparalleled firm-specific information. We predict that, after 1989, as competition becomes tougher, firms with dual leadership and high levels of information specificity costs outperform firms with separate leadership and high levels of information specificity costs.

To test our hypothesis, we divide the sample into two groups, firms with above-median values of information specificity costs and firms with below-median values. We use the level of R&D spending to proxy for the level of information specificity costs. Literature establishes that R&D involves specialized inputs that are unique to the investing firm and is a powerful proxy for information that is privy to insiders and costly to transfer (Levy (1985) and Aboody and Lev (2000)).[7] Following the literature, we replace missing R&D spending with zero. Since the median value of R&D is zero, we replace R&D spending with capital expenditure (CAPX) in the baseline regression. Similar to our treatment of R&D, we replace missing CAPX with zero. Our sample has 455 observations, which miss values of CAPX. We also replace two observations that have negative values of CAPX with zero. Results are reported in Table 4.

Consistent with our expectation, the coefficient estimate of *Tariff*post89*dual* is positive and significant for firms with positive R&D spending. This result suggests that, when the level of information specificity costs is high, firms with dual leadership outperform firms with separate

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[7] R&D is also the most commonly used variable to proxy for relation-specific investment (Dass, Kini, Nanda, Onal and Wang (2010) and Kale, Kedia and Williams (2010)).

leadership after the trade liberalization. Further, the economic significance of *Tariff*post89*dual* is also larger compared to the baseline model (2.74%). The mean value of the tariff rates for the sample firms with positive R&D spending (13,011 firm-year observations) is 2.1%, suggesting an increase in *Q* of 4.8%. In contrast, albeit positive, the coefficient estimate of *Tariff*post89*dual* is insignificant for firms without any R&D spending, and the size of the coefficient is also much smaller when compared to firms with R&D spending.

For additional evidence, we use advertising expense to sales as an alternative proxy for information specificity. Firms that spend heavily on advertisement likely have more unique products and non-standardized production inputs, which should be positively associated with the level of information specificity costs (Levy (1985)). To the extent that advertising itself creates an intangible asset that is non-transferable in nature (Grullon, Kanatas, and Kumar (2006)), the level of advertising spending should also correlate with the level of information specificity costs. Consistent with our hypothesis, the positive effect of dual leadership is more statistically and economically significant for firms with above median advertising expenditure post trade liberalization.

One potential concern is that the levels of R&D and advertising spending are systematically related to tariff rates. In such a case, we may capture the effect of dual leadership associated with changes in competition intensity instead of different levels of information specificity costs. To mitigate this concern, we include in the regressions only firms with above-average tariff rates (1.68%) and firms that are not impacted by the 1989 FTA. We obtain similar results.[8]

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[8] Specifically, the coefficient estimate of *tariff*post89*dual* is 2.161 (3.633) with a *p*-value of 0.022 (0.029) for firms with positive R&D spending (firms with above-median advertising spending), while the coefficient estimate of *tariff*post89*dual* is 0.199 (2.442) with a *p*-value of 0.866 (0.159) for firms without R&D spending (firms with below-median advertising spending).

5.3.Information immediacy

We argue that competition demands immediate decision-making because information obsoletes at a faster rate and the consequence of lost opportunity becomes more severe. If dual leadership is more efficient than separate leadership at processing information and making speedy decisions, then after 1989, as competition becomes tougher, firms with dual leadership and high levels of information immediacy costs should outperform firms with separate leadership and high levels of information immediacy costs.

Firms with a large amount of intangible assets are more likely to suffer greater loss in value from delayed decision-making than firms with a large amount of tangible assets. This happens because intangibles such as company reputation and intellectual property do not have obvious physical value. Their value critically depends on firm's ability to adapt to changing environment and capitalize on new opportunities. We use the ratio of intangible assets over total assets to measure the level of information immediacy costs that a firm faces. We divide the sample into two groups, firms with above-median ratios of intangible assets (0.54%) and firms with below-median ratios, and then re-run the baseline regression. The results are reported in Table 5. Consistent with our argument, duality firms with above-median ratios of intangible assets experience a significantly larger increase in Tobin's Q post 1989 than non-duality firms with above-median ratios of intangible assets, whereas duality firms with below-median ratios experience similar changes in Q as non-duality firms with below median ratios.[9] Additionally, the magnitude of the increase in Q ($e^{1.70\%*3.06}-1=5.34\%$) is significantly larger for the sub-sample

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[9] We obtain similar results, if we use the ratio of tangible assets over total book assets, where tangible assets is the sum of 0.715*receivables, 0.547*inventory, and 0.535*Property, Plant and Equipment (Berger, Ofek, and Swary (1996)). The coefficient estimate of *Tariff*post89*dual* is 1.445 (*p*-value=0.140) for firms with above median ratios of tangible assets to total assets (45.0%), but is 2.290 (*p*-value=0.048) for firms with below median ratios.

of firms with above-median ratios of intangible assets than for the full sample (2.74%) in Table 3.

Similar to Section 5.2, to mitigate the potential concern that tariff rates may be systematically related to the levels of intangible assets, we include in the regressions only firms with above-average tariff rates (1.68%) and firms that are not impacted by the 1989 FTA. We obtain similar results.[10]

5.4. Robustness check, controlling for other operating and governance variables

We re-estimate Equation 1, controlling for other operating and governance variables that potentially impact Tobin's Q. Trade liberalization likely has a smaller effect on diversified firms. Frésard (2010) finds that cash reserves lead to future market share gains. Therefore, as a robustness check, we add to our baseline model the logarithm of the number of business segments and zCash. Following Frésard (2010), we compute zCash as last year's cash-to-assets ratio minus industry-year mean over the industry-year standard deviation. As Table 6 Column 1 shows, our results hold when we control for these aspects of firm operation. Further, the coefficient estimate of zCash is significant and has expected sign. In Table 6 Column 2, we also control for the potential effects of board size, board composition, D&O ownership, and institutional ownership. Inclusion of these governance variables does not change our results.

5.5. Impact of duality on ROA, ROE, and sales growth

As we argued earlier, Tobin's Q is our primary measure of firm performance as opposed to other measures such as accounting performance and market share. This is because, while competition unambiguously promotes efficiency, its impact on profitability and market power is less clear (Nickell (1996) and Frésard and Valta (2012)). Further, Q is a forward-looking

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[10] The coefficient estimate of *tariff*post89*dual* is 3.041 with a *p*-value of 0.002 for firms with above median-value intangible ratios, while the coefficient estimate of *tariff*post89*dual* is 0.035 with a *p*-value of 0.98 for firms with below median-value intangible ratios.

measure of all aspects of firm operation. While the aggregate effect captured by Q might be large, it could be difficult to detect significant improvements in any single dimension of a firm's operations like sales growth. Nonetheless, for completeness, we re-run the baseline regression using ROA, ROE, and change in market share. Table 7 reports the results.

ROA and ROE is EBIT over book value of total assets and book value of common equity, respectively. Following Frésard (2010), we measure change in market share as sales growth minus the industry-year average. This variable is winsorized at 1% at each tail to alleviate the problem of extreme outliers. Before winsorization, the mean (median) for a change in market share is 46.44% (-8.44%) with a standard deviation of 52. After winsorization, the mean (median) for a change in market share is -12.41% (-8.44%) with a standard deviation of 0.44%. We do not find that duality firms outperform non-duality firms in terms of ROA, ROE, and sales growth, when competition increases. Consistently with Frésard (2010), we find that high cash levels are positively related to market share gains.

5.6. Superior performance or reduction of slack

So far, we establish that dual leadership leads to better firm performance as competition intensifies. The literature is replete with the empirical evidence that "competition is the enemy of sloth" (Nickell (1996), Bertrand and Mullainathan (2003), and Giroud and Mueller (2010)). One main argument for splitting the titles of CEO and COB is the alleviation of agency costs. If duality firms systematically have more slack, which is a significant form of agency costs due to lack of efforts, then an important question to ask is: Will we still find a large, positive effect of dual leadership once change in managerial slack is controlled for? If we do, the evidence provides further support for our hypothesis that dual leadership is a superior organization structure to separate leadership when competition intensifies. Furthermore, we have contended

that dual leadership is superior to separate leadership, because it minimizes control costs. The reason behind this is that competition aligns CEOs' interests with shareholders' interests by forcing managers to internalize certain agency costs including managerial lack. If we find that the relation between firm performance and reduction of slack is stronger for firms with tariff protection than for firms without tariff protection after the trade liberalization, then the finding lends indirect support to our argument regarding control costs.

To address the above questions, we add to the baseline model potential effects of slack reduction. We use various measures to proxy for the degree of managerial slack including sales per employees, overhead costs, input costs, and employee wage. Sales per employer is a turnover ratio that directly measures employee productivity and is a common proxy for firm efficiency (see e.g., Vining and Boardman (1992) and Clark (1984)). Overhead costs is the ratio of selling, general and administrative expenses to sales. Input costs is the ratio of costs of goods sold to sales. Employee wage is the staff expense to employees. Giroud and Mueller (2010) find that overhead costs, input costs, and wage all increase once managers are insulated from competition and the takeover market, which they conclude as consistent with the "quiet-life" hypothesis. To mitigate the influence of extreme outliers, we winsorize sales per employee, overhead costs, and the ratio of costs of goods sold at 1% at both tails and use the logarithm form of wage.[11]

As Table 8 shows, our results remain after including various proxies for slack except for employee wage. *Tariff*post89*dual* is insignificant in the wage regression, likely because the number of observations is small. Many firms do not report staff expense thereby reducing the number of observations in the wage regression by nearly 90%. For the other three proxies of

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[11] Before winsorization, the mean (media) value of sales per employee is 0.18 (0.11) with a standard deviation of 0.48. After winsorization, the mean (media) value of sales per employee is 0.16 (0.11) with a standard deviation of 0.17. Before winsorization, the mean (media) value of overhead costs is 0.51 (0.22) with a standard deviation of 21. After winsorization, the mean (media) value of overhead costs is 0.26 (0.22) with a standard deviation of 0.21. Before winsorization, the mean (media) value of input costs is 1.41 (0.67) with a standard deviation of 36. After winsorization, the mean (media) value of input costs is 0.67 (0.68) with a standard deviation of 0.24.

managerial slack, we find evidence consistent with our hypothesis and the conventional wisdom that competition promotes efficiency. Specifically, firms that have tariff protection before 1989 experience a larger increase in *Q* after 1989 when they increase employee productivity and decrease input costs. Importantly, *Tariff*post89*dual* is positive and significant in all specifications. Given that sales per employees, overhead costs, and input costs are in decimal, our results also suggest that the performance contribution by dual leadership far exceeds the contribution from reduction of slack. For example, using the average tariff rate of 1.68%, duality firms experience an increase of 2.27% in *Q* after the trade liberalization, whereas firms that reduce input costs by 10 percentage points experience an increase of 1% in *Q* after the trade liberalization.

5.7.Superior performance or survival bias

Studies have found that CEOs with more decision-making power are associated with more variable firm performance (Adams, Almedia, and Ferreira (2005)). If duality firms experience larger variance in firm performance, then a sudden increase in competition may disproportionately eliminate a larger number of poorly-performing duality firms than poorly-performing non-duality firms. In such a case, our results may arise from a survival bias instead of a detection of true performance enhancement due to dual leadership. To address this potential concern, we study corporate failure rate. If we do not find a disproportionately higher corporate failure rate for duality firms relative to non-duality firms in previously protected industries after the trade liberalization, then this survival bias may not be a concern for our results.

We construct the sample of failed firms using two different approaches. The first approach uses Compustat and CRSP. Specifically, we first identify our sample firms that file for Chapter 7 or Chapter 11 using Compustat data item 'STALT.' We find 57 unique firms. We then

verify Compustat bankruptcy records against CRSP delisting data, namely whether CRSP data item, HDLRSN, is coded '02' or '03.' A code of '02' indicates that the firm is in bankruptcy, while '03' in liquidation. Since a firm can continue to have stock price data after filing for bankruptcy, a large gap sometimes exists between the delisting date in CRSP and the date of the last financial statement in Compustat. For our sample, the mode of this gap is three years, with a maximum of 14. To make sure that we robustly test the survival-bias concern, we want to be as aggressive as possible in identifying corporate failures for our sample period. Thus, we treat a delisting firm as failed during our sample period if the gap between the delisting date in CRSP and the date of the last financial statement in Compustat is less than or equal to four years. Seventy-five percent of our sample firms are delisted within four years of the last financial statement. We identify an additional 110 unique bankrupt firms using this process. We use the year of the last financial statement as the year in which the firm fails. We report corporate failure rates using the first approach for the sample period of 1988-1998 in Table 9 Panel A. We choose 1988 as our starting year, because our board data start in 1988, which artificially requires that firms are in business in 1988.

As the first approach is a crude way to identify corporate failures (e.g., it does not have precise bankruptcy dates and may not include all bankruptcies or incorrectly include non-bankruptcy events), we construct the second sample of failed firms using the bankruptcy database compiled by Yung-Yu Ma.[12] The advantage of Ma's database is that it contains all bankruptcies filed by public firms. The disadvantage of the database is that it covers only part of our sample period, 1991-1998. However, this partial coverage is not an issue, as we care about corporate failures in years after the trade liberalization much more than in years before. We report the time trend of corporate failure rate using the second approach in Table 9 Panel B.

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[12] We deeply appreciate and thank Yung-Yun Ma for his generosity in sharing with us his manually-collected data.

To provide another benchmark, we also report corporate failure rate for firms not impacted by the 1989 FTA. If the relative failure rate of duality vs. non-duality firms that are impacted by the 1989 FTA is similar to the relative failure rate of duality vs. non-duality firms that are not impacted by the 1989 FTA, then it provides additional assurance that survival bias is not a concern to our study.

As Table 9 shows, the two approaches tell a consistent story. Of the firms that are impacted by the 1989 FTA, duality firms do not have a higher failure rate than non-duality firms after the trade liberalization. The relative failure rate of duality vs. non-duality firms that are impacted by the 1989 FTA is also similar to the relative failure rate of duality vs. non-duality firms that are not impacted by the 1989 FTA. In addition, regardless of whether a firm is impacted by the FTA, duality firms typically have a lower failure rate than non-duality firms, which is consistent with the notion that only good-performing CEOs are awarded the additional title of the COB.

In summary, our result is robust to survival bias. The positive impact of dual leadership on Q is not due to the possibility that poorly performing duality firms in protected industries are more likely to exit the sample after the trade liberalization.

5.8. Impact of board size, %outsider, and %D&O on Tobin's Q

In this section, we investigate the potential effects of other governance variables on Tobin's Q as a firm's competitive environment changes. First, we replace duality with board size, board composition, and D&O ownership to test whether these governance variables also have significant impact on a firm's competitive ability. Results are reported in Table 10 Panel A. We find that firms with larger boards perform better after trade liberalization, supporting the notion that large boards provide valuable advising and networking resources. The logarithm of

board size is negatively and significantly related to Tobin's *Q,* which is consistent with the literature (e.g., Yermack (1996)). Firms with larger fraction of outsiders on the board also perform better after trade liberalization, corroborating our findings on board size that the board of directors provides critical advising and other resource support when competition is intense. The interaction of *Post89*%outsider* is positive and significant, which is consistent with the idea that boards have come to play a more prominent governance role in recent years. The variable of *%outsider* is significantly, negatively related to Tobin's *Q*. Neither *Tariff*post89*%D&O* nor *%D&O* enter the regression with any significance. One important takeaway from these results is that the relation between firm performance and other governance variables is not unidirectional. It is contingent on the level of competition.

In Table 10 Panel B, we run a horse race, including all the governance variables in the baseline regression. Governance system is complex, interdependent and dynamic. The impact of any single governance control on firm performance is likely contingent on the strength of other controls and the competitive environment in which the firm operates. *Tariff*post89*dual* and *Tariff*post89*%outsider* are no longer significant. *Tariff*post89*log(board size)* remains significantly and positively related to Tobin's *Q*, while *Tariff*post89*%D&O* becomes marginally significant with a negative sign. Notably, the joint test of these four triple interaction terms are significant, supporting the concept that, while the effect of any single governance trait may be unclear when viewed independently, the overall governance temperament matters for a firm's competitive success. The logarithm of board size is still negatively and significantly related to Tobin's *Q,* whereas neither board composition nor D&O ownership has any significant impact on Tobin's *Q*.

5.9.Event study results

We conduct an event study to assess the market perception of the value contribution of dual leadership as the FTA comes into effect. As there are no clear event dates, we follow the long-run event study methodology in Chhaochharia and Grinstein (2007) and Wintoki (2007) and calculate excess portfolio returns for an extended event window using the following four-factor model:

$$R_{pt}\text{-}R_{ft} = \alpha_p + \beta_1(R_{mt}\text{-}R_{ft}) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 MOM_t + \varepsilon_{it} \qquad \text{...}(2)$$

where R_{ft} is the risk-free rate. The first three factors, $(R_{mt}\text{-}R_{ft})$, SMB_t, and HML_t, are based on Fama and French (1993), which measure the market excess return, the differences in returns between portfolios of small and large stocks, and the differences in returns between portfolios of high and low book-to-market stocks, respectively. The fourth factor, momentum factor (MOM_t), is based on Carhart (1997). It measures the differences in returns between a portfolio of stocks with high returns in the past year and a portfolio of stocks with low returns in the past year. R_{pt} is the equally weighted portfolio of duality firms or non-duality firms that are under the tariff protection. α_p is the daily excess portfolio returns relative to the four factors. To get annualized rate, we multiply α_p by 252 trading days. If the market perceives that the 1989 FTA benefits duality firms more than non-duality firms, then a position long in the portfolio of duality firms and short in the portfolio of non-duality firms should yield positive returns. We use daily stock returns adjusted for delisting returns to perform our study. Based on our review of the events, we choose four different event windows. Results are reported in Table 11.

As Table 11 shows, we do not find any significant results for any of our event windows. One reason for the non-results could be that negotiations regarding a free-trade agreement encapsulate an event that spans too long a period for our methodology to detect any meaningful effects. A free-trade regime between Canada and the U.S. has been on the working agenda of both governments since the early 1900s. Canadian Prime Minister Mulroney formally requested

that the U.S. and Canada explored the possibility of a comprehensive free trade agreement on September 26, 1985. It could also be that the U.S. stock market does not view the implementation of the 1989 FTA as a significant event. Although the 1989 FTA was extremely contentious in Canada to the extent that the Canadian general election of 1988 was largely fought on this single issue, the FTA did not garner much attention in the U.S. It passed without any fanfare the House by a vote of 366 to 40 and the Senate by a vote of 83 to 9. In fact, polls show that up to 40% of Americans were unaware that the FTA had been signed compared to 3% of Canadians.

6. Time trends of board leadership

The evolutionary theory of organizations predicts that firms adopt governance arrangements that give them a competitive edge (see, e.g., Kole and Lehn (1997) and Fama and Jensen (1983)). If duality is a superior leadership structure in a competitive environment, we should expect more firms to adopt this leadership structure over time. In this section, we examine the time trend of dual leadership to gain a glimpse into the adaptive behavior of firms.

To place the time trend of duality in a broader context, we first plot the time trend of competition intensity in Figure 2 Panel A. We compute for each 4-digit SIC industry, if the industry has at least five firms in a given year, the Herfindahl-Hirschman index (HHI) to measure the intensity of competition within the industry. A higher HHI suggests a more concentrated industry or weaker competition (Giroud and Mueller (2010)). Consistent with the consensus that economic forces such as globalization and technology advancement have increased competition in the U.S. (Guadalupe and Wulf (2010)), Panel A shows that mean and median values of HHI have steadily declined during our sample period of 1979-1998.

In Panel B and C, we plot the time trends of board leadership and board composition partitioned by whether a firm is impacted by the 1989 FTA. Contrary to the clear downward trend observed for HHI, the fraction of firms with dual leadership exhibits no apparent trend. This is at odds with the evolutionary arguments that firms adopt the governance structure that maximize their survival chances and our findings that duality is a superior leadership structure when competition intensifies. Several explanations potentially explain this seemingly puzzling time trend of dual leadership.

The signing of the FTA coincides with the start of a seismic shift from managerial centrality to shareholder empowerment in the corporate world.[13] This socioeconomic movement has exerted strong external pressure on firms to adopt more independent boards (Gordon (2011)). As Panel B and C shows, the fraction of outsiders on the board has steadily increased during 1979-1998. Therefore, the time trend of dual leadership could reflect the competitive pressure not only from the product market but also from the society. It is interesting to note that we find some evidence in Table 10 that more outsiders on the board may be beneficial to firms as competition intensifies. Another explanation is that the governance system is multi-dimensional and interdependent. Recall that when we simultaneously study the impact of duality, board size, board composition, and D&O ownership on firm performance, the effect of duality loses significance.

7. Conclusion and Discussion

Despite the large literature on board leadership, the evidence on the relation between board leadership structure and firm performance is mixed. In this paper, we hypothesize that dual leadership (CEO being the Chairman of the Board) is a more effective model than separate

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[13] Buchanan, Poulsen, Netter, and Yang (2012) account key events in the mid-1980s that propelled the movement of shareholder activism, particularly activism by institutional investors.

leadership (a director who is not the CEO holds the COB title) when competition becomes tougher, because duality minimizes information costs and control costs. We use an exogenous shock, the passage of the 1989 Canada-United States Free Trade Agreement, which substantially increased competition intensity to U.S. firms, to study the impact of board leadership structure on firm performance. Consistent with our hypothesis, we find that, after the trade liberalization, duality firms experience a larger increase in Tobin's Q compared to non-duality firms. Further, the positive effect of dual leadership becomes more significant if firms face a higher level of information specificity costs and information immediacy costs.

Our results help us gain a better understanding of the mixed evidence in the existing literature on the efficacy of board leadership structure by offering two potential explanations. First, the performance contribution by board leadership structure may be more subtle than some other board attributes and thus is more difficult to detect empirically. More specifically, we find that dual leadership is associated with a 3% increase in Q when competition intensifies. Although the increase is economically meaningful, it is much smaller than the 13% increase in Q that has been found for classified boards. Additionally, the positive effect of dual leadership disappears once we control for other governance mechanisms. In contrast, board size retains the significance level, regardless of whether we only consider the impact of board size or consider the impact of board size along with other governance controls including board leadership. Therefore, our results suggest that the function of board leadership may be more substitutable than some other board features. However, the impact of board leadership structure is likely to become larger and more uniquely important going forward, because the board of directors is taking on more responsibilities and playing an increasingly more active governance role since the passage of the Sarbanes-Oxley of 2002.

Our results also shed light on some seemingly puzzling phenomena in practice. Firms have been under enormous pressure to abolish dual leadership for over two decades. While firms in other countries seem to be more amicable to the idea, U.S. firms have been reluctant to change. For example, in the late 1980s, a majority of U.K. firms combined the titles of CEO and COB (Dahya et al. (2009)). Now, less than 5% of U.K. firms still do.[14] In contrast, the majority of U.S. firms still have a dual leadership structure. Certain investors are also less enthusiastic in supporting the effort to separate the CEO and COB titles than some other governance initiatives. For instance, Morgan et al. (2011) find that mutual funds support 90% of shareholder proposals that aim to declassify the board, but support only 34% of proposals that call to separate the CEO and COB positions. Our findings help explain the reluctance on part of U.S. firms and certain investor groups to embrace independent COB. Our results also complement Bloom and Van Reenen (2007), who find that the U.S. has the best management practice of the four countries (U.S., U.K., France and Germany) that they surveyed. Further, poor management practice is more prevalent when produce market competition is weak. Bloom and Van Reenen find that the U.S. has the most competitive market of the four countries.

One limitation of our study is that we do not distinguish amongst non-CEO Chairmen, e.g., whether the Chairman is a former or present employee of the firm or is an independent director. This limitation is partially attributable to data availability and partially attributable to the fact that the practice of having an independent chair is only a recent phenomenon. Firms made the noticeable move to adopt independent chairman after the passage of the Sarbanes-Oxley Act. By 2007, just 13% of S&P500 firms have a truly independent chairman (PR

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[14] Financial Reporting Council, "Developments in Corporate Governance 2011," *available at* http://www.frc.org.uk/getattachment/5f4fada9-2a88-43a4-bbec-be15b6519e79/Developments-in-Corporate-Governance-2011-The-impact-and-implementation-of-the-UK-Corporate-Governance-and-Stewardship-Codes.aspx

Newswire, July 30, 2012).[15] Despite of the data limitation, we believe that our results are useful in understanding the existing literature, which has historically defined board leadership structure similarly to this paper. Our results are also useful in explaining corporate behavior during our sample period as well as at the present time. As we mentioned earlier, the majority of U.S. firms still combine the CEO and COB positions.

Importantly, our results highlight the link between the identity of the COB and his influence on firm performance. Prior literature has long argued that CEOs possess unparalleled firm-specific information, which gives them unique advantage over non-CEO chairman in leading the board of directors. We provide evidence explicitly linking information specificity costs to the positive impact of dual leadership on firm performance. Favaro, Karlsson, and Neilson (2010) report that "(a)t the outset of the decade [2000], roughly half of the North American and European CEOs entering office were named chairman and CEO. In 2009s incoming class, that number had fallen to 16.5% in North America and 7.1% in Europe." The current push towards more independent chairman will inevitably result in a more heterogeneous distribution of non-CEO chairmen. Future work is urgently needed to understand the identities and different incentives of newly minted COBs, as well as how different types of COBs may have different impact on firm performance and corporate polices.

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[15] 10 years later: Sarbanes-Oxley Act Continues to Shape Board Governance, *available at* http://www.prnewswire.com/news-releases/10-years-later-sarbanes-oxley-act-continues-to-shape-board-governance-164296516.html

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Appendix I: Examples of Arguments Made by Firms in Support of Dual Leadership

Argument 1: COB selection is part of the succession planning process. CEO is the best person to set board agenda.

Honeywell, Inc., in its 2003 proxy statement, notes that "[t]he Company has no fixed rule as to whether these offices should be vested in the same person or two different people, or whether the Chairman should be an employee of the Company or should be elected from among the non-employee directors. The Board believes that this issue is part of the succession planning process and that it is in the best interests of the Company to make such a determination when it elects a new CEO. Under Honeywell's Corporate Governance Guidelines, the Chairman establishes the agenda for each Board meeting. The Board believes that the CEO is in the best position to develop this agenda from among the many short-term and long-term issues facing Honeywell."

available at http://www.sec.gov/Archives/edgar/data/773840/000095011703000983/a34157.txt

Argument 2: Dual leadership provides clarity regarding the leadership of the firm.

In their statement to oppose a shareholder proposal calling for separate COB and CEO filed at the 2010 annual shareholder meeting, the board of directors of Goldman Sachs reasons that "…the most effective leadership model for our firm at this time is to have the roles of CEO and Chairman combined… this structure helps to ensure clarity regarding leadership of the firm, allows the firm to speak with one voice and provides for efficient coordination of Board action, particularly in times of market turmoil or crisis. The combination of the Chairman's ability to call and set the agenda for Board meetings with the CEO's intimate knowledge of our business, including our risk management framework, provides the best structure for the efficient operation of our Board process and effective leadership of our Board overall. This structure avoids potential confusion as to leadership roles and duplication of efforts that can result from the roles being separated, especially in complex firms like ours where the information necessary to make critical decisions is often in flux."

available at http://www.sec.gov/Archives/edgar/data/886982/000119312510078005/ddef14a.htm

Argument 3: Dual leadership promotes more effective business planning and execution.

Office Depot, in their 2009 proxy statement, states that "[t]he Board has given careful consideration to separating the roles of Chairman and Chief Executive Officer and has determined that the Company and its shareholders are best served by having Mr. Odland, serve as both Chairman of the Board and Chief Executive Officer. Mr. Odland's combined role as Chairman and Chief Executive Officer promotes unified leadership and direction for the Board and executive management and it allows for a single, clear focus for the chain of command to execute the Company's strategic initiatives and business plans.

available at http://www.sec.gov/Archives/edgar/data/800240/000119312509050893/ddef14a.htm

Appendix II: Top 20 U.S. Industries with Highest Tariff on Canadian Imports, 1986-1988

Four-Digit SIC	Industry Description	Average Tariffs
3021	RUBBER & PLASTICS FOOTWEAR	36.06%
0182	FOOD CROPS GROWN UNDER COVER	33.40%
2342	BRASSIERES, GIRDLES, AND ALLIED GARMENTS	29.13%
2326	MEN'S AND BOYS' WORK CLOTHING	28.88%
2075	SOYBEAN OIL MILLS	22.49%
2321	MEN'S AND BOYS' SHIRTS, EXCEPT WORK SHIRTS	21.90%
2325	MEN'S AND BOYS' SEPARATE TROUSERS AND SLACKS	21.06%
2331	WOMEN'S, MISSES', AND JUNIORS' BLOUSES AND SHIRTS	20.86%
2335	WOMEN'S, MISSES', AND JUNIORS' DRESSES	20.14%
3253	CERAMIC WALL AND FLOOR TILE	20.00%
2311	MEN'S AND BOYS' SUITS, COATS, AND OVERCOATS	19.97%
2111	CIGARETTES	19.33%
2337	WOMEN'S, MISSES', AND JUNIORS' SUITS, SKIRTS, AND COATS	18.11%
2369	GIRLS', CHILDREN'S, AND INFANTS' OUTERWEAR, NEC	18.10%
2252	HOSIERY, NEC	16.81%
2231	BROADWOVEN FABRIC MILLS, WOOL, INCLUDING DYEING AND FINISHING	16.53%
2381	DRESS AND WORK GLOVES, EXCEPT KNIT AND ALL-LEATHER	14.99%
2257	WEFT KNIT FABRIC MILLS	14.69%
3262	VITREOUS CHINA TABLE AND KITCHEN ARTICLES	14.68%
3151	LEATHER GLOVES AND MITTENS	14.56%
2221	BROADWOVEN FABRIC MILLS, MAN MADE FIBER AND SILK	14.52%

Figure 1: Time trend of Tobin's *Q*

The graphs display time trends of median values of Tobin's *Q* for firms with stable duality status of board leadership (*Dual*) and firms with stable non-duality status of board leadership (*Non-dual*). We define a firm as having a stable duality (non-duality) status, if the firm has a CEO (a director other than the CEO) as the Chairman of the Board for more than 80% firm years for a minimum of four years from 1988 to 1998. Panel A contains only sample firms impacted by the 1989 trade liberalization. Panel B contains sample firms not impacted by the trade liberalization (i.e., firms' tariff rates equal zero).
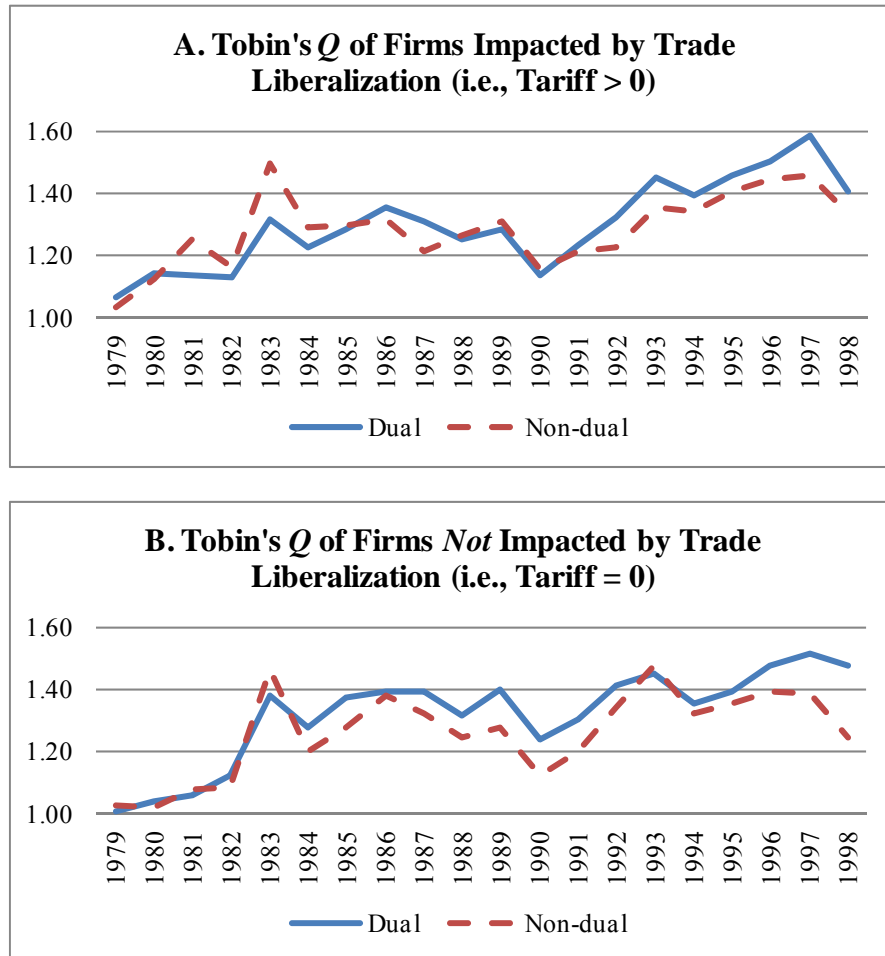
Figure 2: Time trends of competition intensity, board leadership, and board composition

Time trend of HHI

B. Tariff > 0

C. Tariff = 0
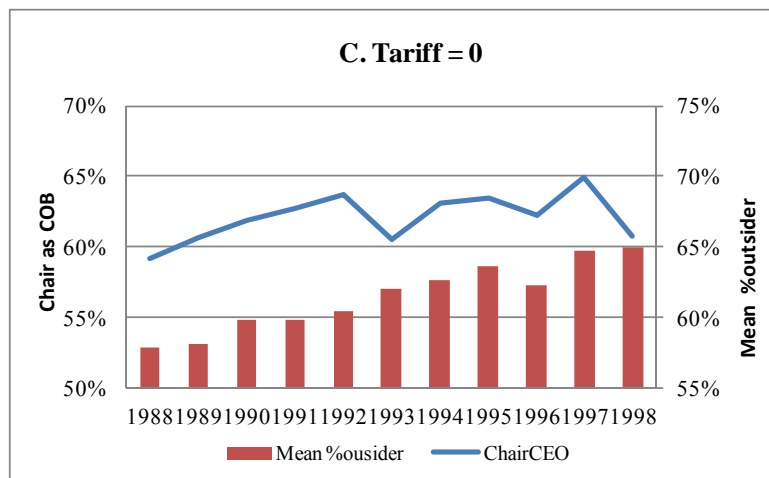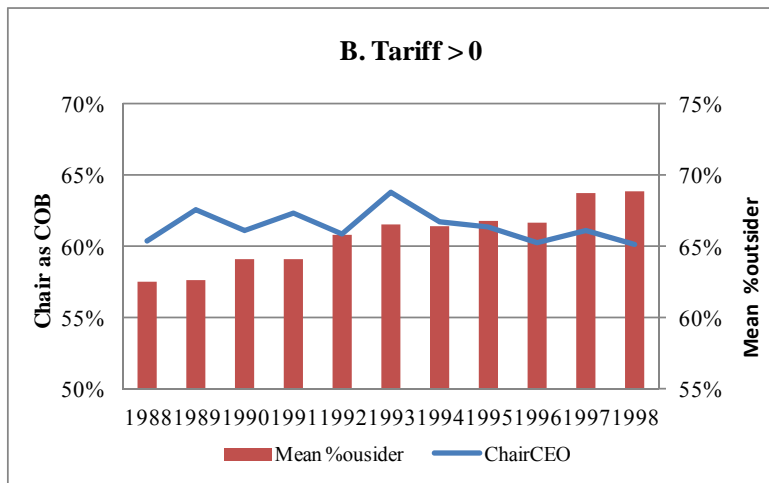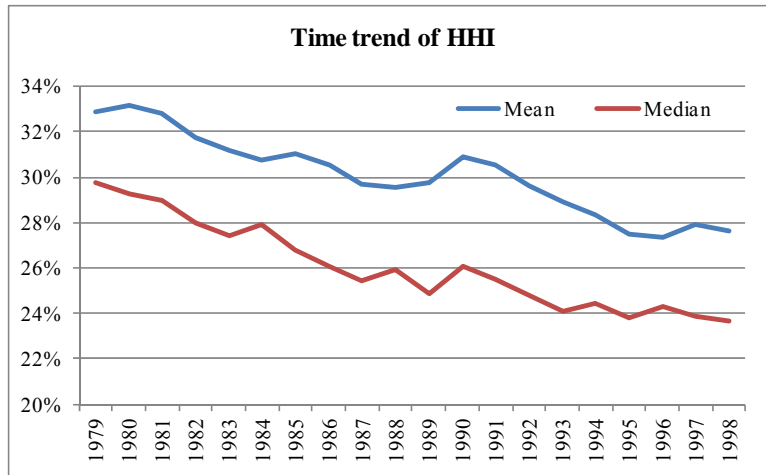
Table 1: Variable description

Variable Name	Variable Description [computation presented using WRDS variable names]
Tariff	Average US tariff rate on Canadian imports for a firm from 1986 to 1988. Operationally, we first obtain the average tariff rate for each U.S. industry on Canadian imports at the 4-digit SIC level for 1986-1988. We then compute firm-level tariff rates, by multiplying the industry-level tariff rate with the percent of the firm's segment sales over the firm's total sales and then summing those products. We obtain the data on segment sales from Compustat Segment provided by the Wharton Research Data Services (WRDS).
Dual	Dummy variable that equals one, if the firm has a stable duality status for 1988-1998; or zero, if the firm has a stable non-duality status for 1988-1998. We define a firm as having a stable duality (non-duality) status, if the firm has a CEO (a director other than the CEO) as the Chairman of the Board (COB) for more than 80% firm years for a minimum of four years from 1988 to 1998.

Firm operating characteristics

Tobin's Q	Market value of common equity minus book value of common equity plus book value of total assets, over book value of total assets [(prcc_f*csho-ceq+at)/at]
Firm size	Natural logarithm of total book assets [ln(at)]
Return on assets (ROA)	Earnings before interest, taxes and depreciation (EBIT) over book value of total assets [(oiadp+dp (if not missing))/at]
Return on equity (ROE)	EBIT over common equity [(oiadp+dp(if not missing))/ceq]
R&D ratio	R&D expenditure over sales [xrd/sale]; xrd=0, if missing.
Debt ratio	Long-term debt over total assets [dltt/at]
Volatility	Standard deviation of daily stock returns*the square root of 252 We compute stock return volatility if the stock was traded for at least a quarter of the year.
Ratio of intangible assets	Intangible assets over total book assets [intan/at]; if negative, then zero (one such observation)
Ratio of advertising expense	Advertising expense over sales [xad/sale]
Ln(#business segments)	Natural logarithm of the number of business segments, in which the firm operates
Altman z-score	Altman (1968) z-score, as modified by MacKie-Mason (1990) [(3.3(oiadp+dp (if not missing))+sale+1.4*re+1.2*(act-lct)))/at]
Change in market share	Sales growth minus the industry-year average (Frésard (2010))
z Cash	The cash-to-assets ratio minus industry-year mean, over the industry-year standard deviation (Fresard (2010)).
Sales per employees	Sales over total number of employees [sale/(emp*1000)]
Overhead expense	Selling, General and Administrative Expense over sales [xsga/sale]
Input costs	Costs of goods sold over sales [1-cogs/sale]
Wage	Employee wage [(xlr*1000)/emp]

Firm governance characteristics

%Dual	Percent of firms with stable duality status
Board size	Total number of directors on the board
%Outsider	Percent of non-executive directors on the board
%D&O	Percent of director and officer ownership
%Institution_own	Percent of institutional ownership

Table 2: Sample description

Pane A reports summary statistics of key operating characteristics for 1,927 unique firms from 1979 to 1998, partitioned by whether a firm is protected by U.S. tariff on Canadian imports (*Tariff>0*) prior to 1989. Variables are as described in Table 1. R&D is winsorized at 99%. ROE and sales growth are winsorized at 1% at both tails. Panel B reports summary statistics of key governance variables for 1988-1998, the time period for which governance data are available. Test statistics for differences in mean (*Mean dif*) are based on two-sample *t*-test. Test statistics for differences in median (*Median dif*) are based on Wilcoxon two-tail test. We use chi-square test to compare the differences in *%Dual*. [a], [b] and [c] denote significance at the 1%, 5%, and 10% level, respectively.

Panel A: Operating characteristics (1979-1998)

	Tariff > 0 (A)				Tariff = 0 (B)				A-B	A-B
	n	Mean	Median	Std. Dev.	n	Mean	Median	Std. Dev.	Mean *dif.*	Median *dif.*
Before 1989										
Tariff (%)	6,787	2.85%	2.54%	2.91%	4,440					
Tobin's *Q*	6,787	1.61	1.24	1.46	4,440	1.70	1.25	1.68	-0.09 [a]	-0.01 [b]
Total assets ($MM)	6,787	1,215	97	3,978	4,440	1,050	76	6,605	165	22 [a]
#Business segments	6,787	2.20	2.00	1.53	4,438	1.56	1.00	1.10	0.63 [a]	1.00 [a]
ROA	6,787	8.00%	9.82%	16.68%	4,440	7.32%	9.28%	17.75%	0.67% [b]	0.54% [a]
ROE	6,676	16.03%	20.47%	36.42%	4,362	17.85%	22.41%	38.72%	-1.81% [b]	-1.94% [a]
R&D ratio	6,787	3.97%	1.16%	11.68%	4,440	3.39%	0.00%	14.70%	0.57% [b]	1.16% [a]
Debt ratio	6,787	17.29%	14.82%	15.28%	4,438	19.54%	15.90%	18.33%	-2.25% [a]	-1.08% [a]
Volatility	6,787	46.27%	40.25%	25.61%	4,440	48.46%	42.67%	25.75%	-2.19% [a]	-2.42% [a]
Sales growth	6,702	17.23%	10.44%	40.02%	4,348	23.41%	13.74%	46.59%	-6.18% [a]	-3.30% [a]
After 1989										
Tobin's *Q*	8,812	1.77	1.34	1.65	7,306	1.83	1.36	1.79	-0.07 [a]	-0.01
Total assets ($MM)	8,812	2,245	138	10,204	7,306	1,547	111	9,902	699 [a]	27 [a]
#Business segments	8,810	1.88	1.00	1.33	7,306	1.39	1.00	0.86	0.49 [a]	0.00 [a]
ROA	8,812	6.12%	8.22%	16.79%	7,306	4.66%	7.54%	19.08%	1.46% [a]	0.68% [a]
ROE	8,570	14.34%	18.18%	39.88%	7,000	12.11%	18.18%	43.22%	2.23%	0.00% [b]
R&D	8,812	4.62%	1.22%	12.81%	7,306	4.91%	0.00%	18.12%	-0.29%	1.22% [a]
R&D ratio	8,807	17.63%	13.96%	18.68%	7,295	19.32%	14.70%	20.93%	-1.69% [a]	-0.74% [b]
Volatility	8,812	55.75%	44.94%	40.13%	7,306	62.55%	50.78%	45.88%	-6.80% [a]	-5.84% [a]
Sales growth	8,783	12.23%	7.27%	34.64%	7,249	15.54%	9.23%	36.65%	-3.31% [a]	-1.96% [a]

Panel B: Governance characteristics (1988-1998)

	Tariff > 0 (A)				Tariff = 0 (B)				A-B	A-B
	n	Mean	Median	Std. Dev.	n	Mean	Median	Std. Dev.	Mean *dif.*	Median *dif.*
%Dual	9,727	61.78%	100.00%	48.60%	8,026	63.22%	100.00%	48.22%	-1.44% [b]	
Board size	8,433	8.48	8.00	3.51	6,912	7.77	7.00	3.05	0.71 [a]	1.00 [a]
%Outsider	8,433	65.64%	69.23%	18.72%	6,912	61.40%	63.64%	19.01%	4.24% [a]	5.59% [a]
%D&O	7,526	19.99%	13.04%	20.04%	6,124	26.67%	21.92%	21.80%	-6.68% [a]	-8.89% [a]
%Institution_own	7,600	33.99%	31.03%	24.75%	6,241	30.52%	26.34%	24.23%	3.46% [a]	4.69% [a]

Table 3: Impact of duality on Tobin's *Q*

This table reports regression estimation of the impact of board leadership on firm performance. See Table 1 for details on variable construction. We estimate all models controlling for firm-level clustering. *p*-value are reported in parentheses below the coefficient estimates. [a], [b] and [c] denote significance at the 1%, 5%, and 10% level, respectively.

Dependent variable =	Ln(Tobin's *Q*)			
	Baseline			
	(1)	(2)	(3)	(4)
(1) Tariff*post89*dual	1.582 [b]	0.503		
	(0.031)	(0.563)		
(2) Tariff*post89	-0.594	0.239	0.604 [c]	
	(0.388)	(0.764)	(0.070)	
(3) Post89*dual		0.055 [b]		
		(0.022)		
Tariff*post88 (placebo)				0.540
				(0.139)
Firm size	-0.103 [a]	-0.104 [a]	-0.103 [a]	-0.103 [a]
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.454 [a]	0.453 [a]	0.453 [a]	0.453 [a]
	(0.000)	(0.000)	(0.000)	(0.000)
ROA_{t-1}	0.150 [a]	0.151 [a]	0.150 [a]	0.150 [a]
	(0.000)	(0.000)	(0.000)	(0.000)
ROA_{t-2}	0.013	0.013	0.014	0.013
	(0.574)	(0.591)	(0.562)	(0.568)
R&D ratio	0.327 [a]	0.323 [a]	0.328 [a]	0.327 [a]
	(0.004)	(0.004)	(0.004)	(0.004)
Debt ratio	0.065	0.065	0.066	0.066
	(0.304)	(0.306)	(0.292)	(0.290)
Volatility	-0.138 [a]	-0.137 [a]	-0.140 [a]	-0.140 [a]
	(0.000)	(0.000)	(0.000)	(0.000)
Wald test for joint significance				
p -value for (1) and (3)		(0.007) [a]		
p -value for (1), (2) and (3)		(0.004) [a]		
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
#obs	26,280	26,280	26,280	26,280
F -value	52.58	51.01	54.30	54.23
Adj. R-squared	0.609	0.610	0.609	0.609

Table 4: Impact of duality on Tobin's *Q*, contingent on the level of information specificity costs

This table reports regression estimation of the impact of board leadership on firm performance. R&D and advertising expense are winsorized at 99%. Capital expenditure (CAPX) is capital expenditure over sales [capx/sale]. We set missing (455 such observations) and negative values (2 such observations) of CAPX to zero. See Table 1 for details on the computation of other variables. We estimate all models controlling for firm-level clustering. *p*-value are reported in parentheses below the coefficient estimates. [a], [b] and [c] denote significance at the 1%, 5%, and 10% level, respectively.

Dep. var.= Ln(Tobin's Q)	R&D ratio		Ratio of advertising expense	
	High	Low	High	Low
Tariff*post89*dual	2.235 [b]	0.148	3.834 [b]	2.217
	(0.016)	(0.900)	(0.021)	(0.214)
Tariff*post89	-0.639	0.350	-1.984	-1.616
	(0.482)	(0.756)	(0.217)	(0.320)
Firm size	-0.121 [a]	-0.091 [a]	-0.143 [a]	-0.096 [a]
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.394 [a]	0.586 [a]	0.696 [a]	0.582 [a]
	(0.007)	(0.000)	(0.000)	(0.013)
ROA$_{t-1}$	0.014	0.322 [a]	0.269 [a]	0.189 [a]
	(0.720)	(0.000)	(0.007)	(0.007)
ROA$_{t-2}$	-0.029	0.047	0.060	0.074
	(0.484)	(0.262)	(0.485)	(0.176)
R&D ratio			0.019	0.587
			(0.928)	(0.178)
CAPX ratio	0.167 [b]	0.179 [a]		
	(0.023)	(0.000)		
Debt ratio	0.031	0.026	-0.132	-0.055
	(0.587)	(0.780)	(0.119)	(0.503)
Volatility	-0.190 [a]	-0.067 [a]	-0.135 [a]	-0.094 [a]
	(0.000)	(0.002)	(0.006)	(0.009)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
#obs	13,011	13,269	4,911	4,911
F-value	28.06	25.79	15.23	9.07
Adj. R-squared	0.628	0.611	0.701	0.688

Table 5: Impact of duality on Tobin's *Q*, contingent on the level of information immediacy costs

This table reports regression estimation of the impact of board leadership on firm performance. See Table 1 for details on variable construction. We estimate all models controlling for firm-level clustering. *p*-value are reported in parentheses below the coefficient estimates. [a], [b] and [c] denote significance at the 1%, 5%, and 10% level, respectively.

Dep. var.= Ln(Tobin's Q)	Ratio of intangible assets	
	High	Low
Tariff*post89*dual	3.061 [a]	-0.061
	(0.002)	(0.964)
Tariff*post89	-0.899	0.148
	(0.307)	(0.909)
Firm size	-0.115 [a]	-0.072 [a]
	(0.000)	(0.001)
ROA	0.771 [a]	0.452 [a]
	(0.000)	(0.000)
ROA_{t-1}	0.169 [c]	0.210 [a]
	(0.066)	(0.000)
ROA_{t-2}	-0.005	0.045
	(0.813)	(0.334)
R&D ratio	0.582 [a]	-0.070
	(0.001)	(0.688)
Debt ratio	0.006	0.116
	(0.927)	(0.339)
Volatility	-0.163 [a]	-0.079 [a]
	(0.000)	(0.002)
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
#obs	11,015	11,016
F-value	26.39	19.16
Adj. R-squared	0.685	0.636

Table 6: Impact of duality on Tobin's Q - Robustness check

This table reports regression estimation of the impact of duality on firm performance, controlling for other operating and governance characteristics. See Table 1 for details on variable construction. We estimate all models controlling for firm-level clustering. p-value are reported in parentheses below the coefficient estimates. [a], [b] and [c] denote significance at the 1%, 5%, and 10% level, respectively.

Dependent variable =	Ln(Tobin's Q)	
	(1)	(2)
Tariff*post89*dual	2.143 [a]	2.340 [b]
	(0.008)	(0.022)
Tariff*post89	-1.119	-1.070
	(0.140)	(0.271)
Firm size	-0.092 [a]	-0.094 [a]
	(0.000)	(0.000)
ROA	0.425 [a]	0.755 [a]
	(0.000)	(0.000)
ROA_{t-1}	0.121 [a]	0.061
	(0.003)	(0.531)
ROA_{t-2}	-0.007	-0.024
	(0.822)	(0.586)
R&D ratio	0.308 [a]	0.469 [a]
	(0.009)	(0.001)
Debt ratio	0.059	0.010
	(0.420)	(0.826)
Volatility	-0.144 [a]	-0.106 [a]
	(0.000)	(0.000)
Ln(#business segments)	-0.034	-0.033
	(0.131)	(0.206)
$z\,Cash_{t-1}$	0.020 [a]	0.018 [a]
	(0.003)	(0.012)
Log(board size)		-0.052
		(0.194)
%outsider		-0.024
		(0.647)
%D&O		-0.056
		(0.332)
%Institution_own		0.254 [a]
		(0.000)

Table 6 cont'd

Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
#obs	22,079	15,835
F-value	37.80	29.06
Adj. R-squared	0.615	0.652

Table 7: Impact of duality on ROA, ROE, and market share

This table reports regression estimation of the impact of duality on ROA, ROE and Change in market share. Each dependent variable is winsorized at 1% at both tails. See Table 1 for details on variable construction. We estimate all models controlling for firm-level clustering. p-value are reported in parentheses below the coefficient estimates. [a], [b] and [c] denote significance at the 1%, 5%, and 10% level, respectively.

Dependent variable =	ROA	ROE	Change in market share
	(1)	(2)	(3)
Tariff*post89*dual	-0.158	0.117	-1.038
	(0.288)	(0.807)	(0.117)
Tariff*post89	0.076	-0.189	0.169
	(0.580)	(0.645)	(0.756)
Firm size	0.026 [a]	0.065 [a]	0.013
	(0.000)	(0.000)	(0.211)
ROA_{t-1}	0.241 [a]		
	(0.000)		
ROE_{t-1}		0.030 [a]	
		(0.000)	
R&D ratio	-0.449 [a]	-0.622 [a]	
	(0.000)	(0.000)	
Debt ratio	-0.075 [a]	-0.024	
	(0.001)	(0.590)	
Volatility	-0.043 [a]	-0.168 [a]	
	(0.000)	(0.000)	
Ln(#business segments)			0.058 [a]
			(0.008)
Altman z-score			0.036 [a]
			(0.000)
$z\,Cash_{t-1}$			0.053 [a]
			(0.000)
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
#obs	27,064	26,196	22,675
F-value	39.45	17.73	21.27
Adj. R-squared	0.533	0.456	0.152

Table 8: Impact of duality, controlling for potential performance improvement due to reduction of slack

This table reports regression estimation of the impact of duality on firm valuation, controlling for changes in the level of slack. We winsorize sales per employee, overhead expense, and input costs at 1% at both tails. We estimate all models controlling for firm-level clustering. *p*-value are reported in parentheses below the coefficient estimates. [a], [b] and [c] denote significance at the 1%, 5%, and 10% level, respectively.

Dependent variable =			Ln(Tobin's Q)		
Slack =		Sales per employees	Overhead expense	Input costs	Ln(Wage)
Tariff*post89*dual	+	1.334 [c] +	1.644 [b] +	1.656 [b] +	0.190
		(0.072)	(0.026)	(0.022)	(0.928)
Tariff*post89		-1.175	-1.063	2.838 [c]	17.147
		(0.113)	(0.268)	(0.059)	(0.402)
Tariff*post89*slack	+	3.219 [b] -	2.101 -	-5.412 [a] -	-1.502
		(0.042)	(0.377)	(0.009)	(0.420)
Post89*slack		0.015	-0.147 [b]	0.083	0.026
		(0.822)	(0.051)	(0.131)	(0.486)
Slack		0.093	0.271 [a]	-0.156 [a]	-0.116 [b]
		(0.389)	(0.006)	(0.012)	(0.042)
Firm size		-0.104 [a]	-0.089 [a]	-0.103 [a]	-0.115 [a]
		(0.000)	(0.000)	(0.000)	(0.007)
ROA		0.484 [a]	0.639 [a]	0.404 [a]	0.818 [a]
		(0.000)	(0.000)	(0.000)	(0.000)
ROA_{t-1}		0.140 [a]	0.202 [a]	0.143 [a]	0.448 [a]
		(0.000)	(0.000)	(0.000)	(0.005)
ROA_{t-2}		0.030	0.030	0.009	0.105
		(0.360)	(0.286)	(0.694)	(0.466)
R&D ratio		0.354 [a]	0.337 [b]	0.389 [a]	0.173
		(0.003)	(0.029)	(0.000)	(0.715)
Debt ratio		0.075	0.081	0.065	-0.160
		(0.241)	(0.188)	(0.318)	(0.248)
Volatility		-0.133 [a]	-0.112 [a]	-0.138 [a]	0.003
		(0.000)	(0.000)	(0.000)	(0.962)
Firm fixed effects		Yes	Yes	Yes	Yes
Year fixed effects		Yes	Yes	Yes	Yes
#obs		25,847	24,258	26,280	2,751
F-value		49.50	47.87	48.39	16.36
Adj. R-squared		0.615	0.608	0.611	0.689

Table 9: Corporate failure rates

	Tariff > 0						Tariff = 0					
	Dual = 1			Dual = 0			Dual = 1			Dual = 0		
	Total firms	Bankrupt firms	(%)	Total firms	Bankrupt firms	(%)	Total firms	Bankrupt firms	(%)	Total firms	Bankrupt firms	(%)
1988	562			353	1		459	2		261		
1989	580			374	1		486			281		
1990	587	1		382	2		501			302	1	
1991	593			383	6		510	9		308	9	
1992	582	5		372	1		513	5		315	7	
1993	573	4		358	2		500	8		304	1	
1994	554	5		338	1		488	2		288	3	
1995	538			319	2		456	3		265	5	
1996	515	3		301			428	4		240	5	
1997	480	2		282	3		392	11		211	5	
1998	445	2		256	3		341	3		177	1	
1989-1998	5,447	22	0.40%	3,365	21	0.62%	4,615	45	0.98%	2,691	37	1.37%

	Tariff > 0						Tariff = 0					
	Dual = 1			Dual = 0			Dual = 1			Dual = 0		
	Total firms	Bankrupt firms	(%)	Total firms	Bankrupt firms	(%)	Total firms	Bankrupt firms	(%)	Total firms	Bankrupt firms	(%)
1991	593			383	2		510	7		308	9	
1992	582	3		372	2		513	7		315	3	
1993	573	6		358	4		500	6		304	2	
1994	554	2		338	1		488	2		288	2	
1995	538	2		319	1		456	3		265	3	
1996	515	4		301	1		428	3		240	5	
1997	480	1		282			392	5		211	1	
1998	445	3		256	4		341	8		177	4	
1991-1998	4,280	21	0.49%	2,609	15	0.57%	3,628	41	1.13%	2,108	29	1.38%

Table 10: Impact of duality, board size, board composition, and D&O ownership on Tobin's Q

This table reports regression estimation of the impact of board size, the percent of outside directors one the board (*%outsider*), and the percent of D&O ownership (*%D&O*) on Tobin's Q. We estimate all models controlling for firm-level clustering. *p*-value are reported in parentheses below the coefficient estimates. [a], [b] and [c] denote significance at the 1%, 5%, and 10% level, respectively.

Panel A:

	Dependent variable = Ln(Tobin's Q)		
	Ln(board size)	%outsider	%D&O
	(1)	(2)	(3)
Tariff*post89*ln(board size)	1.469 [a]		
	(0.013)		
Tariff*post89	-2.221 [c]		
	(0.082)		
Post89*ln(board size)	0.194 [a]		
	(0.000)		
Ln(board size)	-0.187 [a]		
	(0.000)		
Tariff*post89*%outsider		2.115 [b]	
		(0.041)	
Tariff*post89		-0.533	
		(0.469)	
Post89*%outsider		0.212 [a]	
		(0.000)	
%outsider		-0.177 [a]	
		(0.005)	
Tariff*post89*%D&O			-1.524
			(0.275)
Tariff*post89			1.121 [b]
			(0.023)
Post89*%D&O			-0.229 [a]
			(0.000)
%D&O			0.080
			(0.329)
Controls (Firm size, ROA, ROA_{t-1}, ROA_{t-2}, R&D, Debt ratio, Volatility)	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
#obs	22,540	22,540	20,205
F-value	48.09	47.91	41.99
Adj. R-squared	0.637	0.634	0.636

Panel B:

	Dependent variable = Log(Tobin's Q)
(1) Tariff*post89*dual	0.797
	(0.361)
Tariff*post89	-2.801
	(0.108)
(2) Tariff*post89*log(board size)	1.568 [b]
	(0.043)
Post89*log(board size)	0.169 [a]
	(0.000)
Log(board size)	-0.180 [a]
	(0.000)
(3) Tariff*post89*%outsider	0.255
	(0.862)
Post89*%outsider	0.012
	(0.877)
%outsider	-0.034
	(0.652)
(4) Tariff*post89*%D&O	-1.875 [c]
	(0.090)
Post89*%D&O	-0.063
	(0.369)
%D&O	-0.046
	(0.603)
Wald test for joint significance	
p-value for (1), (2), (3) and (4)	(0.068) [c]
Controls (Firm size, ROA, ROA_{t-1}, ROA_{t-2}, R&D, Debt ratio, Volatility)	Yes
Firm fixed effects	Yes
Year fixed effects	Yes
#obs	20,205
F-value	36.25
Adj. R-squared	0.6408

Table 11: Event study results

Panel A: Key event dates

Dates	Events
9/23/1987	Negotiations on the Canada-United States Free-Trade Agreement (FTA) were discontinued
9/30/1987	It was announced at midnight that the possibility of resuming negotiations would be discussed
10/3/1987	Substantive negotiations conclude and agreement is reached
1/2/1988	The Canadian Prime Minister Mulroney and the U.S. President Reagan signed the FTA subject to the FTA being ratified by the U.S. and Canadia legislature within the 1988 calendar year

U.S. Reaction to the FTA

7/26/1988	Representatives Foley and Michel introduced H.R. 5090, a Bill to implement the FTA, in the U.S. House of Representatives
8/9/1988	The House passed the Bill by a vote of 366 to 40
9/9/1988	The Senate passed the Bill by a vote of 83 to 9

Canadian Reaction to the FTA

7/20/1988	Liberal party leader Turner announced that the Liberal-dominated Senate would delay its approval of FTA implementing legislation until Mulroney called a national election
10/1/1988	Mulroney dissolved Parliament and announced to hold a general election on Nov. 21 in a bid to save the FTA
11/7/1988	Gallup Poll: the Liberal party had a ten percentage point lead
11/10/1988	Globe-Environomics Poll: Liberal and Conservative parties were tied.
11/21/1988	Mulroney won the election with a 43.7% popular vote
1/1/1989	the FTA came into effect

Panel B: Event-period Alpha from the four-factor model

Event period	Annualized Alpha		*dif.*
	Duality firms	Non-duality firms	[*t*-value]
9/15/1987-11/30/88	10.9%	11.6%	-0.7%
			[0.23]
10/1/1987-11/30/88	11.5%	12.1%	-0.6%
			[0.19]
1/1/1988-11/30/88	10.9%	10.2%	0.8%
			[0.21]
7/15/1988-11/30/88	5.7%	4.7%	1.1%
			[0.21]