When Does CEO Duality Add Value? Evidence from a Natural Experiment

Abstract

By using a natural experiment and a differences-in-differences methodology, we establish a causal relation between board leadership and firm performance. The natural experiment is an exogenous shock that increased competition and broadened market opportunities for U.S. firms. We find that, under this changing business environment, firms with combined titles of CEO and Chairman of the Board are valued 6.0% higher than firms with separate titles. Importantly, competition amplifies the positive impact of unitary leadership on firm value. Our results suggest that the relation between board leadership and firm performance is a function of the underlying firm characteristics and competitive environment. Our paper has policy implications for the growing movement towards independent board leadership.

1. Introduction

Whether or not to split the titles of the Chief Executive Officer (CEO) and the Chairman of the Board (COB) is one of the most contentious issues in the recent history of corporate governance. U.S. corporations have a long tradition of combining the titles. Until earlier 1990s, more than 70% U.S. firms practice unitary leadership (we use unitary leadership and CEO duality or duality interchangeably in this paper to denote combined positions of CEO and COB). However, companies are under growing pressure to separate. In 2009, shareholder proposals calling for separate CEO/COB titles averaged 36.3% vote support, an increase of 6.5 percentage points over 2008 and 11.5 points over 2007 (The 2009 RiskMetrics Group Postseason Report). Firms seem to be yielding to the pressure. Using the RiskMetrics board data, we calculate about 55% S&P1500 firms have unitary leadership in 2009, a dramatic decrease from 70% in 1996.

The trend towards separate leadership is unsettling given the lack of convincing evidence on either issue, namely we do not know for sure that having separate titles creates shareholder value or having unitary leadership destroys value (see Section 2.1 for a summary of this literature). Several factors explain the inconclusive evidence on the subject. It is not theoretically obvious whether separate or unitary leadership is optimal. Therefore, the question is an empirical one. However, due to endogeneity, it is difficult to correctly measure the duality-performance relation. For example, if firms likely to award good-performing CEOs the additional title of COB, we will detect an artificial positive relation between CEO duality and firm performance.

In this paper, we address the duality-performance relation using a natural experiment. In their study of endogeneity and corporate governance, Wintoki, Linck and Netter (2009) argue that natural experiment is one of the best ways to identify causal relations.[1] The natural experiment is the 1989 Canada-United States Free Trade Agreement (FTA), an external shock

[1] Adams, Hermalin and Weisbach (2010) make similar observation.

that substantially increased the competition as well as expanded market opportunities for U.S. firms. We test whether there is any differential performance change across firms of different leadership types after the implementation of the agreement. Additionally, we employ a differences-in-differences methodology to better control for unobserved heterogeneities and contemporaneous shocks that potentially influence firm valuation.

We find robust evidence that firms with unitary leadership perform better than firms with separate leadership. We track 424 *Forbes*' 500 firms from 1984 to 1993. Before the FTA, the average U.S. tariff on Canadian imports is 1.11%. After the trade liberalization, we find that firms with unitary leadership experience 6.0% increase in Tobin's Q compared to firms with separate leadership. The valuation premium grows to 12.2%, when we exclude industries without tariff on Canadian imports (i.e. allowing the average U.S. tariff on Canadian imports to rise to 3.01%). Therefore, our evidence is consistent with the argument that unitary leadership provides streamlined chain of command and effective decision-making, which becomes more valuable as competition intensifies. More importantly, our evidence suggests that, as competition grows, the benefits of having unified board leadership also increases. Our results are robust to a battery of tests, including controlling for other governance characteristics, the career cycle of the CEO and potential contemporaneous movements that may drive firm valuation.

Our paper makes several contributions to the literature. First, we find strong and robust evidence for the impact of board leadership on firm performance. Due to endogeneity, the literature lacks convincing evidence on this issue. We are able to establish a clear causal relation by using a natural experiment and the differences-in-differences methodology. Second, this paper contributes to the literature that shows board leadership is an endogenous choice by firms and the relation between board leadership and firm performance is likely a function of firm

characteristics and operating environment (e.g. Faleye (2007) and Dey et al. (2009)). Therefore, our findings have important policy implications. In recent years, firms are under increasing pressure from governance activists and regulators to split the dual roles of CEO and COB.[2] Our findings cast doubt on this movement.

The rest of paper is organized as follows: Section 2 reviews the literature, Section 3 presents the costs and benefits of having unitary leadership and develops hypotheses, Section 4 provides the institutional background of the FTA and discusses research methodology, Section 5 describes the sample, Section 6 presents empirical results, and Section 7 concludes.

2. Related literature

2.1.Determinants of board leadership

Compared to the literature on board size and composition, modeling papers on the determinants of board leadership are sparse. However, numerous empirical studies have so far provided rather consistent evidence. Overall, the literature finds that the likelihood of unitary leadership increases in operation complexity (typically proxied with the size of the firm such as sales and market value of equity, growth opportunities such as sales growth, and debt level), CEO age, CEO tenure, and CEO ownership (Faleye (2007), Linck, Netter and Yang (2008), Dey, Engel and Liu (2009), Grinstein and Valles (2008)). Taken together, the evidence on the determinants of board leadership is consistent with the evidence on the determinants of board size and composition that firms choose board structure by making trade-off decisions based on the conditions of their competitive environment.

[2] For example, the Securities and Exchange Commission (SEC) issued new rules in 2010 on Proxy Disclosure Enhancement, which requires firms to disclose whether and why the company has chosen to combine or separate the titles of CEO and COB and the reasons why they believe that it is an appropriate structure for the company. Companies with combined titles need to disclose whether and why the company has a lead independent director and the specific roles the lead independent director plays in the leadership of the company. http://www.sec.gov/rules/final/2009/33-9089.pdf

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, Coles and Jarrell (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 unitary leadership is associated with better accounting performance. Their event study yields corroborative evidence. They identify 264 events of board leadership changes for the period of 1984 to 1991 and find no significant abnormal returns for announcements of either changing from unitary to separate leadership or from separate to unitary leadership. Further, to compare with Pi and Timme (1993), Brickley et al. study 130 banks and thrifts and find no significant differences in accounting performance across firms with different board leadership models.

Palmon and Wald (2002) study 157 announcements of changes in board leadership 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 conditional on firm size, they find that small firms experienced negative abnormal returns when changing from unitary to separate leadership, while large firms experienced positive abnormal returns. They find insignificant abnormal returns for changing from separate to unitary leadership for all firm sizes. They use three alternative measures of firm size (book value, market value and sales). The results of Palmon and Wald are in contrast with Faleye (2007), who find that Tobin's Q is higher when complex firms have unitary leadership and lower when non-complex firms do the same. Faleye's measure of firm complexity is a principal component extracted from total assets, net property, plant, and equipment over total assets, and sales growth. Dalton, Daily, Johnson and Ellstrand

(1998) conduct a meta-analysis of 31 studies and conclude that CEO duality does not affect performance. Further, firm size does not moderate the duality-performance relation. Dahya and Travlos (2000) review ten studies on CEO duality and find mixed results.

In 1992, the Cadbury Committee's Code of Best Practice calls U.K. firms to separate the combined titles of CEO and COB. Using this external shock, Dahya, Galguera-Garcia and Bommel study 1,124 U.K. industrial companies from 1989 to 1996 to test whether firms experienced performance improvement after the separation. They fail to find any such evidence.

3. Hypothesis development

In this section, we summarize the costs and benefits of unitary leadership under the conflict-of-interest hypothesis and the stewardship hypothesis, respectively.

3.1.Conflict-of-interest hypothesis

The arguments against unitary leadership or alternatively in favor of separate leadership are largely based on the agency theory. Board of directors is the apex of the governance control system that mitigates agency conflicts arising from separation of ownership and control (Fama and Jensen (1983)). Combining the positions of the Chairman of the Board of Directors with the CEO seems to exemplify the ultimate conflict of interest. It is tantamount to letting the CEOs grade their own homework (Brickley et al. (1997)). Supporting this conflict-of-interest argument, empirical studies find that when the duties 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), 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.

3.2.Stewardship hypothesis

The arguments for unitary leadership emphasize the benefits of strong stewardship. Consolidated power, although may not be the best governance practice, 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. As CEO possesses the most intimate knowledge of the firm, 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 competitive edge particularly during crisis.[3]

Combined titles of CEO and COB may be an integral part of CEO incentive contract. Brickley et al. (1997) find that most of the new CEOs are awarded the COB title if the firm performs well after a short period. CEOs may be less motivated to work hard or even consider leaving the firm, if the firm does not offer the additional title of COB.[4] Separating the dual roles may also interfere with succession planning. The process has the retiring CEO remain on the board as the COB and relinquish the COB title to the new CEO only after the new CEO successfully passes the probationary period. The process enables the retired CEO to pass on

[3] 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 reason 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."

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

important advice and experience to the successor and allows the firm to evaluate the new CEO at reduced risk. Brickley et al. (1997) and Brickley, Coles and Linck (1999) find evidence consistent with this "passing-the-baton" argument.

Combined 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 chairman creates its own agency problems in the form of "monitoring the monitor." Some scholars also argue that separate leadership is a "red herring," because the spirit of independent board oversight can be achieved through other board arrangements. For example, after the enactment of the Sarbanes-Oxley Act in 2002, U.S. publicly-traded firms are required to have majority independent boards and entirely independent audit, compensation and nominating/governance committees, and independent directors to meet regularly without management.[5]

To summarize, it is not theoretically obvious whether separate or unitary leadership is optimal. Each model carries a long spectrum of benefits and costs, which are likely function of firm characteristics and competitive environment. In other words, the relation between board leadership and firm performance is not absolute; it can vary depending on specific firm and operating conditions under examination. This probably explains the conflicting empirical evidence that prior studies have found regarding this relation. This line of reasoning also introduces an important caveat about our paper. Our natural experiment is an external shock that increased competition and broadened market opportunities. Under these circumstances, our preceding discussion suggests that the benefits of unitary leadership outweigh the costs and we should find evidence consistent with the stewardship hypothesis. It is possible that if our natural

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

experiment involves a significant increase in CEO entrenchment costs, we will then find evidence for the conflict-of-interest hypothesis.

4. Research design

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

Our natural experiment is the Canada-United States Free Trade Agreement of 1989 (FTA) that eliminated tariffs and other trade barriers between the two countries. U.S. President Ronald Reagan and Canadian Prime Minister Brian Mulroney signed the FTA on January 2, 1988. The FTA encountered strong opposition in Canada. The opposition parties, the Liberal Party and the New Democratic Party, both opposed the FTA and vowed to abrogate it if elected. The Liberal Party announced that it would use its majority in the Senate to block the passage of the FTA until Canadian voters decided the agreement's fate in the 1988 general election. Although more Canadians were against the FTA than in favor of it, Mulroney's Progressive Conservative Party won the governing majority of the House as they benefitted from being the only party in favor of the agreement, while the two opposition parties split the anti-free trade vote.[6] The FTA took effect on January 1, 1989. As the passage of the FTA was improbable and unexpected, it qualifies as an exogenous shock (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. Bilateral trade between Canada and the U.S. is the world largest; Canadian imports represented an average of 20% of total U.S. imports at the time. As Appendix I 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

[6] The FTA faced much less opposition in the U.S. Polls showed that up to 40% of Americans were unaware that the agreement had been signed, compared to 3% of Canadian.

industrial structure and standards of living so that Canadian products are likely to compete directly with U.S. products. Clausing (2001) find that the FTA significantly increased U.S. imports from Canada and the increase was larger for goods undergoing greater tariff reduction. The FTA has also been found to be associated with substantial employment loss, labor productivity gains, and reduction in price-cost margin (Trefler (2004)). Collectively, these pieces of evidence suggest that the FTA increased competitive pressure for and brought new market opportunities to U.S. companies. In addition, the FTA is a relatively clean policy experiment, untainted by confounding events like macroeconomic shocks or financial crisis (Trefler (2004)).

4.2.Empirical methodology

We implement a differences-in-differences method (DID) to study the effect of duality.[7] The basic regression specification is as follows:

$$Tobin's\ Q_{it} = \gamma_1 tariff_k * post89 * duality_{i,88} + \gamma_2 post89 * tariff_k + \tau \mathbf{X}_{it} + d_t + d_i + \varepsilon_{it} \quad \ldots(1)$$

- i indexes firms
- k indexes industries
- d_t denotes time dummies
- d_i denotes firm fixed effects
- $post89$ = 1, if t > 1988, zero if t < 1989
- $tariff_k$ is the average US tariff rate on Canadian imports by industry k for 1986-1988
- $\boldsymbol{X}$ are firm characteristics such as firm size
- ε_{it} is the error term

This DID setup allows us to use the natural experiment of FTA to study the causal effect of duality on firm value by comparing valuation changes for firms with unitary leadership (the treatment group) to those with separated leadership (the control group) when competitive

[7] For notes on DID estimation, see lecture notes for Institute for Research on Poverty's Applied Microeconometrics Workshop by Guido W. Imbens and Jeffrey M. Wooldridge (last accessed on December 29, 2010 at http://www.irp.wisc.edu/newsevents/workshops/appliedmicroeconometrics/schedule1.htm). For some examples of DID application, see Bertrand and Mullainathan (2003), Low (2009), Yun (2009), and Guadalupe and Wulf (2010).

environment changed after 1989. If $\gamma_1 > 0$, then unitary leadership increases firm value when business environment becomes more competitive or opportunistic. The advantage of taking this DID approach is that it permits us to measure the impact of an endogenous choice, duality, through natural experiment, while controlling for obscure heterogeneities (e.g. contemporaneous movements in economic conditions and technology or general sentiment shift towards more independent boards) through the control group. Wintoki et al. (2009) suggest that natural experiment is one of the best ways to correctly identify casual relations.

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 prior studies and treat all industries equally regardless of their phase-out schedule, by exploiting the differential tariff rates during 1986-1988. As firms endogenously choose board structure, board leadership can change in any given year. To mitigate this endogenous problem, we choose firms with unitary leadership as of 1988 as the treatment group. Assuming continuous treatment of $\text{duality}_{i,88}$ should bias us against finding predicted results, because the gap in firm valuation narrows when the treatment group (i.e. firms with unitary leadership that we hypothesize to have higher valuation post 1989) includes control firms (i.e. firms with separated leadership that we hypothesize to have lower valuation post 1989) and vice versa.

The FTA likely impacts different U.S. industries differently, due to the relative strength of the pre-agreement industry and market conditions in the two countries. Assume same tariff rates for imports from and exports to Canada, U.S. firms with comparative advantage over Canadian firms should rise in value relative to those facing comparative disadvantage against Canadian firms after 1989. In this case, the differential change in firm value is not due to

competitive advantage afforded by unitary leadership but due to pre-existing industry conditions. To control for this possibility, we also include $post89*tariff_k$ in the model. Following existing literature (Yermak (1996)), we use firm size (log of market value of equity), current-year return on assets (ROA), one-year and two-year lagged ROA, capital expenditure over sales as likely drivers of firm value. d_t controls for economic-wide changes. d_i absorbs time-invariant industry and firm heterogeneity. We use panel-data methods to estimate all regressions and use cluster-robust standard error to control for correlation among observations from the same firm.

5. Sample

Since the FTA is implemented in 1989, we focus on the time period from 1984 to 1993. The sample period is chosen so that we have relatively equal time span before and after the event year. Sample period ends by 1993, since the North American Free Trade Agreement (NAFTA), which expands the free-trade zone to include Mexico, took effect in January 1994. We start the sample with the dataset of Yermack (1995 and 1996), which includes all firms that appear at least four times among Forbes' ranking of the 500 largest U.S. corporations in any of the categories of sales, assets, net income, and market capitalization between 1984 and 1991. Sample firms also need to be traded on a U.S. exchange for at least four consecutive fiscal years during the period. We exclude from this sample utility and financial firms. The final sample consists of 424 unique firms or 3,924 firm years from 1984 to 1993.

Financial data comes from COMPUSTAT, stock price data comes from CRSP, board and ownership data between 1984 and 1991 comes from David Yermack. Tariff data are based on U.S. import statistics as compiled by Feenstra (1996). Table 1 reports the summary statistics for key operating and governance characteristics of the sample. The number of observations for

governance variables is fewer than that for operating variables because we do not have data for governance variables after 1991.

We perform univariate tests comparing firms protected by tariff on Canadian imports to those without such protection and report the results in Table 3. Firms with tariff have lower valuation and ROA, slower sales growth, and higher R&D investment, consistent with the notion that tariffs are established to protect vulnerable domestic industries.

We report time trend of board structure from 1984 to 1991 in Table 4. Our sample firms exhibit similar trends as Linck et al. (2008) document for 1990-2000, declining board size and increasing board independence both in terms of representation of outside directors on the board and the percent of firms with separate leadership. It is worth noting that the trend of board leadership is stable. The fraction of firms with unitary leadership is 84.6% in both 1990 and 1991. Linck et al. report similar results.

6. Empirical results

6.1. Impact of board leadership on Tobin's *Q*

Table 5 reports the main results of the paper. Column 1 is our base model (Equation 1). Column 2 excludes $tariff*post89*duality_{88}$ from the base model to shed some light on the overall effect of the FTA on firm performance. Column 3 adds $post89*duality_{88}$ to the base model to control for the possibility that other shocks contemporaneous with the FTA systematically affect our treatment and control groups. The coefficient of interest, $tariff*post89*duality_{88}$, is significantly positive in Column 1 and 3, implying that unitary leadership adds value when competition becomes fierce. The positive effect is also economically large. Given the average tariff rate of 1.11% (Table 2), the coefficient estimate of 5.345% in Column 1 suggests that, after

the implementation of the FTA, firms with unitary leadership experienced 6.0% (5.345%*1.11%) increase in Tobin's *Q* compared to firms with separate leadership. $post89*duality_{88}$ is insignificant in Column 3, but is jointly significant with $tariff*post89*duality_{88}$ with a *p*-value of 0.0105, suggesting an 8.7% *Q* premium for firms with unitary leadership in a industry with an average tariff of 1.11%.

*tariff*post89* is negatively significant in Column 1 and 3, thereby providing corroborating evidence for the stewardship hypothesis from a different angel. Using Column 1 to illustrate, in an industry with an average U.S. tariff on Canadian imports, firms with separate leadership experience 5.9% (-5.320%*1.11%) reduction in Tobin's *Q* after the trade liberalization, while firms with unitary leadership did not experience devaluation ((5.345%-5.320%)*1.11%=0.0%). *tariff*post89* is insignificant in Column 2, which is consistent with the argument that the FTA brought competition to but also created new market opportunities for U.S. firms, and its overall effect on firm performance is neutral.

Estimation results of our control variables are qualitatively similar to Yermack (1996). As a robustness check, we also include industry dummies in all regressions in Table 5, re-run the tests and obtain the similar results. We do not report these results separately in a table.

We re-estimate Equation 1, controlling for other governance variables such as board size, board composition and director and officer (D&O) ownership. As Table 6 shows, we obtain similar results. Consistent with Yermack (1996), we find that smaller boards are associated with higher valuation. Supporting the incentive-alignment argument, firms with higher director and officer ownership have higher valuation. We do not find any significant results for board composition.

We further break the sample into firms protected by tariff on Canadian imports and firms without such protection and re-run the tests. The intuition is that the effects of unitary leadership should be stronger for firms that experience more significant changes in competitive environment. As Table 7 shows, *post89*duality*$_{88}$ is positive and significant for firms with tariff on Canadian imports before 1989, but is insignificant for firms without such protection. The results hold after we control for board size, board composition and D&O ownership. Further, the economic significance is large. Column 1 suggests that firms with unitary leadership are valued on average 12% higher than firms with separate leadership after trade liberalization. Recall, for the full sample, we find a valuation premium for unitary leadership when the average tariff rate is 1.11%. For the sub-sample of firms with trade protection, the mean tariff rate is 3.01%. Therefore, Table 7 provides strong, additional evidence for the argument that strong leadership is beneficial during unstable business times. Further, competition magnifies the positive impact of unitary leadership on firm value.

6.2.The career cycle of the CEO

One concern over our empirical test is that our proxy, *duality*$_{88}$, does not perfectly capture the state of board leadership. One extreme example will be that a firm has unitary leadership in all sample years except for 1988. A more realistic problem could be caused by the practice of 'passing-the-baton.' Specifically, a firm may be a habitual practitioner of unitary leadership. But during our measurement time, the firm just appointed a new CEO and the retiring CEO held the title of COB as part of the succession process we describe in the section of hypothesis development. The new CEO was later awarded the title of COB after we completed our measurement.

We perform two robustness tests to address the limitation of $duality_{88}$ due to the career cycle of a CEO. We restrict the sample to firms that never changed board leadership during 1984-1991, the sample period for which we have board data, and re-run our tests. We report the results in Table 8. Our results become stronger. For example, firms that habitually combine CEO and COB titles have a market value 21% higher after any tariff reduction, compared to 12% when we do not control for the career cycle of CEO (Table 7). This result again confirms the argument that one size does not fit all. The duality-performance relation is a function of underlying firm characteristics and operating conditions. Our results suggest that competition amplifies the positive relation between unitary leadership and firm performance. The higher the competition, the more beneficial it is to have unitary leadership. In the other robustness test, we allow duality to change by year and obtain similar results. We do not report those results separately in a table.

6.3.Additional robustness check

We performance additional robustness tests by allowing control variables to vary by year, in case our results are driven by contemporaneous shocks that differentially affect large firms, firms with good accounting performance or high growth firms. As Table 9 shows, this robustness test does not alter our conclusion.

7. Conclusion and discussion

In recent years, there has been a global movement towards more independent board leadership (Dahya et al. (2009)). U.S. firms are under growing pressure to separate the dual titles of CEO and COB. Unfortunately, due to problems of endogeneity and measurement issues, we still do not know whether unitary leadership destroys value or, conversely, separate leadership creates value. In this paper, we use a natural experiment and the differences-in-differences methodology to provide robust evidence on the impact of board leadership on firm performance.

We use the 1989 Canada-United States Free Trade Agreement (FTA) as the natural experiment, an external shock that substantially increased market competition and opportunities for U.S. firms. We find that, after the trade liberalization, firms with unitary leadership experience 6.0% increase in Tobin's Q compared to firms with separate leadership. Further, competition strengthens the positive relation between unitary leadership and firm performance. Our results are consistent with the argument that the relation between board leadership and firm performance is not absolute. One size does not fit all. Whether a leadership model creates or destroys value is contingent on firm and business conditions.

Therefore, our paper calls into question the recent movement towards abolishment of combined leadership. Our paper also highlights future research areas. What kind of operating environment attenuates the positive effects of unitary leadership? What conditions give rise to a positive relation between separate leadership and firm performance? Our sample consists of large firms. Existing literature suggests that the determinants of board leadership vary by firm size (Grinstein and Valles (2008). What factors moderate or amplify the relationship between board leadership and firm performance for small firms? Will the conditional effects of board leadership vary by firm size as well?

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

Four-Digit SIC	Industry Description	Average Tariffs
3021	BOOTS, INCLUDING HUNTING, OVER 90% RUBBR A/OR PLASTIC EXTERIOR	36.06%
2821	PHENOLIC RESINS	11.25%
2211	OTHER COTTON SATEENS EQUAL TO OR GREATER 6 OZ/SYD NAP UBNFCV	8.80%
2015	BIRDMEAT NSPF, FRESH OR FRZN PLKD, BHDED, EVIS, NT CUT INPCS	7.76%
3661	OTHER TELEPHONE ANSWERING MACHINES	7.75%
3851	OPHTHALMIC LENSES NSPF, NOT MOUNTED	7.55%
3942	ARTIFICIAL EYES, EXCEPT PROSTHETIC ARTICLES	6.73%
3841	HOSP FURN NSPF	6.60%
2844	COSMETIC CREAM ETC NC ALCL	5.30%
3613	FUSES, 2300 V OR MORE	5.13%
3678	CONNECTORS, CYLINDRICAL MULTI-CONTACT NSPF	5.11%
3443	RESERVOIRS, TANKS, ETC OF METAL WITH CAPACITY OV 75 GAL	4.99%
3663	TAPE RECORDERS VIDEO EXCEPT COLOR OR AUDIO	4.77%
2771	SOCIAL AND GIFT CARDS, ETC, WITHOUT GREETING OR WORDING	4.71%
3825	METERS, ELECTRICITY SUPPLY ETC, OVER $1O NOT OVER $15	4.54%
3845	ELEC-MED MONITOR SYSTME	4.39%
3651	TELEVISION RECEIVERS EXCEPT DIRECT VIEWING, NSPF	4.38%
2085	WHISKY, EXC IRISH AND SCOTCH IN CONTAINERS, 1 GALLON OR LESS	3.98%
3571	COMPUTING & OTHER DATA-PROC MACHINE F USE IN CIVIL AIRCRAFT	3.92%
3944	TOY BOOKS	3.83%

Table 1: Variable Description

Variable Name	Variable Description
Operating characteristics	
Total assets	Book value of total assets
Market value of equity (MVE)	Number of common shares outstanding multiplied by fiscal-year-end common share price
Tobin's *Q*	(Market value of common equity - Book value of common equity + Book value of total assets) / Book value of total assets
Return on assets (ROA)	Earnings before interest, taxes and depreciation over book value of total assets
Operating profit	Earnings before interest, taxes and depreciation over net sales
CAPEX over sales (CAPEX)	Capital expenditure over net sales
Sales growth	Net sales$_t$/net sales$_{t-1}$
Governance characteristics	
Board size	Total number of directors on the board
%Independent directors on the board	Percent of independent directors on the board of directors. To qualify as an independent director, a director cannot be a current or former officer of the company.
%Firm with unitary leadership (duality)	Percent of firms with Chief Executive Officer (CEO) as Chairman of the Board
D&O ownership (D&O)	Director and officer ownership

Table 2: Summary Statistics

This table reports summary statistics for our sample of 424 unique firms from 1984 to 1993. *Tariff* is the average tariff rate for U.S. industries defined at the level of 4-digit SIC code on Canadian imports for 1986-1988. Other variables are as described in Table 1.

	N	Mean	Median	Std. Dev.	Lower Quartile	Upper Quartile	Minimum	Maximum
Total assetes ($MM)	3,924	5,874	2,243	14,885	1,117	4,908	105	251,506
Market value of equity ($MM)	3,924	4,183	1,765	7,780	897	3,937	4	95,698
Tobin's *Q*	3,924	1.66	1.39	0.91	1.12	1.88	0.63	12.28
Return on assets (%)	3,924	16.40%	15.97%	7.94%	11.56%	20.45%	-17.26%	83.64%
Operating profit margin (%)	3924	15.50%	13.78%	10.07%	9.03%	20.34%	-79.70%	66.61%
CAPEX (%)	3,924	8.08%	5.73%	8.56%	3.41%	9.65%	0.00%	115.43%
Sales growth (%)	3,924	10.07%	7.75%	21.27%	1.28%	14.69%	-91.36%	341.29%
Tariff (%)	3,924	1.11%	0.00%	3.10%	0.00%	0.91%	0.00%	36.06%
Board size	3,169	12.29	12.00	3.41	10.00	14.00	4.00	34.00
%Independent directors (%)	3,169	53.53%	56.25%	19.19%	41.67%	66.67%	0.00%	93.33%
%Firm with unitary leadership (%)	3,169	82.90%	100.00%	37.66%	100.00%	100.00%	0.00%	100.00%
D&O ownership (%)	3,166	9.28%	2.80%	14.58%	1.10%	10.30%	0.00%	95.10%

Table 3: Univariate test

This table reports univariate test statistics, comparing the sub-samples of firms with tariff reduction and firms facing zero tariff reductions. *tariff* is the average tariff rate for U.S. industries defined at the level of 4-digit SIC code on Canadian imports for 1986-1988. We perform two-sample *t*-test for all variables except for whether firms have unitary leadership, on which we use Chi-Square test. [a], [b] and [c] denote significance at the 1%, 5%, and 10% level, respectively.

	N	Mean	Median	N	Mean	Median	*t*-value/ Chi-Square
	Firms with tariff > 0			*Firms with tariff = 0*			
Tariff (%)	1,452	3.01%	2.31%				
Total assetes ($MM)	1,452	5,360	2,447	2,472	6,177	2,154	-1.93 [b]
Market value of equity ($MM)	1,452	4,263	1,789	2,472	4,137	1,751	0.50
Tobin's *Q*	1,452	1.59	1.31	2,472	1.70	1.43	-3.74 [a]
Return on assets (%)	1,452	16.09%	15.71%	2,472	16.59%	16.21%	-1.98 [b]
Operating profit margin (%)	1,452	15.37%	14.84%	2,472	15.57%	12.99%	-0.62
CAPEX (%)	1,452	8.16%	6.46%	2,472	8.04%	5.28%	0.47
R&D	1,452	3.50%	1.45%	2,472	1.30%	0.00%	14.59 [a]
Sales growth (%)	1,452	9.14%	6.73%	2,472	10.61%	7.99%	-2.03 [b]
Board size	1,180	12.21	12.00	1,989	12.34	12.00	-1.09
%Independent directors (%)	1,180	54.64%	57.52%	1,989	52.88%	55.56%	2.50 [a]
%Firm with unitary leadership (%)	1,180	82.46%	100.00%	1,989	83.16%	100.00%	0.61
D&O ownership (%)	1,178	8.40%	2.10%	1,988	9.81%	3.40%	-2.62% [a]

Table 4: Board trend from 1984 to 1991

This table reports time trend in the percent of firms with unitary leadership, board size, and the percent of independent directors on the board for 423 unique firms from 1984 to 1991.

	N	%Firm with unitary leadership	Board size		%Independent directors	
			Mean	Median	Mean	Median
1984	387	80.6%	12.62	12.0	52%	54%
1985	396	80.1%	12.62	12.0	52%	55%
1986	401	82.5%	12.48	12.0	53%	56%
1987	409	83.9%	12.30	12.0	53%	56%
1988	409	83.4%	12.15	12.0	53%	56%
1989	396	83.6%	12.04	12.0	54%	57%
1990	389	84.6%	12.08	12.0	55%	58%
1991	382	84.6%	12.02	12.0	55%	58%

Table 5: Impact of unitary leadership on firm performance

This table reports regression estimation on the impact of board leadership on firm valuation. We estimate all models using panel data estimation methods, controlling for firm-level clustering. Test sample consists of 424 unique firms for 1984-1993. *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 = Log(Tobin's *Q*)		
	(1)	(2)	(3)
tariff*post89*duality$_{88}$	5.345 [a]		4.426 [b]
	(0.007)		(0.031)
tariff*post89	-5.320 [a]	-0.158	-4.455 [b]
	(0.007)	(0.534)	(0.029)
post89*duality$_{88}$			0.038
			(0.186)
LogMVE	0.119 [a]	0.119 [a]	0.120 [a]
	(0.000)	(0.000)	(0.000)
ROA	1.927 [a]	1.929 [a]	1.927 [a]
	(0.000)	(0.000)	(0.000)
ROA$_{t-1}$	0.010	0.024	0.014
	(0.917)	(0.812)	(0.887)
ROA$_{t-2}$	-0.037	-0.062	-0.043
	(0.723)	(0.574)	(0.675)
CAPEX	0.191 [b]	0.208 [b]	0.188 [b]
	(0.022)	(0.021)	(0.025)
Firm dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
#obs	3,924	3,924	3,924
F-value	56.23	60.53	53.13
R-squared	0.3864	0.3887	0.3839

Table 6: Impact of unitary leadership on firm performance - controlling for other governance characteristics

This table reports regression estimation on the impact of board leadership on firm valuation, considering other governance characteristics. We estimate all models using panel data estimation methods. Standard errors are robust to firm-level clustering. Test sample consists of 423 unique firms from 1984 to 1991. *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 = Log(Tobin's *Q*)		
	(1)	(2)	(3)
tariff*post89*duality$_{88}$	4.970 [a]	5.037 [a]	4.806 [a]
	(0.006)	(0.008)	(0.007)
tariff*post89	-4.909 [a]	-5.040 [a]	-4.753 [a]
	(0.007)	(0.008)	(0.007)
LogMVE	0.135 [a]	0.127 [a]	0.136 [a]
	(0.000)	(0.000)	(0.000)
ROA	1.664 [a]	1.708 [a]	1.654 [a]
	(0.000)	(0.000)	(0.000)
ROA$_{t-1}$	0.080	0.110	0.086
	(0.456)	(0.311)	(0.419)
ROA$_{t-2}$	0.060	0.047	0.057
	(0.555)	(0.644)	(0.570)
CAPEX	0.132 [c]	0.161 [b]	0.133 [c]
	(0.103)	(0.054)	(0.099)
Log(board size)	-0.240 [a]		-0.228 [a]
	(0.000)		(0.000)
%Independent directors	0.077		0.108
	(0.272)		(0.149)
Log(D&O ownership)		0.328 [b]	0.295 [b]
		(0.032)	(0.051)
Firm dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
#obs	3,169	3,166	3,166
F-value	43.03	43.64	40.23
R-squared	0.4049	0.3799	0.4210

Table 7: Impact of unitary leadership on firm performance - partitioned by tariff rate

This table reports regression estimation on the impact of board leadership on firm valuation for 1) firms with zero tariff on Canadian imports before the FTA (tariff=0) and 2) firms protected by tariff on Canadian imports before the FTA (tariff>0). We estimate all models using panel data estimation methods. Standard errors are robust to firm-level clustering. Test sample consists of 424 unique firms for 1984-1993. *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 = Log(Tobin's *Q*)			
	tariff > 0		tariff = 0	
	(1)	(2)	(3)	(4)
post89*duality$_{88}$	0.122 [b]	0.091 [b]	0.036	0.046
	(0.019)	(0.045)	(0.295)	(0.137)
LogMVE	0.178 [a]	0.208 [a]	0.094 [a]	0.102 [b]
	(0.000)	(0.000)	(0.012)	(0.018)
ROA	1.603 [a]	1.323 [a]	2.085 [a]	1.828 [a]
	(0.000)	(0.000)	(0.000)	(0.000)
ROA$_{t-1}$	-0.167	-0.143	0.079	0.223
	(0.223)	(0.308)	(0.580)	(0.177)
ROA$_{t-2}$	-0.432 [a]	-0.272 [c]	0.199	0.267 [b]
	(0.010)	(0.089)	(0.131)	(0.041)
CAPEX	0.434 [b]	0.430 [b]	0.149 [c]	0.087
	(0.022)	(0.037)	(0.083)	(0.275)
Log(board size)		-0.271 [a]		-0.200 [a]
		(0.000)		(0.000)
%Independent directors		-0.026		0.209 [b]
		(0.850)		(0.016)
Log(D&O ownership)		0.241		0.355 [b]
		(0.472)		(0.024)
Firm dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
#obs	1,452	1,178	2,472	1,988
F-value	27.36	22.97	35.49	25.64
R-squared	0.3055	0.3249	0.4372	0.4692

Table 8: Impact of unitary leadership on firm performance, controlling for the career cycle of the CEO

This table reports regression estimation on the impact of board leadership on firm valuation, excluding firms that changed board leadership during 1984 and 1991. We estimate all models using panel data estimation methods. Standard errors are robust to firm-level clustering. Test sample consists of 273 unique firms for 1984-1991. *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 = Log(Tobin's *Q*)		
	All	tariff = 0	tariff > 0
	(1)	(2)	(3)
tariff*post89*duality$_{84\text{-}91}$	6.845 [a]		
	(0.005)		
tariff*post89	-6.891 [a]		
	(0.005)		
post89*duality$_{84\text{-}91}$		0.211 [a]	0.038
		(0.003)	(0.539)
LogMVE	0.187 [a]	0.233 [a]	0.168 [a]
	(0.000)	(0.000)	(0.000)
ROA	1.873 [a]	1.581 [a]	1.987 [a]
	(0.000)	(0.000)	(0.000)
ROA$_{t\text{-}1}$	0.002	-0.198	0.100
	(0.985)	(0.191)	(0.556)
ROA$_{t\text{-}2}$	-0.005	-0.247	0.107
	(0.964)	(0.166)	(0.435)
CAPEX	0.145	0.409 [c]	0.104
	(0.117)	(0.078)	(0.245)
Firm dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
#obs	2,493	978	1,515
F-value	47.04	25.02	27.61
R-squared	0.3173	0.2878	0.3412

Table 9: Impact of unitary leadership on firm performance - robustness check

This table reports regression estimation on the impact of board leadership on firm valuation. We estimate all models using panel data estimation methods. Standard errors are robust to firm-level clustering. Test sample consists of 424 unique firms for 1984-1993. *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 = Log(Tobin's *Q*)					
	(1)	(2)	(3)	(4)	(5)	(6)
tariff*post89*duality$_{88}$	5.276 [a]	5.318 [a]	5.435 [a]	5.375 [a]	5.292 [a]	5.429 [a]
	(0.008)	(0.007)	(0.005)	(0.006)	(0.008)	(0.004)
tariff*post89	-5.243 [a]	-5.269 [a]	-5.330 [a]	-5.277 [a]	-5.273 [a]	-4.599 [a]
	(0.008)	(0.008)	(0.006)	(0.007)	(0.008)	(0.014)
LogMVE	0.099 [a]	0.118 [a]	0.123 [a]	0.124 [a]	0.119 [a]	0.095 [a]
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
ROA	1.922 [a]	1.799 [a]	1.925 [a]	1.906 [a]	1.925 [a]	1.439 [a]
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA$_{t-1}$	0.018	0.034	0.029	0.031	0.013	0.291
	(0.856)	(0.735)	(0.866)	(0.760)	(0.900)	(0.500)
ROA$_{t-2}$	-0.045	-0.035	-0.014	0.028	-0.036	0.226
	(0.662)	(0.724)	(0.885)	(0.862)	(0.728)	(0.394)
CAPEX	0.203 [a]	0.184 [b]	0.192 [b]	0.201 [b]	0.284 [b]	0.344 [b]
	(0.014)	(0.025)	(0.019)	(0.018)	(0.044)	(0.015)
LogMVE*Year dummies	Yes	No	No	No	No	Yes
ROA*Year dummies	No	Yes	No	No	No	Yes
ROA$_{t-1}$*Year dummies	No	No	Yes	No	No	Yes
ROA$_{t-2}$*Year dummies	No	No	No	Yes	No	Yes
CAPEX*Year dummies	No	No	No	No	Yes	Yes
Firm dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
#obs	3,924	3,924	3,924	3,924	3,924	3,924
F-value	44.81	41.79	39.25	40.16	38.17	24.64
R-squared	0.3861	0.3909	0.3832	0.3804	0.3872	0.3920