Industry Tournament Incentives and the Strategic Value of Corporate Liquidity

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Abstract

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JEL classification: G31; G32; G34; J31; J33; L25; D21

Keywords: Industry tournament incentives; Marginal value of cash; Level of cash; Dissipation and accumulation of excess cash; Strategic investments; Market share; Product markets

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Abstract

We evaluate the link between CEO industry tournament incentives (*ITI*) and the strategic value of corporate liquidity. We find that *ITI* increase the level and marginal value of cash holdings even after conducting several tests to control for endogeneity. Additionally, for firms with excess cash, higher *ITI* lead to increased R&D expenditures and spending on focused acquisitions, and reduced shareholder payouts. Furthermore, *ITI* strengthen the relation between firm cash holdings and market share gains. Overall, our results suggest that *ITI* increase the value of cash by incentivizing CEOs to deploy cash strategically to capture its product market benefits.

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1. Introduction

Recent research suggests that the inherent optionality present in industry and intra-firm tournaments provide managers with distinct and incremental career enhancing incentives from option-based compensation schemes to implement riskier but value enhancing firm policies (Coles, Li, and Wang, 2013; Kale, Reis, and Venkateswaran, 2009; and Kini and Williams, 2012). For example, focusing on intra-firm tournaments that arise as a result of the compensation gap between the CEO and top managers, Kale, Reis, and Venkateswaran (2009) find that the option-like feature of winning the CEO promotion tournament *within* the firm positively influences firm performance, while Kini and Williams (2012) document that it also encourages firm risk taking. Extending the notion of tournaments beyond the top management team to focus on the CEO, Coles, Li, and Wang (2013) find that CEO industry tournament incentives, as captured by the compensation gap between the firm's CEO and higher paid CEOs operating in the same product market (for example, the pay differential between the firm's CEO and the maximal industry CEO pay), encourage the adoption of riskier but value enhancing corporate policies.

Corporate liquidity decisions are especially vulnerable to potential agency conflicts between managers and shareholders because it is not easy to ascertain whether managerial actions with regard to the accumulation, maintenance, and dissipation of cash are driven by managerial self-interest or shareholder interest (see, e.g., Harford, 1999; Dittmar and Mahrt-Smith, 2007; and Harford, Mansi, and Maxwell, 2008). Nalebuff and Stiglitz (1983) and Zabojnik and Bernhardt (2001) suggest that tournaments are particularly valuable when extracting managerial effort from output signals is difficult. Thus, tournament incentives can potentially serve as economically efficient mechanisms to induce managers to pursue cash policies that are consistent with shareholder value maximization. To shed light on this issue, we empirically examine the impact of CEO industry tournament incentives (henceforth referred to as *ITI*) on the: (i) marginal value of corporate cash holdings, (ii) level of cash holdings, (iii) rate of accumulation and dissipation of excess cash, and (iv) strategic actions that entail the use of excess cash to obtain competitive benefits in the firm's product markets. We focus on *ITI* primarily because, amongst all the senior managers, the CEO is likely to have the most influence on the cash policies of the firm due to the importance of cash as a "strategic" resource (see, e.g., Benoit, 1984; Bolton and Scharfstein, 1990; Campello, 2006; and Fresard, 2010). While our emphasis is on CEO industry tournament incentives, we control for intra-firm tournament incentives as well as the CEO's shareholder alignment of interest (CEO delta) and risk-taking (CEO vega) incentives that arise from her compensation structure in all our empirical tests.

Our focus on examining how *ITI* shape various facets of firm cash policy and their economic consequences is also driven by the growing propensity for U.S. corporations to stockpile huge cash reserves well in excess of what is required to fund operations coupled with the dramatic and secular increase in their cash holdings.[1] The overarching concern with regard to greater managerial access to liquidity arises from cash being a fundamentally different type of asset in the hands of management, largely because of the flexibility it provides them in terms of decisions related to its accumulation and dissipation. The pursuit of managerial self-interest can result in the unproductive utilization of cash holdings as a result of either overinvestment or underinvestment. In the former case, cash enables managers to pursue risky empire building investments that can destroy shareholder value but increase their personal benefits (Jensen, 1986). In the latter case, a combination of managerial risk aversion and preference for the "quiet life" (Bertrand and Mullainathan, 2003) can result in shareholder wealth destruction due to underinvestment of cash holdings.[2]

While the discretionary nature of cash holdings can impose substantial costs on shareholders as described above, it also has the potential to generate considerable strategic and hedging benefits. For

[1] Gao, Harford, and Li (2013) report that cash represents approximately 20.45% of firm assets as of 2011. In addition, Bates, Kahle, and Stulz (2009) report that the average cash ratio for U.S. firms has doubled during the 1980 – 2006 period.

[2] In support of the notion that agency conflicts negate any potential benefits of liquidity, Faulkender and Wang (2006) find that shareholders of an average firm assign a value of $0.94 for each dollar of cash in the hands of management. Similarly, Nikolov and Whited (2014) estimate that typical agency problems can result in increased cash holdings and a significant drop in shareholder value.

instance, Fresard (2010) points out that cash holdings have a strategic dimension that can affect firm and rival product market strategies and outcomes. Specifically, research suggests that there are at least three avenues through which cash rich firms can secure a competitive advantage in their product markets. First, cash rich firm can effectively take predatory actions against their financially constrained rivals by engaging in aggressive price cutting and/or capacity expansion that can shrink industry profit margins and drive weaker firms from the market (Bolton and Scharfstein, 1990).

Second, cash holdings provide firms with an insurance policy against rivals adopting similar predation strategies since the threat of aggressive retaliation by deep pocket competitors can be sufficient to deter aggressive capacity expansion decisions by rivals and deter entry from potential entrants (Benoit, 1984). Finally, moving beyond predation strategies, cash holdings provide firms with the flexibility to withstand short term shrinkage in profit margins in order to pursue longer term market share building strategies such as investments in advertising and promotions, development of supplier/customer networks, more efficient supply chains, and increases in capital expenditures and R&D investments (Campello, 2006; Fresard, 2010). Consistent with the notion that cash represents a strategic resource, Fresard (2010) finds that large cash reserves lead to future market share gains by firms at the expense of industry rivals. Overall, these studies suggest that cash policy has competitive effects that can allow firms to influence product market outcomes.

The dichotomy arising from cash serving as a “strategic” resource capable of generating product market benefits versus its potential to increase agency costs underscores the importance of evaluating how alternative managerial incentive systems and/or governance mechanisms influence the value to shareholders from maintaining a highly liquid balance sheet. Extant evidence indicates that while good governance increases the value of liquidity, CEO compensation incentives such as CEO vega and CEO delta have either no effect or decrease the value of excess cash in the hands of management (Dittmar and Mahrt-Smith, 2007; and Liu and Mauer, 2011). Extending this line of research, we evaluate the impact of *ITI* on the value of balance sheet liquidity as well as on various facets of firm cash policy. Specifically, we develop and test three hypotheses – *strategic investment, empire building,* and *bondholder risk aversion* – on the link between *ITI* with firm cash policies (decision to hold excess cash and the rate of accumulation and dissipation of excess cash) as well as their economic consequences (marginal value of cash holdings, investment and payout choices, and the product market effects of cash). As such, we not only attempt to evaluate the relation between *ITI* and the value of firm liquidity, but also try to shed light on the avenues through which *ITI* can impact the value of excess cash in the hands of management.

The *strategic investment hypothesis* is based on the premise that industry tournament incentives provide CEOs with career enhancing incentives to work harder and efficiently as well as pursue riskier polices choices.[3] Consistent with the notion that *ITI* give career enhancing incentives to CEOs to work harder, smarter, and more efficiently in order to win the tournament, Coles, Li, and Wang (2013) find that higher *ITI* are associated with higher shareholder value and better firm performance. Further, consistent with the inherent optionality in *ITI*, they also document that higher *ITI* are associated with greater firm risk and riskier firm policies. Our *strategic investment hypothesis* is predicated on both these aspects of *ITI*; that is, CEOs will use cash to pursue riskier but value enhancing policies in order to improve their relative ranking in the managerial labor market. Specifically, *ITI* can reshape managerial view of cash as a conservative asset to a riskier orientation where it is seen as a “strategic weapon” to be used to implement value maximizing product market strategies that result in garnering market share at the expense of rivals in the hopes of winning the tournament prize.[4] Since CEOs are motivated to exploit the strategic benefits of cash in order to win the industry tournament, shareholders will view cash in the hands of CEOs with higher *ITI* more positively. Therefore, this hypothesis predicts a positive relation between the marginal value of cash and *ITI*.

[3] Lazear and Rosen (1981) and Prendergast (1999) contend that the effort exerted by economic agents will be higher if the size of the promotion prize is greater. In addition, the option-like features and convex payoff structure of tournament incentives will also increase managerial appetite for risk taking in order to increase the probability of winning the tournament (see, e.g., Chen, Hughson, and Stoughton, 2012; Coles, Li, and Wang, 2013; Goel and Thakor, 2008; and Hvide, 2002).

[4] The CEO can take incremental and distinct steps in winning the industry tournament by getting hired by another firm or alternatively by getting higher compensation in the same firm possibly by being benchmarked against a now more appropriate compensation peer group.

Further, under this hypothesis, the optionality and convexity inherent in *ITI* are likely to spur CEOs to embrace risk taking initiatives by accumulating a cash war chest to be able to undertake aggressive product market strategies. Specifically, CEOs with higher *ITI* will accumulate cash more quickly to build up its cash war chest in order to be able to subsequently use it either as an offensive weapon to fund market share enhancing investments and/or as a predation deterrence mechanism while pursuing riskier product market strategies. As such, under this hypothesis, we would expect firms managed by CEOs with higher *ITI* to maintain larger cash holdings and exhibit a faster rate of accumulation of cash reserves relative to firms managed by CEOs with lower *ITI*. The *strategic investment hypothesis* has no clear prediction on the relation between the dissipation of excess cash and *ITI*. On the one hand, the excess cash allows CEOs with high *ITI* to take bigger strategic bets because the cash will make the firm less vulnerable to the downside of such risk-taking. Under this scenario, high *ITI* CEOs will dissipate cash slower. On the other hand, if time-sensitive investment opportunities arise, the high *ITI* CEO will be motivated to aggressively dissipate the excess cash in order to capture its product market benefits. Finally, the sensitivity of market share gains to excess cash holdings should be higher for firms with higher *ITI*, since these CEOs are motivated to exploit the strategic benefits of cash in order to win the industry tournament.[5]

On the other hand, the *empire building hypothesis* posits that, in an attempt to generate the same benefits as winning the industry tournament, self-interested CEOs will immediately use any excess cash to pursue overpriced acquisitions and other similar forms of myopic investments that rapidly scale up the firm and generate compensation and control benefits, but do not necessarily contribute to shareholder value. It draws upon the “spending hypothesis” in Harford, Mansi, and Maxwell (2008), which suggests that self-interested CEOs prefer immediate spending of excess cash and discount the ability to invest in

[5] Note that *ITI* alleviate concerns regarding both the overinvestment and underinvestment of excess cash under the strategic investment hypothesis.

the future.[6] Thus, under this hypothesis, the risk taking incentives generated by *ITI* exacerbate rather than mitigate agency conflicts with regard to cash policy. As such, the *empire building hypothesis* posits that *ITI* can reduce incentives for CEOs to accumulate cash reserves to reduce predation risk, deter aggressive investments by rivals and/or await opportunities to invest cash strategically to generate product market gains. It instead spurs them to immediately deploy any available excess cash to fund myopic investments that rapidly scale up the firm and, in the process, enhance their prestige, reputation, and visibility in the managerial labor market, but potentially destroy shareholder value. By managing a larger firm, these CEOs can obtain the same benefits as winning the industry tournament either through an increase in compensation in their current jobs or by moving to a higher paying job before the outcomes of their sub-optimal investment decisions are fully realized and understood by the managerial labor market. Thus, the *empire building hypothesis* predicts a negative relation between the marginal value of cash holdings and *ITI* due to the increased incentive to overinvest and the loss of the product market benefits of excess cash.

Further, since CEOs with high *ITI* are focused on immediately spending excess cash, the rate of accumulation of excess cash will be slower, while the rate of dissipation of excess cash will be faster in high *ITI* firms relative to their low *ITI* counterparts. As a result, high *ITI* firms will maintain lower cash holdings relative to low *ITI* firms due to the faster spending of excess cash. Additionally, self-interested managers with high *ITI* will use any excess cash to make myopic investments with an eye towards short-term payoffs, either within or outside the firm's industry, in an attempt to derive pecuniary and non-pecuniary benefits that arise from managing a bigger firm and/or improved visibility in the managerial labor market. As a result, *ITI* should not materially affect the market share sensitivity of cash reserves under this hypothesis.

While *ITI* have the potential to reduce agency costs by aligning the interests of CEOs and shareholders as described in the *strategic investment hypothesis*, it can heighten conflicts of interests between shareholders and bondholders. We evaluate this effect through the *bondholder risk aversion*

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[6] Managers may be spurred to take these actions because CEO compensation and wealth, on average, increase after both acquisitions and large capital expenditures even if these investments are value destroying (see, e.g., Bliss and Rosen, 2001; and Harford and Li, 2007).

hypothesis. This hypothesis draws upon the *costly contracting hypothesis* described in Liu and Mauer (2011) who argue that compensation-based incentives that promote managerial risk taking behavior can heighten creditor concerns regarding the potential for liquidity problems. Consequently, stronger managerial risk-taking incentives can lead creditors to seek protection through liquidity covenants, thereby requiring firms to hold higher cash reserves. Since the higher cash reserves serve to protect creditors' interests rather than shareholders, Liu and Mauer (2011) argue and find evidence to suggest that stronger CEO risk taking incentives (*CEO vega*) lead to higher cash holdings and lower marginal value of cash reserves. We similarly argue that higher *ITI* can increase the potential for managerial risk shifting or asset substitution, thereby increasing bondholder risk aversion. In order to protect themselves against the possibility that *ITI* give CEOs excessive risk taking incentives that can result in inefficient liquidation, bondholders will impose stronger liquidity covenants and seek higher cash reserves. Thus, under the *bondholder risk aversion hypothesis*, firms with higher *ITI* are likely to maintain a higher level of cash to satisfy bondholder liquidity covenants.

Further, higher *ITI* should result in a faster rate of excess cash accumulation and a slower rate of dissipation relative to low *ITI* firms. In terms of economic effects, since some part of the excess cash reserves are held to protect creditor interests rather than to pursue strategies aimed at boosting product market performance, we expect a negative relation between *ITI* and the marginal value of cash. Additionally, for the same reason as above, the positive relation between excess cash and subsequent market share gains documented by Fresard (2010) will be negatively impacted by *ITI*. We provide a summary of the predictions with regard to the impact of *ITI* on various facets of firm cash policy and their economic consequences under the above three hypotheses in Table 1.

Our empirical analysis unfolds as follows. First, we adapt the Faulkender and Wang (2006) cash value model by additionally including both *ITI* and the interaction between *ITI* and *Change in cash* in all our estimated regressions models. We use four different proxies for *ITI* based on the compensation gap between the firm's CEO and alternative definitions of maximal CEO pay of firms operating in the same product market. We focus on the coefficient on the interaction term, *ITI*Change in cash* to determine whether *ITI* increase or decrease the marginal value of cash. We attempt to establish whether a causal link exists between tournament incentives and the marginal value of cash holdings by conducting a battery of tests to alleviate concerns regarding endogeneity. Specifically, we always use lagged *ITI* measures (instruments for lagged *ITI* measures) in all our estimated OLS (2SLS) regression models. Additionally, in these regression models, we control for industry (or firm) and year fixed effects to account for time invariant industry (or firm) factors and time trends. Finally, we conduct two quasi-natural experiments associated with exogenous shocks to *ITI* and estimate difference-in-differences regressions. The first exogenous shock we use impacts the competitive environment of the firm through a reduction in import tariffs, while the second exogenous shock we use impacts *ITI* through a change in the enforceability of executive non-competition agreements.

Overall, for all four measures of *ITI*, we find consistent evidence to indicate that CEO industry tournament incentives positively influence the marginal value of firm cash holdings. These results are consistent with the *strategic investment hypothesis*, but inconsistent with the *empire building hypothesis* and the *bondholder risk aversion hypothesis*. Our results are both statistically and economically significant. Specifically, for our main measure of *ITI*, we find that there is a \$0.45-\$0.50 difference in the marginal value of a dollar of cash between firms that have an above median level and below median level of *ITI*.

Next, we evaluate the impact of *ITI* on the level of excess cash holdings as well as the rate of accumulation and dissipation of cash. We estimate the link between *ITI* and the level of cash by augmenting the Bates, Kahle, and Stulz (2009) cash model by including *ITI* as the main independent variable of interest. We control for industry (or firm) and year fixed effects in the estimated OLS and 2SLS models. We find a consistently significant and positive relation between *ITI* and the level of cash holdings which is consistent with both the *strategic investment* and *bondholder risk aversion hypotheses*, but inconsistent with the *empire building hypothesis*. In an attempt to assess the impact of *ITI* on bondholder behavior, we additionally evaluate whether *ITI* are associated with the presence of liquidity covenants in new bank loans. We do not find any reliable relation between them, thereby suggesting that the positive relation between *ITI* and the level of cash holdings is not due to creditors imposing additional liquidity covenants that require higher cash reserves as predicted under the *bondholder risk aversion hypothesis*. In addition, we find that firms with higher *ITI* have both higher rates of accumulation and dissipation of excess cash. Our findings that greater *ITI* increase the marginal value of cash, result in a higher level of cash holdings, and lead to both faster accumulation and dissipation of excess cash are consistent only with the *strategic investment hypothesis*.

Finally, we examine the impact of *ITI* on investment strategies of cash rich firms that can potentially yield product market benefits as well as the sensitivity of market share gains to excess cash to provide additional insights as to why the market assesses a larger marginal value to cash in the hands of CEOs with higher *ITI*. Our results suggest that high *ITI* firms invest more in R&D and acquisitions (especially focused acquisitions), and have lower shareholder payouts. While R&D investments can potentially give the firm a competitive advantage in either the short- or long-term (given the nature of the industry), the pursuit of focused acquisitions can rapidly increase firm scale and efficiency. The presence of a larger cash war chest in the hands of CEOs with higher *ITI* will dissuade rival firms' CEOs with lower *ITI* from pursuing similar strategies. Thus, our results suggest that *ITI* provide CEOs with incentives towards investment strategies largely directed towards gaining a competitive advantage at the expense of rival firms. In order to assess the effectiveness of this strategy, we further evaluate whether tournament incentives influence the relation between excess cash holdings and subsequent market share gains. Our results provide consistent evidence to suggest that the market share gains arising from excess cash holdings are larger for high *ITI* firms relative to low *ITI* firms. Overall, in line with the *strategic investment hypothesis*, our analyses suggests that *ITI* provide CEOs with incentives to aggressively build and then deploy excess cash reserves to pursue product market strategies that produce competitive benefits at the expense of industry rivals, and consequently enhance the value shareholders assign to cash in the hands of management. Harford, Mansi, and Maxwell (2008) find evidence consistent with the notion that managerial predilection for immediately investing excess cash and, consequently, their tendency to overinvest is mitigated in well-governed firms. The results in our paper suggest higher *ITI*, much like good governance, tend to mitigate rather than exacerbate agency conflicts with regard to cash policy.

Our paper makes contributions to the following strands of research – tournament incentives, design of corporate compensation policies/incentive structures, corporate liquidity policies, and product market outcomes. Our paper is most closely tied to the literature on CEO industry tournament incentives and intra-firm tournament incentives that suggests that these tournament incentives lead to value enhancing risk taking strategies by firms (Coles, Li, and Wang, 2013; Kale, Reis, and Venkateswaran, 2009; Kini and Williams, 2012). Consistent with both the value creating and risk taking incentives that arise from tournament incentives, we find higher powered CEO industry tournament incentives increase the marginal value of cash and enhance the strategic use of cash to gain market share. Next, our study adds to a growing stream of research that focuses on governance structures that can increase the marginal value of cash in the hands of management (see, e.g., Bates, Chang, and Lindsey, 2012; and Dittmar and Mahrt-Smith, 2007). For instance, Dittmar and Mahrt-Smith (2007) find that good governance increases the marginal value of cash by preventing inefficient investment. In our paper, we also find that industry tournament incentives increase the marginal value of cash, but with the key difference that the value enhancement comes not from preventing inefficient investment, but rather from more efficient deployment of cash to capture its competitive benefits.

In addition, our results provide additional insights as to how alternative CEO incentive mechanisms differentially influence the value of cash. For example, Liu and Mauer (2011) find that CEO risk taking incentives (*CEO vega*) decrease the value of cash and attribute their result largely to creditors seeking protection against excessive managerial risk taking by imposing stronger liquidity constraints. In contrast, we find evidence consistent with the notion that the risk taking incentives attributable to CEO industry tournament incentives enhance the value of cash, thereby indicating that they do not lead to an increase in the agency cost of debt. Our paper also builds on the literature which views corporate cash holdings as a strategic resource (see, e.g., Bolton and Scharfstein, 1990; Opler, Pinkowitz, Stulz, and Williamson, 1999; and Fresard, 2010) by illustrating that CEO tournament incentives strengthen the link between cash holdings and subsequent market share gains.

Finally, while boards can design CEO and top management incentive mechanisms and internal governance structures, they have little control on the design of the industry tournament and the setting of the CEO industry pay gap. Our results suggest that boards should take into account *ITI* in formulating incentive/governance mechanisms that are under their control to properly influence managerial behavior vis-à-vis liquidity policies. On this note, it is also likely that we are able to empirically document the positive effects of *ITI* on the marginal value of cash, level of cash, and relation between market share gains and excess cash because boards have little influence over *ITI*.[7]

The rest of the paper is structured as follows. Section 2 presents our sample selection procedure and describes our variables. Section 3 examines the relation between *ITI* and the value of cash and, in Section 4; we examine the relation between *ITI* and the level of cash holdings. In Sections 5, we examine the impact of *ITI* on the accumulation and dissipation of excess cash. We examine whether CEOs with greater *ITI* are more or less effective in using cash to garner market share in Section 6. The paper concludes in Section 7.

2. Sample selection and variable description

2.1. Sample Description

Our initial sample consists of all ExecuComp firms from 1994 to 2009. In line with prior research on corporate liquidity, we exclude utility and financial firms (Standard Industrial Classification (SIC) codes between 4900 – 4999 and 6000 – 6999, respectively). We include all firm-years that have an identifiable CEO on ExecuComp. We obtain data that are used to compute our various measures of

[7] See Coles, Li, and Wang (2013) for similar arguments.

industry tournament incentives (*Industry pay gap*), intra-firm tournament incentives (*Firm pay gap*), CEO alignment of interest incentives (*CEO delta*), and CEO risk-taking incentives (*CEO vega*) from the ExecuComp database and require information be available to compute these variables for inclusion in our sample.[8] We obtain data on firm-specific financial variables from the Compustat data files and stock return data from the Center for Research in Security Prices (CRSP) files. Our final sample consists of 2,266 firms with 18,641 firm-year observations. All dollar-denominated variables are inflation-adjusted to 2003 dollars using the consumer price index. Further, all the continuous variables are winsorized at their 1% and 99% values.

2.2. Description of main variables

In this section, we describe the main variables used in our study. A more detailed description of each variable and its measurement is provided in the Appendix. We also report univariate statistics for these variables in Table 2.

2.2.1. Measures of industry tournament incentives

We follow Coles, Li, and Wang (2013) in computing four alternative measures of industry tournament incentives under the premise that every CEO in the industry except the highest paid CEO has an incentive to compete for the position of highest paid CEO in the industry. Thus, all our measures of *ITI* are related to the pay gap between the given firm's CEO pay and measures of the maximal CEO pay in the industry with industry being defined on the basis of Fama-French 30-industry classification scheme.[9] The four measures of industry pay gap largely differ in terms of choice of the definition of maximal CEO pay. The univariate statistics on our four measures of *ITI* are provided in Table 2.

Our first and primary measure of *ITI* (*Industry pay gap 1*) is based on Coles, Li, and Wang (2013) and is defined as the pay gap between the firm's CEO and the second highest paid CEO in the same

[8] In order to make the computation of all ExecuComp variables consistent throughout our entire sample period, we follow the approach outlined in Kini and Williams (2012) and Coles, Daniel, and Naveen (2014) to modify the database for the post-2005 period in response to the passage of Financial Accounting Standards (FAS) 123R on December 12, 2004.

[9] See Coles, Li, and Wang (2013) for the justification behind using the Fama-French 30-industry classification to compute industry pay gaps.

Fama-French 30 industry.[10] The mean (median) value of *Industry pay gap 1* for our sample firms is \$26.32 (\$14.72) million and is in line with Coles, Li, and Wang (2013) who report mean (median) values of \$24.50 (\$14.29) million. Our second measure of industry pay gap (*Industry pay gap 2*) is drawn from an earlier version of Coles, Li, and Wang (2013) and is measured as the difference in compensation between the firm's CEO and the highest paid CEO in the industry. The mean (median) value of *Industry pay gap 2* is \$55.06 (\$24.38) million. Our third measure of industry pay gap measures the gap in compensation between the firm's CEO and the size- and industry-matched maximal CEO pay. As such, in line with Coles, Li, and Wang (2013), we segment firms in each industry-year into two groups based on whether their net sales are above or below the industry median. Therefore, our third measure of industry pay gap (*Industry pay gap 3*) is measured as the difference in compensation between the firm's CEO and the second highest paid CEO in the industry who belongs to the same size group (above or below industry median). The mean (median) value of *Industry pay gap 3* is \$32.14 (\$12.95) million. Finally, our fourth and final *ITI* measure (*Industry pay gap 4*) is the difference in compensation between the firm's CEO and the CEO in the same industry whose compensation is 50 percentile points higher in the compensation distribution.[11] The mean (median) values of *Industry pay gap 4* is \$31.83 (\$9.44) million.

2.2.2. Measures of firm pay gap and CEO performance incentives

In evaluating the relation between *ITI* and the market value of firm cash holdings, we control for the effect of *Firm pay gap*, *CEO vega*, and *CEO delta*.[12] In line with Kale, Reis, and Venkateswaran (2009) and Kini and Williams (2012), we estimate intra-firm tournament incentives by the variable *Firm pay gap* which is computed as the difference between firm CEO compensation and median VP compensation. The mean (median) *Firm pay gap* value in our sample is \$3.06 million (\$1.44 million) and

[10] Coles, Li, and Wang (2013) argue that the highest compensation in the industry in any year may be a transitory event and not representative of compensation available to the tournament winner. As such, to control for outliers, they recommend using the second highest compensation in the industry as a proxy for the maximal CEO pay.

[11] This proxy for *ITI* is also in line with one of the measures used in an earlier version of Coles, Li, and Wang (2013).

[12] Liu and Mauer (2011) study whether both *CEO delta* and *CEO vega* impact the value of cash holdings. Similarly, Kale, Reis, and Venkateswaran (2009) examine whether internal promotion-based incentives as proxied by *Firm pay gap* can lead to better performance.

is comparable to Kini and Williams (2012) who report a mean (median) value of \$3.03 million (\$1.42 million).

The variable *CEO delta* represents the increase in a CEO's portfolio wealth for a percentage increase in the stock price, while *CEO vega* is the dollar increase in a CEO's portfolio for a 0.01 increase in the standard deviation of the underlying stock volatility. Consistent with Coles, Daniel, and Naveen (2006) and Kini and Williams (2012), *CEO delta* is constructed as the weighted average of the delta of a CEO's stock and option holdings, while *CEO vega* is the vega of a CEO's option holdings. We follow the methodology in Kini and Williams (2012) to value the options for the delta and vega calculations and they are both adjusted for inflation by scaling to 2003 dollars. Our sample has a mean (median) *CEO delta* of \$0.43 million (\$0.16 million) and a mean (median) *CEO vega* of \$0.197 million (\$0.073 million).

3. Industry tournament incentives and the marginal value of cash holdings

In this section, we evaluate whether a causal link runs from *ITI* to the marginal value of cash holdings. To establish this link, we first develop and estimate various alternative specifications of cash value regression models after accounting for endogeneity concerns to assess whether *ITI* influence the marginal value of cash holdings. To further alleviate endogeneity concerns, we use two quasi-natural experiments and estimate difference-in-differences regressions to evaluate whether *ITI* are related to the marginal value of cash. In Section 3.1, we provide a discussion of the empirical methodology underlying our cash value regression models and discuss our results along with robustness tests. In Section 3.2, we discuss the empirical design and results of our quasi-natural experiments and the results from the corresponding difference-in-differences regressions.

3.1. Cash value regression model with industry tournament incentives

3.1.1. Empirical methodology

Our empirical methodology builds on the Faulkender and Wang (*FW*) (2006) cash value regression model to evaluate whether there is a link between industry pay gap and the marginal value of cash holdings. To achieve this objective, we extend the Faulkender and Wang (2006) model by: (i) including our alternative measures of *ITI* both directly as well as interacted with the change in cash (*ΔC/MVE*), (ii) controlling for the effects of *Firm pay gap*, *CEO delta*, and *CEO vega*, and (iii) addressing concerns regarding endogeneity by also estimating instrumented 2SLS regressions as well as controlling for industry (or firm) and year fixed effects.[13] As such, our regression model is specified as follows:

$$R_{i,t} - R_{i,t}^{B} = \beta_0 + \beta_1 \Delta C_{i,t}/MVE_{i,t-1} + \beta_2 Ln(Industry\ pay\ gap_{i,t-1}) * \Delta C_{i,t}/MVE_{i,t-1} + \beta_3 Ln(Industry\ pay\ gap_{i,t-1}) + FW\ control\ variables + Other\ control\ variables + industry\ (firm) fixed\ effects + year\ fixed\ effects + \varepsilon_{i,t} \quad (1)$$

The univariate statistics on both the dependent as well as independent variables are reported in Table 2. The dependent variable excess return, ($R_{i,t} - R_{i,t}^{B}$) is measured as the difference in returns for firm *i* during fiscal year *t* and the return on its size and book-to-market matched Fama-French portfolio measured over the same period.[14] The mean (median) value of excess return in our sample is 1.46% (-3.98%).

The notation Δ refers to the change in the value of a right hand side variable for firm *i* during fiscal year t with each variable being scaled by the lagged market value of equity. As such, $\Delta C_{i,t}/MVE_{i,t-1}$ represents the change in cash holdings for firm *i* during fiscal year *t* scaled by market value of equity end of period *t-1*. Additionally, its coefficient β_1 can be interpreted as the change in shareholder wealth for a dollar increase in cash held by the firm when there are no other variables interacted with $\Delta C_{i,t}/MVE_{i,t-1}$ (Faulkender and Wang, 2006). The mean (median) $\Delta C_{i,t}$ for our sample firm represents 0.98% (0.23%) of the market value of equity. The variable $Ln(Industry\ pay\ gap_{i,t-1})$ represents the natural logarithm of lagged industry tournament incentives and is measured by one of our four alternative proxies for *ITI* as described earlier. Since we are interested in the impact of *ITI* on the value of firm cash holdings, our main right hand side variable of interest is the interaction of $Ln(Industry\ pay\ gap_{i,t-1})$ with $\Delta C_{i,t}/MVE_{i,t-1}$. As

[13] Our results are qualitatively similar whether we use two-digit SIC codes or the Fama-French 30-industry classification to control for industry fixed effects.
[14] Following Faulkender and Wang (2006), we use the 25 Fama-French portfolios formed on size and book-to-market as our benchmark portfolios. The benchmark return is the value-weighted return based on market capitalization within each of the 25 portfolios.

such, a positive and significant value for β_2 would indicate that an increase in industry pay gap increases the marginal value of cash in the hands of management, and vice versa.

Further, *FW control variables* represent the set of Faulkender and Wang (2006) control variables. With the exception of leverage, all these variables are scaled by the lagged market value of equity. These variables include change in earnings before extraordinary items ($\Delta E_{i,t}/MVE_{i,t-1}$), change in net assets ($\Delta NA_{i,t}/MVE_{i,t-1}$), change in R&D expenditures ($\Delta RD_{i,t}/MVE_{i,t-1}$), change in interest expense ($\Delta I_{i,t}/ MVE_{i,t-1}$), change in dividends ($\Delta D_{i,t}/MVE_{i,t-1}$), lagged cash ($Cash_{i,t-1}./MVE_{i,t-1}$), leverage ($L_{i,t}$), net new financing ($NF_{i,t}/MVE_{i,t-1}$), interaction of lagged cash with change in cash ($C_{i,t-1}/MVE_{i,t-1}*\Delta C_{i,t}/MVE_{i,t-1}$), and interaction of leverage with the change in cash ($L_{i,t*}\ \Delta C_{i,t}/MVE_{i,t-1}$). A more detailed description of the above variables and measurement information is provided in the Appendix. In addition to the Faulkender and Wang (2006) control variables, we also include *CEO vega, CEO delta*, and *Firm pay gap* as control variables. Since cash policy is a possible channel through which *CEO vega, CEO delta*, and *Firm pay gap* can influence firm value, we include both their direct as well as interactive effects with change in cash in our cash value regressions.[15] Finally, we include industry (or firm) and year fixed effects to account for any time invariant industry (or firm) sources of heterogeneity and time trends.

While deploying lagged instead of contemporaneous industry tournament incentives in OLS cash value regressions is an initial step towards addressing endogeneity concerns, we additionally estimate instrumented 2SLS regressions to mitigate concerns regarding the potential for endogeneity arising from missing latent factors. We, therefore, endogenize our measures of *ITI* as well as the interaction of *ITI* with change in cash in our cash value regressions. As such, our instrumented 2SLS regressions proceed as follows. Initially, we estimate two first stage regressions to obtain predicted values of *Ln(Industry pay gap*$_{i,t-1}$) and *Ln(Industry pay gap*$_{i,t-1}$)$*\Delta C_{i,t}./MVE_{i,t-1}$. For instance, in the first stage regression for predicted values of *Ln(Industry pay gap*$_{i,t-1}$*)*, the dependent variable is *Ln(Industry pay gap*$_{i,t-1}$*)* and the independent

[15]Since Dittmar and Mahrt-Smith (2007) find evidence to indicate that governance quality influences the market value of cash, we additionally control for the interactive effects of alternative measures of governance quality with the change in cash. The results with these alternative specifications are not reported in the paper for purposes of brevity, but are briefly discussed in the relevant sections of the paper.

variables include appropriately selected instruments as described below as well as all other second stage regressors. Similarly, in the first stage regressions for $Ln(Industry\ pay\ gap_{i,t-1})*\Delta C_{i,t}/MVE_{i.t-1}$, the dependent variable is $Ln(Industry\ pay\ gap_{i,t-1})*\Delta C_{i,t}/MVE_{i,t-1}$ and the independent variables include selected instruments and all the second stage regressors. Next, we estimate Equation (1) in our second stage regressions with the variable $Ln(Industry\ pay\ gap_{i,t-1})$ and $Ln(Industry\ pay\ gap_{i,t-1})*\Delta C_{i,t}/MVE_{i,t-1}$ being replaced by their predicted values from the first stage regressions.

Since we are dealing with potentially two endogenous variables ($Ln(Industry\ pay\ gap_{i,t-1})$ and $Ln(Industry\ pay\ gap_{i,t-1})*\Delta C_{i,t}/MVE_{i,t-1}$, we seek to identify three relevant and valid instruments in order to overidentify the model.[16] In order to satisfy the relevance criteria, our selected instruments should be correlated with industry pay gap and its interaction with $\Delta C_{i,t}/MVE_{i,t-1}$ after controlling for all other second stage regressors. Additionally, our instruments should satisfy the exclusion criteria and consequently impact the dependent variable only through their effect on $Ln(Industry\ pay\ gap_{i,t-1})$ and $Ln(Industry\ pay\ gap_{i,t-1})*\Delta C_{i,t}/MVE_{i,t-1}$. In selecting our instruments, we draw from the literature on tournament-based incentives to identify instruments that can potentially meet both relevance and validity criteria. In the discussion below, we describe our instruments and provide an economic justification for their inclusion. We provide univariate statistics for our instruments in Table 2.

Our primary instrument is based on the number of CEOs in the same industry as the sample firm (*Number of CEOs within each industry*). We draw support for our choice of this instrument from Coles, Li, and Wang (2013) who argue that since it may take several moves for CEOs at the lower spectrum of industry pay to achieve maximal CEO pay, they may have to participate in multiple tournaments. As such, a larger number of industry CEOs increases the number of tournaments that a firm CEO may need to win to achieve maximal pay. Consequently, the incentive effects of industry pay gap will increase with the number of industry CEOs. In line with the above reasoning, we find that the number of industry CEOs to be significantly positively correlated at the 1% level with all our measures of industry pay gap. Further,

[16] We repeat our analysis by estimating exactly identified models. These results are qualitatively similar to those reported in the paper. We do not report them for brevity.

we have no economic reason to expect that excess returns should be directly related with the number of CEOs in the industry and any potential impact of this variable on firm excess returns should arise as a result of its impact on industry pay gap. As such, our primary instrument is *Number of CEOs within each industry* and its mean (median) value in our sample is 101.63 (69.00).

Our second instrument is drawn from Coles, Li, and Wang (2013) and represents the total compensation received by all CEOs in the same industry. In line with Coles, Li, and Wang (2013), we compute total CEO compensation in the industry by excluding the maximal CEO pay as well as firm CEO pay to avoid a mechanical relation with industry pay gap. Thus, our second instrument is the natural logarithm of the sum of the CEO compensation across all firms in the industry (*Ln(Sum of CEO compensation within each industry)*), and it has a mean (median) value of 12.48 (12.47). Additionally, we also use another instrument for industry pay gap in Coles, Li, and Wang (2013) – the average compensation of geographically close CEOs – in lieu of one of the above described instruments for industry pay gap if required. Therefore, our third instrument is the natural logarithm of the average CEO compensation of geographically close firms (*Ln(average CEO compensation of geographically close firms)*), and it has a mean (median) value of 8.53 (8.67).[17, 18]

3.1.2. Empirical results of cash value regression models

The results of our estimation of various alternative specifications of the cash value regression model in Equation (1) are reported in Table 3 for our primary measure of *ITI* (*Industry pay gap 1*). Models 1 – 5 represent specifications with industry and year fixed effects, while Models 6 – 10 represent corresponding specifications with firm and year fixed effects. In all the reported 2SLS regression specifications, we employ $Number\ of\ CEOs\ within\ each\ industry_{t-1}$, $Number\ of\ CEOs\ within\ each\ industry_{t-1}*\Delta C_{i,t.}/MVE_{i,t-1}$, and $Ln(Sum\ of\ CEO\ compensation\ within\ each\ industry_{t-1})*\Delta C_{i,t.}/MVE_{i,t-1}$ as the three instruments.

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[17] Geographically close firms are defined as firms headquartered within a 250-kilometer radius. In line with Coles, Li, and Wang (2013), we exclude all CEOs of firms in the same industry (based on Fama-French 30-industry classification scheme) as the given firm in computing the average compensation of geographically close CEOs.

[18] We repeat our analyses using the same two instruments as Coles, Li, and Wang (2013) for industry pay gap. Our results with these alternative set of instruments are qualitatively similar to those reported in the paper.

Model 1 represents our baseline model based on Faulkender and Wang (2006) to facilitate comparison with the literature. Models 2 – 3 (Models 4 – 5) represent estimates of our complete cash value regression model as specified in Equation (1) with our primary measure of *ITI* measured as a dichotomous (continuous) variable. In Models 2 and 3, we construct a dichotomous variable to capture *ITI* that takes on the value 1 if *Industry pay gap 1* is above its median value, and zero otherwise. Finally, while Models 2 and 4 represent OLS specifications, Models 3 and 5 are the corresponding 2SLS models.

The results from our baseline model (Model 1) indicate that the marginal value of cash holdings for an average firm in our sample is $1.48. In the extant literature, estimates for the marginal value of cash holdings for an average firm range from $0.94 to $1.45 depending on the sample source (Compustat versus ExecuComp firms) as well as time period. For example, using a sample of Compustat firms over the period 1972 – 2002, Faulkender and Wang (2006) estimate the value of a dollar of cash for an average firm as $0.94. Dittmar and Mahrt-Smith (2007), who also use a sample of Compustat firms but over the period 1990 – 2003 and restricted to firms with either strong or weak governance, arrive at an estimate of $1.09. In contrast, Liu, Mauer, and Zhang (2014) focus on a sample of ExecuComp firms over the period 2006 – 2011 and estimate the marginal value of cash for an average firm to be $1.45 which is similar to our estimate. Importantly, the sign and significance of the control variables in our baseline Model 1 are similar to Faulkender and Wang (2006).

Next, we focus on Models 2 – 5 where the coefficient of interest (β_2) is on the interaction term, $Ln(Industry\ pay\ gap\ 1_{i,t-1})*\Delta C_{i,t}/MVE_{i,t-1}$. The results indicate β_2 is positive and significant in the second-stage of both the instrumented 2SLS regression specifications (Models 3 and 5). Specifically, in Model 3, where we use the dichotomous measure of *ITI*, the results indicate that that our instruments meet all the relevance conditions and are individually significant at the 5% or below level in at least one of the two first-stage regressions. The first-stage F-statistic for both endogenous variables is greater than 10 and significant at the 1% level. The Hansen J-statistic is 0.0204 and is insignificant, thereby suggesting that the instruments are valid. The Anderson-Rubin Wald F-statistic for joint relevance is 7.846 and significant at the 1% level indicating that the endogenous variables are jointly significant. Finally, the difference in Sargan-Hansen statistic is 17.10 and significant at the 1% level indicating that the use of 2SLS methodology is appropriate. The results of the second-stage regressions of Model 3 indicate that the coefficient on *Industry pay gap* $1_{i,t-1}*\Delta C_{i,t}/MVE_{i,t-1}$ (where *Industry pay gap* is measured as a dichotomous variable) is 0.4980 and is significant at the 1% level. This result supports our *strategic investment hypothesis* which predicts that *ITI* will increase the marginal value of cash holdings. In terms of economic significance, our results from Model 3 suggest that the marginal value of a dollar of cash for firms with high industry pay gap is $1.68 relative to $1.18 for firms with low industry pay gap.[19] As such, our results suggest that going from the low to high industry pay gap group increases the marginal value of a dollar of cash in the hands of management by $0.50. Further, the results from Model 5, which is similar to Model 3 with the exception that industry pay gap is measured as a continuous variable *(Ln(Industry pay gap 1)*) instead of a dummy variable, provide additional support to the hypothesis that *ITI* positively influence the marginal value of firm cash holdings. Specifically, the coefficient on the interaction of industry pay gap and the change in cash is 0.1942, and is also significantly positive at the 1% level. Once again, our instruments pass all the relevance and validity tests.

Next, we focus on Models 5 – 10 which are specifications with firm and year fixed effects. The results are qualitatively similar to those reported for industry and year fixed effects. For instance, the coefficient on *Industry pay gap* $1_{i,t-1}*\Delta C_{i,t}/MVE_{i,t-1}$ is positive and significant at least at the 5% level for both the 2SLS models (Models 8 and 10) and one of the OLS specifications (Model 9). Further, our instruments pass the relevance and validity tests in both estimated models. As such, the results of our 2SLS instrumented regressions provides consistent evidence of a positive relation between *ITI* and the market value of cash holdings after controlling for industry (or firm) and year fixed effects.[20] Again, in terms of economic significance, our results from Model 8 suggest that the marginal value of a dollar of

[19] In computing marginal value of cash for the high and low *ITI* firms, i.e., $1.68 and $1.18, respectively, all the other variables that are interacted with $\Delta C_{i,t}/MVE_{i,t-1}$ in Equation (1) are assessed at their mean values.

[20] In untabulated results, we find that the results reported in the paper are robust to controlling for additional CEO characteristics such as CEO age and tenure.

cash for firms with high industry pay gap is \$1.76 relative to \$1.31 for firms with low industry pay gap. These results only rely on within-firm variation which controls for the unobserved heterogeneity between firms.

We evaluate the sensitivity of our results to the choice of measure of industry pay gap. In Table 4, we report results with our three alternative measures of industry tournament incentives, i.e., *Industry pay gap 2*, *Industry pay gap 3*, and *Industry pay gap 4* which are as defined earlier. For purposes of brevity, we only report results of our 2SLS specifications. The instruments employed in this table are the same as in Table 3. Models 1 – 3 represent specifications with industry and year fixed effects, while Models 4 – 6 represent specifications with firm and year fixed effects. Our results indicate that regardless of the measure of *ITI*, the coefficient on $Ln(Industry\ pay\ gap\ _{i,t-1})*\Delta C_{i,t}/MVE_{i,t-1}$ is positive and significant for models with industry and year fixed effects as well as with firm and year fixed effects. Further, our instruments pass all the relevance and validity tests in all six estimated 2SLS regression models.[21]

We conduct additional robustness tests to evaluate whether our main result of a positive relation between *ITI* and the value of cash holdings continues to hold after controlling for the quality of firm governance. Dittmar and Mahrt-Smith (2007) find that good governance approximately doubles the marginal value of cash holdings. We, therefore, additionally include governance quality, both directly as well as interacted with the change in cash as additional control variables in Equation (1). We follow Dittmar and Mahrt-Smith (2007) in using the Gompers, Ishii, and Metrick (2003) index (GIM Index) as our primary measure of governance. Further, in line with their study, we create the variable *Governance* that takes on the value of one if the firm is in the top tercile of the GIM index, and is zero if it is in the bottom tercile.[22] Our results indicate that the coefficient on $Ln(Industry\ pay\ gap\ 1_{i,t-1})*\Delta C_{i,t}/MVE_{i,t-1}$ continues to be positive and significant in all the estimated 2SLS specifications after controlling for the

[21] It is likely that CEO industry tournament incentives are weaker or non-existent for new CEOs and retiring CEOs. Consistent with this conjecture, we find that the relation between the marginal value of cash and *ITI* is insignificant for new and retiring CEOs.

[22] Consistent with Dittmar and Mahrt-Smith (2007) we repeat our analysis using three alternative measures of governance such as the Bebchuk, Cohen, and Ferrell (2009) index, the sum of 5% institutional blockholdings, and the sum of public pension holdings. We find that our main result of a positive relation between *ITI* and the market value of cash is not sensitive to our choice of governance measure.

effects of governance quality. For instance, in the 2SLS specification with our primary measure of *ITI* and industry and year fixed effects, the coefficient on $Ln(Industry\ pay\ gap\ 1_{i,t-1})*\Delta C_{i,t}/MVE_{i,t-1}$ is 0.2385 and is significant at the 1% level. Similarly, in the specification with firm and year fixed effects, the coefficient on $Ln(Industry\ pay\ gap\ 1_{i,t-1})*\Delta C_{i,t}/MVE_{i,t-1}$ is 0.1426 and is significant at the 10% level. Given the limited availability of the GIM index and the fact that we only include firm-year observations in the extreme two terciles of the GIM distribution, the sample sizes in these tests are appreciably smaller. We do not tabulate these results for brevity.

Overall, the results from Tables 3 and 4 provide consistent support for our hypothesis of a positive relation between *ITI* and the market value of cash holdings. Specifically, our results support the argument that higher *ITI* reduce investor concerns regarding inefficient use of cash holdings, thereby increasing the value they assign to cash in the hands of management. These results are consistent with the predictions of the *strategic investment* hypothesis, but are inconsistent with the predictions of the *bondholder risk aversion hypothesis* and the *empire building hypothesis*.

3.2. Industry tournament incentives and the value of cash: Evidence from two quasi-natural experiments

We conduct two quasi-natural experiments to further investigate whether there is a causal relation between the marginal value of cash, and *ITI*. In our first quasi-natural experiment, we examine the impact of an exogenous shock to the competitive environment of the firm arising from a significant cut in import tariffs on this relation. In our second quasi-natural experiment, we examine the impact of an exogenous shock to *ITI* arising from changes in the enforceability of non-competition employment agreements on this relation. In both situations, we estimate difference-in-differences regressions to evaluate whether these exogenous shocks lead to changes in the relation between the marginal value of cash holding and *ITI* as would be expected if there were a causal relation between them.

3.2.1. Industry tournament incentives and the value of cash: Evidence from import tariff shocks

A significant reduction in import tariffs will likely trigger an increase in import penetration by foreign firms, considerably increase competition, and result in a negative cash flow shock for all domestic firms in the industry. As indicated earlier, it has been suggested by researchers that cash can be used by firms for strategic purposes vis-à-vis their industry rivals through predatory pricing, concentrated advertising, investment in research and development, building of efficient distribution networks, and as a deterrent to entry (see, e.g., Bolton and Scharfstein, 1990; Campello, 2006; and Benoit, 1984). Consistent with the use of cash to gain a strategic advantage, Fresard (2010) finds a significant positive relation between cash and an increase in industry market share of the firm – a finding that is significantly stronger in the face of a large reduction in import tariffs. Thus, his findings suggest that the value of cash is higher when firms face an exogenous negative cash flow shock due to an increase in their competitive environment. Accordingly, if there is a causal relation between the marginal value of cash and industry tournament incentives, then this effect should be magnified in industries facing exogenous negative cash flow shocks. Specifically, the pre-existing level of cash should be more valuable for firms with CEOs who have greater incentives to exert more effort and aggressively deploy cash to effectively compete in a significantly changed competitive landscape and, in the process, generate greater value for their shareholders than their counterparts with lower industry tournament incentives.

We generally follow the approach described in Fresard (2010) to compute significant decreases in industry tariff rates. Specifically, we obtain the annual values for *Calculated Duties* and *Imports by Custom Value* by the four-digit NAICS industry over the period 1994 – 2006 to compute tariff rates from the United States International Trade Commission (*USITC*) website. *Calculated Duties* are the estimated import duties collected and *Imports by Custom Value* is the value of imports as appraised by the U.S. Customs Service (Source: http://dataweb.usitc.gov/). The tariff rate for an industry-year is calculated as *Calculated Duties* divided by *Imports by Custom Value.* We then compute the annual percentage change in the tariff rate for each industry-year observation. From these annual percentage changes, we estimate the median level of the annual percentage change for each industry across all years. Finally, the annual percentage reduction in tariff rate for any industry-year is considered a significant tariff cut if it is at least

2.0 times, 2.5 times, or 3.0 times the industry median level.[23] In addition, we try to ensure that large tariff cuts reflect permanent rather than transient changes in tariffs by excluding industry-years where the tariff cuts are followed by a comparable large percentage increase in the tariff rate the next year. Overall, as argued in Fresard (2010), the procedure likely captures exogenous changes in product market competition resulting from significant permanent cuts in tariff rates. Finally, we define the variable, *Cut dummy* as a dummy variable that is equal to one for an industry-year that recorded a significant drop in tariff rates, and zero otherwise.

We then estimate the following difference-in-differences regression model to test the prediction that the impact of *ITI* on the marginal value of cash will be stronger in the face of this exogenous shock.

$$\begin{aligned} R_{i,t} - R^B_{i,t} = {} & \beta_0 + \beta_1 Ln(Industry\ pay\ gap_{i,t-1}) * \Delta C_{i,t}/MVE_{i,t-1} * Cut\ Dummy_{i,t} \\ & + \beta_2 Ln(Industry\ pay\ gap_{i,t-1}) * Cut\ Dummy_{i,t} + \beta_3 Ln(Industry\ pay\ gap_{i,t-1}) \\ & * \Delta C_{i,t}/MVE_{i,t-1} + \beta_4 Ln(Industry\ pay\ gap_{i,t-1}) + \beta_5\, \Delta C_{i,t}/MVE_{i,t-1} \\ & * Cut\ Dummy_{i,t} + \beta_6 Cut\ Dummy_{i,t} + \beta_7\, \Delta C_{i,t}/MVE_{i,t-1} + FW\ control\ variables \\ & + Other\ control\ variables + industry\ (firm) fixed\ effects + year\ fixed\ effects \\ & + \varepsilon_{i,t} \qquad (2) \end{aligned}$$

The subscripts *i* and *t* denote firm *i* and time period *t*, respectively. Our empirical strategy is to estimate the same OLS regression model as in Equation (1), but with the addition of the variables *Cut dummy*, *Ln(Industry pay gap)*Cut dummy*, *ΔC/MVE*Cut dummy*, and *Ln(Industry pay gap)*Cut dummy*ΔC/MVE*. Note that the coefficient β_3 indicates the impact of *Ln(Industry pay gap)* on the marginal value of cash for firms operating in industries unaffected by a significant tariff cut. In turn, the sum of the coefficients ($\beta_1 + \beta_3$) reflects the impact of *Ln(Industry pay gap)* on the marginal value of cash for firms operating in industries affected by a significant tariff cut. Thus, the coefficient β_1 captures the incremental effect of industry tournament incentives on the marginal value of cash for firms affected by the tariff shock. Our empirical strategy, therefore, effectively amounts to a difference-in-differences approach. We expect the impact of industry tournament incentives on the marginal value of cash to be

[23] In cases where the industry median annual percentage change in tariff rates is positive, the above procedure will fail to capture any tariff reduction as a significant tariff cut. In these instances, we define an annual percentage *drop* in tariff rate for an industry-year as a significant tariff cut if it is at least 2.0 times, 2.5 times, or 3.0 times the industry median level in *absolute* terms.

stronger for firms operating in industries impacted by the exogenous shock (i.e., $\beta_1 > 0$). On the other hand, if there was no causal impact of industry tournament incentives on the marginal value of cash, then the coefficient β_1 should be insignificantly different from zero.

The results from the estimated OLS regressions are reported in Table 5. The sample size is smaller in this table because information to compute tariff rates is only available for manufacturing industries until 2006. The first three columns in the table report the regression results with industry- and year-fixed effects, whereas the last three columns report the regression results with firm- and year-fixed effects. In each set of regressions, the first, second, and third columns define the *Cut dummy* as the industry-year in which the annual percentage change in the tariff rate is at least 2.0, 2.5, and 3.0 times the industry median level over the entire sample period, respectively. We use our primary measure of *ITI* (*Ln(Industry pay gap 1)*) in all six reported regression specifications in the table.

The results indicate that the coefficient (β_1) on the triple interaction term, *Ln(Industry pay gap 1)*Cut dummy*ΔC/MVE* is significantly positive generally at the 5% level or lower in five of the six reported regressions. The significant coefficients range between 0.4398 – 0.6341 across these five regression specifications. These results indicate the relation between industry tournament incentives and the marginal value of cash is significantly greater for firms operating in industries that are affected by significant cuts in tariff rates in comparison to unaffected firms and, thus, are consistent with the notion that the significant positive relation between industry tournament incentives and the marginal value of cash documented in Tables 3 and 4 is likely to be causal in nature.

We examine whether the above documented results are robust to our alternative definitions of industry pay gap. The results from this analysis are presented in Table 6. Panel A contains results from regression specifications that include industry-fixed effects, while Panel B contains results from regression specifications with firm-fixed effects. In each panel, we report three sets of regressions – with *Ln(Industry pay gap 2)*, *Ln(Industry pay gap 3)*, and *Ln(Industry pay gap 4)* being used as the measure of industry tournament incentive in each set, respectively. As in Table 5, in each set of regressions, the first, second, and third columns define the *Cut dummy* as the industry-year in which the annual percentage change in the tariff rate is at least 2.0, 2.5, and 3.0 times the industry median level over the entire sample period, respectively. The set of control variables are exactly the same as in Tables 3 – 5; we do not report them for purposes of brevity.

Across both panels, the coefficient (β_1) on the triple interaction term, *Ln(Industry pay gap)*Cut Dummy*ΔC/MVE* is significantly positive generally at the 5% level or lower. For example, using *Ln(Industry pay gap 2)* as the measure of industry pay gap and controlling for industry-fixed effects in Columns 1 – 3 in Panel A, the estimated coefficient β_1 ranges from 0.6687 – 0.8340 and is significant at the 1% level in all three regressions. Further, using the same measure of industry pay gap but with firm-fixed effects in Panel B, the estimated coefficient β_1 ranges from 0.6093 – 0.7555 and is also significant at the 1% level in all three regressions. Similarly, the coefficient β_1 is positive and significant in all the specifications with our remaining two measures of industry tournament incentives.

3.2.2. Industry tournament incentives and the value of cash: Evidence from enforceability of non-competition employment agreements

Our second quasi-natural experiment is based on exogenous changes to the enforceability of non-competition employment agreements. These agreements represent covenants in employment contracts designed to reduce the possibility that managers will accept employment offers from rival firms. The ability to deter managers from accepting jobs from rival firms will, however, depend on the enforceability of these agreements. Research suggests that changes to the extent of enforceability of these contracts affect executive mobility as well as their level of compensation; with increased enforceability resulting in lower turnover and compensation (Garmaise, 2011). As such, changes to the enforceability of these non-competition agreements affect the ability of CEOs to move to rival firms and win the tournament and hence represents a shock to *ITI*. We, therefore, exploit the exogenous variation in the enforceability of these contracts to evaluate whether a causal link runs from *ITI* to the value of cash.

Although state laws governing the enforceability of non-competition agreements are largely static, changes in non-competition enforceability law occurred in three states during our sample period. For instance, the enforceability of non-competition agreements increased in Florida in 1996, while it decreased in Texas in 1994 and Louisiana during the period 2002-2003 (Garmaise, 2011). Therefore, in line with Garmaise (2011), we construct a variable *Increased enforceability* that takes on the value of one for firms in Florida in 1997-2004 and -1 for firms in Texas from 1995-2004 and Louisiana in 2002-2003, and zero otherwise. Further, Garmaise (2011) suggests that non-competition law is mainly important to firms with substantial within state competition since non-compete covenants have limited geographic scope and are easiest to enforce in the same legal jurisdiction. As such, the impact of changes in enforceability of non-competition agreement on *ITI* is likely to increase with the number of within state competitors. When the number of within state competitors is low, the impact of the exogenous shock on *ITI* is likely to be marginal. On the other hand, when number of within state competitors is high, changes in the enforceability of non-competition contracts should have a measurable impact on *ITI*.

We, therefore, evaluate the impact of the enforceability shock on the link between *ITI* and the market value of cash on samples with varying degrees of within state competition. Specifically, we report the results for subsamples that include firms-year observations if: (a) there are at least 10 within state competitors in the industry, (b) there are at least 30 within state competitors in the industry, and (c) there are at least 100 within state competitors in the industry. We expect the strength of the relationship between *ITI* and the market value of cash for shock firms to become stronger as the within state competition in an industry is higher. We, thus, estimate difference-in-differences regressions as specified in Equation 2 with the variable *Cut dummy* being replaced by the variable *Increased enforceability* for subsamples based on the amount of within state competition in the industry. We also include the variables *State unemployment rate* and the *State personal per capital income* measured in the relevant year and obtained from the Bureau of Economic Analysis as additional controls. The coefficient of interest is on the triple interaction term, $Ln(Industry\ pay\ gap\ 1_{t-1})$ x $\Delta C_t/MVE_{t-1}$ x $Increased\ enforceability_{t-1}$.

The results are reported in Table 7. As expected, the impact on *ITI* on firm cash value for shock firms increases as the extent of within state competition increases. Focusing on the regression specification with the largest within state completion firms (# in-state competitors >100), the results indicate that the coefficient on the three-way interaction variable *Ln(Industry pay gap* 1_{t-1}*)* x $\Delta C_t/MVE_{t-1}$ *x Increased enforceability*$_{t-1}$ is negative and significant for three of the four alternative *ITI* measures. This is also the case with regression specifications for the moderate within state competition group (# in-state competitors >30). As such, the results suggest that relation between market value of cash and *ITI* is weaker for firms incorporated in states where the enforceability of non-competition agreement is higher, i.e., where CEOs are less likely to win the tournament. Further, this effect becomes stronger as the within state competition facing the firm increases.

Thus, the results from our two quasi-natural experiments suggest that the link between *ITI* and market value of cash becomes stronger when product market competition intensifies and weaker when the enforceability of non-competition agreements are increased. Further, in light of all these results, we again come to the conclusion that the positive relation between industry tournament incentives and the marginal value of cash is not spurious, but is likely to be causal in nature. Finally, this positive relation is only consistent with the *strategic investment hypothesis*.

4. Industry tournament incentives and the level of cash holdings

In this section, we empirically examine the relation between cash holdings and industry tournament incentives. Both the *strategic investment hypothesis* and the *bondholder risk aversion hypothesis* predict a positive relation between cash holdings and industry tournament incentives, while the *empire building hypothesis* predicts a negative relation between cash holdings and industry tournament incentives. Specifically, we estimate the following OLS (2SLS) regressions to test these hypotheses.

$$Cash/Assets_{i,t} = \beta_0 + \beta_1 Ln(Industry\ pay\ gap_{i,t-1}) + \beta_2 Ln(Firm\ pay\ gap_{i,t-1}) + \beta_3 CEO\ vega_{i,t-1} + \beta_4 CEO\ delta_{i,t-1} + Bates, Kahle, and\ Stulz\ (BKS) control\ variables + Other\ control\ variables + industry\ (firm) fixed\ effects + year\ fixed\ effects + \varepsilon_{i,t} \quad (3)$$

In all the estimated regressions, we control for *Firm pay gap*, *CEO vega* and *CEO delta*. The other control variables are the same as those used in Bates, Kahle, and Stulz (2009) and include *Ln(Assets)*, *Cash flow/Assets*, *NWC/Assets*, *Industry sigma*, *R&D/Sales*, *CAPX/Assets*, *Leverage*, *Dividend dummy* (dummy variable that takes on the value of one if the firm pays dividends, and zero otherwise), and *Acquisition/Assets*. Further, we include either industry or firm fixed effects and year fixed effects.

The results are reported in Table 8. The only difference between the two panels is that we include industry fixed effects in Panel A and firm fixed effects in Panel B. In each panel, the results are reported for all four measures of industry tournament incentives. For each tournament incentive variable, the first estimated regression is an OLS model, while the second estimated regression is a 2SLS model. In all the estimated 2SLS regression models, we use over-identified models where the instruments for industry tournament incentives are the *Number of industry CEOs* and *Ln(Average CEO compensation of geographically close firms)*. The justification for the choice of these instruments was described earlier. These instruments pass all our tests for relevance and validity.

In Panel A, we find that the coefficients on our industry tournament incentive variables are positively significant at least at the 5% level in all four estimated OLS regression models and they are positively significant at the 1% level in all four estimated 2SLS regression models. In Panel B, we find that the coefficients on our industry tournament incentive variables are positively significant at least at the 5% level in all four estimated OLS regression models and they are positively significant at the 1% level in all four estimated 2SLS regression models. These results are consistent with the *strategic investment* and *bondholder risk aversion hypotheses*, but inconsistent with the *empire building hypothesis*.

Next, in order to further distinguish between the *strategic investment* and *bondholder risk aversion hypotheses* with regard to the link between *ITI* and firm cash holdings, we evaluate whether the higher cash holdings associated with *ITI* is largely the result of bondholders imposing liquidity provisions in an attempt to reduce incentives for risk shifting or asset substitution on the part of management. Following Liu and Mauer (2011), we estimate probit regressions to examine the relation between the presence of liquidity covenants in new bank loans and *ITI*. We do not report these results for brevity. In these tests, we do not find any reliable relation between them, thereby suggesting that higher *ITI* do not lead to creditors perceiving an increase in the agency cost of debt and consequently imposing additional liquidity constraints. Therefore, our results suggest that creditors understand that while greater industry tournament incentives may give CEOs higher risk taking incentives, they also provide the CEO with the incentives to work harder and more efficiently in order to win the tournament. Overall, our results are inconsistent with the *bondholder risk aversion hypothesis* given that we find a significant positive relation between the marginal value of cash and *ITI* and no relation between the presence of liquidity covenants in new bank loans and *ITI*.

5. Industry tournament incentives and the accumulation, dissipation, and uses of excess cash

In this section, we evaluate whether industry tournament incentives influence the rate of accumulation and dissipation of excess cash reserves as well as the uses of excess cash. In line with the extant cash management literature, we define excess cash as the cash in excess of the level that is required to fund operations and other necessary requirements. Further, we follow the literature in estimating the optimal level of cash by regressing firm cash holdings on variables that capture the precautionary demand for cash such as investment opportunities, financing constraints, etc. (Opler, Pinkowitz, Stulz, and Williamson, 1999; Dittmar and Mahrt -Smith, 2007; Harford, Mansi, and Maxwell, 2008; and Bates, Kahle, and Stulz, 2009). As such, we regress firm cash holdings on several independent variables that include *Ln(Assets)*, *Cash flow/Assets*, *NWC/Assets*, *Industry sigma*, *R&D/Sales*, *CAPX/Sales*, *Book leverage*, and *Dividends dummy* (dummy variable that takes on the value 1 if the firm pays dividends, and zero otherwise). All the above variables are either as described earlier or defined in Appendix. Finally, we compute the variable *Excess Cash* as the difference between actual cash holdings and what is predicted by our optimal cash model. The mean (median) value of excess cash is 0.0011 (-0.1814).

Initially, we provide a univariate analysis of the extent industry tournament incentives influence the rate of accumulation and dissipation of excess cash. We focus on the subset of firms that have excess cash at time t (year 0) and evaluate the rate at which they accumulate and dissipate cash over a (-3, +3) year window. In line with Dittmar and Mahrt-Smith (2007), we compute the ratio of excess cash in each of the years -3 to +3 relative to year 0. In Figure 1, we evaluate the extent to which industry tournament incentives influence the rate of accumulation and dissipation of excess cash. The results are reported for our primary measure of industry pay gap (*Industry pay gap 1*). Specifically, we segment our sample firms with excess cash at time t = 0 into four quartiles based on *Industry pay gap 1*. Figure 1 suggests that firms with higher *ITI* tend to both accumulate and dissipate excess cash faster than firms with lower *ITI*. The results from Figure 1 suggest that firms with the highest industry pay gap dissipate almost all their excess cash within three years. In contrast, firms with the lowest industry pay gap dissipate only about 25% of their excess cash within three years. As such, the univariate results from Figure 1 provide initial support to our argument that industry pay gap influences both the rate of accumulation and dissipation of excess cash. To provide more compelling evidence of the link between *ITI* and rate of accumulation and dissipation of cash, we next report results of our multivariate analysis where we control for other factors that can affect the rate of dissipation and accumulation of cash.

To examine the accumulation (dissipation) of excess cash, our regression analysis involves regressing the Δ*Excess Cash* (change in excess cash) from period *t-1* to *t* (*t* to *t+1)* on our measures of industry tournament incentives after controlling for the effect of *Ln(Firm pay gap)*, *CEO delta*, *CEO vega*, and *Industry average change in excess cash*. In addition to OLS regressions, we also estimate 2SLS regressions to account for endogenous effects of industry tournament incentives on changes in excess cash reserves. We use the *Number of CEOs within each industry* and *Ln(Average CEO compensation of geographically close firms)* as our two instruments for industry pay gap to overidentify the model. The results are reported for accumulation in Panel A and dissipation in Panel B of Table 9. We report results of OLS and 2SLS regressions for all four of our measures of industry pay gap. Focusing on accumulation of excess cash in Panel A, the results indicate that the coefficients on our measures of industry pay gap are positive and significant at the 1% level in all four of the 2SLS models, and at least at the 5% level in three of the four OLS specifications. The only instance where *ITI* is positive but not significant is for the OLS specification where *Industry pay gap 3* is the proxy for industry tournament incentives (Model 5).[24] Further, the results for dissipation of excess cash in Panel B indicate that the coefficients on our measures of industry pay gap are negative and significant at the 1% level in all four of the 2SLS models. In these models, our two instruments pass all the relevance and validity tests in both panels. The only specification where industry pay gap is negative but not significant is for the OLS specification where *Industry pay gap 3* is the proxy for industry tournament incentives (Model 5). The above findings suggest that higher *ITI* result in the faster accumulation and dissipation of excess cash and, therefore, taken together are only consistent with the predictions of the *strategic investment hypothesis*, but are inconsistent with the predictions of the *empire building hypothesis* and the *bondholder risk aversion hypothesis*.

6. Do industry tournament incentives affect the product market benefits of cash?

In the previous section we documented that CEOs with higher tournament incentives are likely to dissipate excess cash faster. Given that the marginal value of cash is higher when CEOs have greater industry tournament incentives and that these CEOs are more likely to dissipate cash faster, it is reasonable to infer that this cash is expected by the market to be deployed in value increasing activities. The natural question that arises is towards what fruitful purposes is cash being used by managers with greater industry tournament incentives. To provide additional insights, we examine whether *ITI* have an effect on the manner in which firms disgorge excess cash by examining its impact on both investment and payout decisions. In line with Harford, Mansi, and Maxwell (2008), we evaluate the extent to which excess cash is deployed among alternative avenues of investment such as R&D, capital expenditures, and acquisition spending as well as to fund shareholder payouts in the form of dividends and repurchases. Additionally, we focus on potential uses of excess cash that are specifically targeted towards building market share gains. As such, we evaluate whether conditional on pursuing acquisitions, high *ITI* firms are more likely to engage in focused acquisitions which can help quickly scale up the firm and increase its

[24] In untabulated results, we generally find that firms with high *ITI* accumulate cash through internal cash flows and debt financing.

market share. We estimate both OLS and 2SLS regression models for firms that have excess cash at time *t*. Our investment decision variables are R&D expenditures ($R\&D/Assets_t$), capital expenditures ($CAPX/Assets_t$), acquisitions ($Acquisitions/Assets_t$), focused acquisition expenditures ($Focused\ acquisitions/Assets_t$), and our payout variable is (*Div + Rep)/Net income* (where *Div* and *Rep* equal cash dividends and stock repurchases, respectively). In all the estimated regressions, we include lagged values of the dependent variable.

The results are reported in Table 10. The results from this analysis indicate that firms with higher *ITI* follow product market strategies that involve increasing their R&D expenditures and investments in acquisitions (driven by focused acquisitions), and reduce their dividend payout ratios. These results are consistent with the findings in Coles, Li, and Wang (2013) that CEOs with higher *ITI* orient their firms towards riskier strategies. Further, since higher R&D spending by cash rich firms can deter rival firms from similarly innovating, and the use of excess cash to pursue focused acquisitions can increase firm scale and efficiency, our results suggest that high *ITI* firms are more likely to use cash to capture its strategic benefits.[25] To directly address this issue, we examine whether these investment strategies by higher *ITI* firms result in the effective deployment of cash reserves to increase firm market share. As such, we attempt to evaluate whether industry tournament incentives positively influence the relation between excess cash reserves and gains in firm market share.

Fresard (2010) argues and documents evidence that excess cash can be used by firms for strategic purposes such as to garner additional market share. We posit that CEOs with higher industry pay gap will have the incentives to use excess cash to accumulate market share because: (i) higher industry tournament incentives will give the CEO incentives to use cash more effectively at gaining market share at the expense of its industry rival firms in order to win the industry tournament, (ii) the higher risk taking incentives due to the option-like features of tournament incentives will result in CEOs keeping the firm

[25] We also examine other possible product market strategies for high *ITI* firms with excess cash such as increasing their marketing efforts. Consistent with these strategies, we find evidence of a significant positive relation between both *Adv/Sales* (advertising/sales) and *SGA/Sales* (selling, general, and administrative expenses/sales) with *ITI* for firms with excess cash.

focused and one way to become bigger and at the same time remain focused is to garner market share and (iii) by becoming relatively larger within the industry, the CEO places herself in a better position to either get higher compensation in another job within the industry or enhanced compensation within the same firm through a different set of compensation peer firms (Bizjak, Lemmon, and Nguyen, 2011). Thus, we predict that CEOs with higher tournament incentives will use cash more effectively to build market share.

We use a modified version of the regression specification used in Fresard (2010) to examine whether industry tournament incentives influence the relation between market share growth and cash. Specifically, we estimate the following regression specification:

$$Market\ share\ growth_{i,t} = \beta_0 + \beta_1 Ln(Industry\ pay\ gap_{i,t-1}) * Cash_{i,t-1} + \beta_2 Ln(Industry\ pay\ gap_{i,t-1}) + \beta_3 Cash_{i,t-1} + Control\ variables + firm\ fixed\ effects + year\ fixed\ effects + \varepsilon_{i,t} \quad (4)$$

The results from these regression specifications are presented in Table 11. The dependent variable is the firm's market share growth [($Market\ share_{i,t}$ - $Market\ share_{i,t-1}$)/$Market\ share_{i,t-1}$] in Models 1 – 4 and is the firm's industry-adjusted sales growth [($Sales_{i,t}$ - $Sales_{i,t-1}$)/$Sales_{i,t-1}$] in Models 5 – 8. In line with Fresard (2010), we use two measures of excess cash (i.e., firm's cash position relative to rivals) in these models – $Industry\text{-}adjusted\ cash_{t\ i,-1}$ in Models 1 – 2 and Models 5 – 6 and $ZCash_{i,t-1}$ in Models 3 – 4 and Models 7 – 8. $Industry\text{-}adjusted\ cash_{i,t-1}$ is computed by subtracting from the firm's *Cash/Assets* ratio its industry-year mean *Cash/Assets* ratio. $ZCash_{i,t-1}$ is computed by subtracting from the *Cash/Assets* ratio its industry-year mean *Cash/Assets* ratio and dividing the difference by its industry-year standard deviation. In all these models, $Ln(Industry\ pay\ gap\ 1_{i,t-1})$ is our measure of industry tournament incentives. Thus, we have four sets of models with each set containing two specifications. In each of these sets, the first specification is the baseline Fresard (2010) 2SLS regression model, and the second specification is our 2SLS model. We include $Ln(Firm\ pay\ gap_{t-1})$, $CEO\ delta_{i,t-1}$, and $CEO\ vega_{i,t-1}$ as control variables in addition to the control variables used in Fresard (2010). Finally, we employ firm- and year-fixed effects in all estimated models. Given the above regression specification, our hypothesis predicts that the coefficient on the interaction term *Ln(Industry pay gap* $1_{i,t-1}$*)* * *Cash* $_{i,t-1}$ (β_1) should be significantly positive.

In the baseline Fresard (2010) 2SLS models, we use *Tangibility* as the instrument for *Cash*. Consistent with the results reported in Fresard (2010), we find that coefficient on *Cash* (either *Industry-adjusted Cash* $_{i,t-1}$ in Models 1 and 5 or *ZCash* $_{i,t-1}$ in Model 3 and 7) is significant at the 1% level. This result is consistent with the notion that firms can use cash for strategic purpose like garnering market share. As expected, in the first-stage regression in all these models, the relation between *Cash* and *Tangibility* is significantly negative (at the 1% level).

Our interest, however, is to determine whether industry tournament incentives amplify the effect of *Cash* on measures of market share growth. Thus, the focus of our attention, therefore, is on the coefficient on the interaction term *Ln(Industry pay gap 1)*Cash*. In Models 2, 4, 6, and 8, we instrument for *Cash*, *Ln(Industry pay gap 1)*, and *Ln(Industry pay gap 1)*Cash*. The instruments are *Number of CEOs within the industry*, *Tangibility*, *Number of CEOs within the industry*Tangibility*, and *Ln(Sum of CEO compensation within the industry)*Tangibility* and, as such, all these models are over-identified. In all these models, the instruments are individually and collectively relevant and they are also valid. Further, the test for endogeneity indicates that the use of the 2SLS methodology is appropriate. In these four estimated 2SLS regression models, the coefficient associated with *Ln(Industry pay gap 1)*Cash* is 0.7981 in Model 2 (significant at the 1% level), 0.1583 in Model 4 (significant at the 1% level), 0.3583 in Model 6 (significant at the 5% level), and 0.0791 in Model 8 (significant at the 1% level). Thus, we find that industry tournament incentives magnify the impact of cash on market share growth regardless of whether we use *Industry-adjusted cash* or *ZCash* as the measure of cash holdings relative to rivals or *Market share growth* or *Industry-adjusted sales growth* as the measure of market share growth. Thus, consistent with our *strategic investment hypothesis*, these results indicate that higher *ITI* increase the effectiveness of these firms in strategically deploying cash to garner market share.

In additional tests, we again investigate whether industry tournament incentives amplify the impact of cash on market share growth, but this time by examining the impact of cash on market share growth for subsamples formed by quartiles of *Ln(Industry pay gap 1)* rather than including the interaction term *Ln(Industry pay gap 1)*Cash* in the estimated regressions. Specifically we form four subsamples with the first including all firm-years that fall in the highest quartile, the second including all firm-years that fall in the middle two quartiles, and the third including all firm-years that fall in the lowest quartile of industry pay gap. Since we are estimating the impact of cash on market share growth for each of these subsamples, we only need to instrument for cash. We use the same instruments for cash as employed by Fresard (2010). All the estimated models include firm- and year-fixed effects. Regardless of whether we use *Industry-adjusted cash* or *ZCash* as the measure of firm cash holdings relative to rival firms or *Market share growth* or *Industry-adjusted sales growth* as the measure of market share growth, we find that the impact of cash on market share growth is the strongest for the subsample of firms with the highest tournament incentives (coefficient is always significant at the 1% level) and the weakest for the subsample of firms with the lowest tournament incentives (coefficient is always insignificant). We do not report these results for purposes of brevity, but they too indicate the strategic use of cash to build market share is most effective for firms in which CEOs have the highest industry tournament incentives.

We conduct robustness tests with our other three measures of industry pay gap too. These results are reported in Table 12 with the dependent variable being *Market share growth* in Panel A, and *Industry-adjusted sales growth* in Panel B. In both the panels, *Industry-adjusted cash* (*ZCash*) is the measure of cash holdings relative to rivals in the first (second) three models. For each combination of market share growth and cash measure, the first, second, and third model uses *Ln(Industry pay gap2)*, *Ln(Industry pay gap 3)*, *Ln(Industry pay gap 4)*, respectively as the measure of industry tournament incentives. All the estimated models use the 2SLS regression methodology with firm- and year-fixed effects. The specifications are the same as those used in the 2SLS regressions in Table 11. Our focus here too is on the coefficient associated with the interaction term between industry pay gap and cash. The instruments used in all the estimated models are exactly the same as those employed in Table 11. These instruments are always individually and jointly relevant. With one exception, they are always valid.[26] In addition, the tests of exogeneity in all the models indicate that the use of the 2SLS methodology is appropriate.

The results reported in both panels of Table 12 indicate that the coefficient associated with the interaction term industry pay gap and cash is significantly positive at least at the 10% level in all the estimated 2SLS regression models. For example, in Panel A where the dependent variable is *Market share growth* and the measure of cash is *Industry-adjusted cash*, the coefficient on the interaction term *Ln(Industry pay gap 2)***Cash* in Model 1 is 1.1415 (significant at the 1% level), the coefficient on the interaction term *Ln(Industry pay gap 3)***Cash* in Model 2 is 0.9031 (significant at the 1% level), and the coefficient on the interaction term *Ln(Industry pay gap 4)***Cash* in Model 3 is 0.8287 (significant at the 5% level). Thus, we find that our results are robust to the specific measure used for market share growth, cash, and industry tournament incentives.

In Tables 3 – 7, we had shown that the marginal value of cash is higher when the CEO of the firm has higher industry tournament incentives, and that this relation is likely to be causal in nature. This result is consistent with the notion that higher industry tournament incentives will give incentives to the CEO to put in more effort to judiciously use cash for value creating purposes to enhance her chance of winning the tournament. In Table 9 and in Figure 1, we had further demonstrated that firms will dissipate excess cash faster if they have higher industry tournament incentives. These results are not surprising because the option-like features of tournament incentives will give CEOs incentives to take on greater risk. The natural question that arises is towards what purpose these funds are being deployed. Consistent with the findings in Coles, Li, and Wang (2013), we document that CEOs in firms with higher industry tournament incentives use their excess cash to invest more in R&D expenditures, pay out lower dividends, and make more focused acquisitions. Further, we find that the net effect of these actions is that it makes these firms

[26] In Model 6 in Panel A, the Hansen J-statistic is 3.796 and is significant at the 10% level. We did not change the instruments to be consistent across all the models in this table. However, when we use other combinations of instruments for industry pay gap, we pass all tests for relevance and validity and the coefficient on the interaction term *Ln(Industry pay gap 4)***ZCash* remains significantly positive.

more effective in garnering market share. Interestingly, size and industry are two of the most important characteristics that determine the composition of firms in the compensation peer group (Faulkender and Yang, 2010). By garnering more market share, these firms are effectively getting relatively larger in their industry and, as a result, their compensation peer group will be comprised of larger firms whose CEOs are paid more (Gabaix and Landier, 2008). Thus, even if these CEOs do not change jobs, they may have effectively won the tournament by getting higher compensation in their current firms (see, e.g., Coles, Li, and Wang (2013) for arguments along these lines). Overall, our results are consistent with the notion that CEOs with higher *ITI* deploy cash strategically to gain market share at the cost of rival firms.

7. Conclusions

In this paper, we study the linkages between CEO industry tournament incentives and the strategic value of corporate liquidity. We first propose and then attempt to empirically discriminate between three non-mutually exclusive hypotheses – the *strategic investment*, *empire building*, and *bondholder risk aversion hypotheses*. Our empirical strategy unfolds in four stages. First, we examine whether there is a causal relation between CEO industry tournament incentives and the marginal value of cash holdings. Our battery of tests suggests that *ITI* increase the marginal value of cash holdings. Second, we find a consistently significant and positive relation between *ITI* and the level of cash holdings. Further, we do not find any relation between the presence of liquidity covenants in new bank loans and *ITI*, thereby suggesting that the positive relation between *ITI* and the level of cash holdings is not due to creditors requiring more liquidity covenants. The above results only support the *strategic investment hypothesis* given that we find a positive relation between the marginal value of cash and *ITI*, a positive relation between the level of cash and *ITI*, and no relation between the presence of liquidity covenants in new bank loans and *ITI*. Third, we examine whether *ITI* affect the rate of accumulation and dissipation of excess cash for a sample of firms that have excess cash. We find that *ITI* increase the rate of accumulation and dissipation of excess cash. Further, firms with higher *ITI* disgorge their excess cash by investing more in R&D expenditures and taking part in more (focused) acquisition activity. Finally, we find that *ITI* positively influence the link between firm cash holdings relative to rivals and market share gains, thereby lending further support to the *strategic investment hypothesis*.

Our paper is most closely tied to studies on CEO industry incentives and intra-firm tournament incentives that suggest that tournament incentives lead to value enhancing risk-taking by firms (Coles, Li, and Wang, 2013; Kale, Reis, and Venkateswaran, 2009; and Kini and Williams, 2012). Consistent with both the value-creating and risk-taking incentives that arise from tournament incentives, we find larger *ITI* increase the value of cash, result in the faster accumulation and dissipation of excess cash, and increase the strategic use of excess cash to gain market share. Further, our paper contributes to a growing stream of research that focuses on identifying monitoring mechanisms that can increase the marginal value of cash (see, e.g., Bates, Chang, and Lindsey, 2012; and Dittmar and Mahrt-Smith, 2007). For instance, Dittmar and Mahrt-Smith (2007) find that good governance enhances the marginal value of cash by deterring inefficient investment. In our paper, we also find that *ITI* increase the marginal value of cash, but with the difference that the value enhancement comes not from preventing inefficient investment but rather from the strategic use of cash to obtain product market benefits.

Our paper is also related to the literature on whether managerial risk taking incentives influence the marginal value of cash. For example, Liu and Mauer (2011) find that an increase in CEO risk-taking incentives (CEO vega) decreases the marginal value of cash. They attribute this result largely to creditors seeking protection against excessive managerial risk taking by imposing stronger liquidity constraints. In contrast, we find evidence consistent with the idea that the risk-taking incentives attributable to *ITI* increase the value of cash because shareholders expect it to be used to gain a competitive advantage in the firm’s industry. Finally, our paper adds additional insights to work that highlights the role of cash as a strategic resource that can be used to gain an advantage in the firm’s product market (e.g., Fresard, 2010). Specifically, we find that higher *ITI* lead to a stronger relation between cash and market share gains.

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Appendix. Definition of the main variables

The appendix provides definition and source of the main variables used in this paper. Our sample is ExecuComp firms from 1994-2009. Financial firms and utilities are excluded from the sample. All continuous variables are winsorized at 1% and 99% and all dollar-value variables are expressed in 2003 dollars.

Variable	Description	Source
Compensation variables		
Industry pay gap 1 $_{t-1}$ (in 000s) ($2003)	*Industry pay gap 1* $_{t-1}$ is the difference between the second highest CEO total compensation in the industry and the CEO's total compensation.	ExecuComp
Industry pay gap 2 $_{t-1}$ (in 000s) ($2003)	*Industry pay gap 2* $_{t-1}$ is the difference between the highest CEO total compensation in the industry and the CEO's total compensation.	ExecuComp
Industry pay gap 3 $_{t-1}$ (in 000s) ($2003)	*Industry pay gap 3* $_{t-1}$ is the difference between the highest CEO total compensation in the industry and size group and the CEO's total compensation.	ExecuComp
Industry pay gap 4 $_{t-1}$ (in 000s) ($2003)	*Industry pay gap 4* $_{t-1}$ is the difference between the total compensation of the CEO 50 percentile points higher in the distribution and the CEO's total compensation and for a CEO above the median it is the difference between the maximal CEO compensation in the industry and the CEO's total compensation.	ExecuComp
Firm pay gap $_{t-1}$ (in 000s) ($2003)	*Firm pay gap* $_{t-1}$ is the difference between the CEO's total compensation and the median VP's total compensation.	ExecuComp
CEO delta $_{t-1}$ (per 1%, in 000s) ($2003)	*CEO delta* $_{t-1}$ is a CEO's total portfolio delta, and is computed as her dollar increase in wealth for a 1% increase in stock price.	ExecuComp
CEO vega $_{t-1}$ (per 0.01, in 000s) ($2003)	*CEO vega* $_{t-1}$ is a CEO's total portfolio vega, or her increase in option-wealth for a 0.01 standard deviation increase in stock volatility.	ExecuComp
Firm characteristics		
$Cash/Assets_t$	$Cash/Assets_t$ is cash plus marketable securities scaled by firm net assets.	Compustat
$Assets_{t-1}$ (in 000,000s) ($2003)	$Assets_{t-1}$ is firm net assets.	Compustat
$Book\ leverage_{t-1}$	$Book\ leverage_{t-1}$ is long-term debt plus short-term debt divided by firm net assets.	Compustat
Cash value regression variables		
$R_{i,t}$ - $R^B_{i,t}$	$R_{i,t}$ - $R^B_{i,t}$ is the excess stock return, where $R_{i,t}$ is the annual stock return of firm i at time t and $R^B_{i,t}$ is stock i's benchmark portfolio return at time t.	CRSP
$\Delta C_t/MVE_{t-1}$	$\Delta C_t/MVE_{t-1}$ is ΔC_t scaled by lagged market value of equity, where ΔC_t is (C_t-C_{t-1}) and C is cash plus marketable securities.	Compustat
C_{t-1}/MVE_{t-1}	C_{t-1}/MVE_{t-1} is C_{t-1} scaled by lagged market value of equity, where C is cash plus marketable securities.	Compustat
$\Delta E_t/MVE_{t-1}$	$\Delta E_t/MVE_{t-1}$ is ΔE_t scaled by lagged market value of equity, where ΔE_t is E_t-E_{t-1} and E is earnings before extraordinary items plus interest, deferred tax credits, and investment tax credits.	Compustat
$\Delta NA_t/MVE_{t-1}$	$\Delta NA_t/MVE_{t-1}$ is ΔNA_t scaled by lagged market value of equity, where ΔNA_t is NA_t-NA_{t-1} and NA is total assets minus cash holdings.	Compustat
$\Delta RD_t/MVE_{t-1}$	$\Delta RD_t/MVE_{t-1}$ is ΔRD_t scaled by lagged market value of equity, where ΔRD_t is RD_t-RD_{t-1} and RD is	Compustat

	research and development expense.	
$\Delta I_t/MVE_{t-1}$	$\Delta I_t/MVE_{t-1}$ is ΔI_t scaled by lagged market value of equity, where ΔI_t is I_t-I_{t-1} and I is interest expense.	Compustat
$\Delta D_t/MVE_{t-1}$	$\Delta D_t/MVE_{t-1}$ is ΔD_t scaled by lagged market value of equity, where ΔD_t is D_t-D_{t-1} and D is common dividends.	Compustat
L_t	L_t is market leverage which is total debt over the sum of total debt and the market value of equity.	Compustat
NF_t/MVE_{t-1}	NF_t/MVE_{t-1} is NF_t scaled by lagged market value of equity, where NF is the total equity issuance minus repurchases plus debt issuance minus debt redemption.	Compustat
Instruments		
Number of CEOs within each industry$_{t-1}$	*Number of CEOs within each industry*$_{t-1}$ is the total number of CEOs within the same industry.	ExecuComp
Ln(Sum of CEO compensation within each industry$_{t-1}$*)* ($2003)	*Ln(Sum of CEO compensation within each industry*$_{t-1}$*)* is the natural logarithm of sum of total compensation received by all other CEOs within the same industry except the highest-paid CEO.	ExecuComp
Ln(Average CEO compensation of geographically-close firms$_{t-2}$*)* ($2003)	*Ln(Average CEO compensation of geographically-close firms*$_{t-2}$*)* is the natural logarithm of average of total compensation received by all other CEOs of firms headquartered within a 250-kilometer radius except its industry peers.	ExecuComp

Table 1. Predicted relations under the strategic investment, empire building, and bondholder risk aversion hypotheses

Hypothesis	Effects	Marginal value of cash	Level of cash	Accumulation of cash	Dissipation of cash	Effect of cash on market share gains
Strategic investment hypothesis	Higher *ITI* provide CEOs with incentives to build a cash war chest in order to pursue value enhancing but riskier strategies. These strategies aim to exploit the product market benefits of excess cash in order to win the tournament.	+	+	+	+/-	+
Empire building hypothesis	Higher *ITI* provide CEOs with incentives to obtain the same benefits as winning the tournament by *immediately* spending excess cash to fund investments that benefit managers but not necessarily shareholders.	-	-	-	+	+/-
Bondholder risk aversion hypothesis	Higher *ITI* increase bondholders' concerns regarding the potential for risk shifting and asset substitution, thereby leading bondholders to impose liquidity constraints in loan covenants.	-	+	+	-	-

Table 2. Summary statistics

This table provides summary statistics for ExecuComp firms from 1994-2009. Financial firms and utilities are excluded from the sample. *Industry pay gap 1*$_{t-1}$ is the difference between the second highest CEO total compensation in the industry and the CEO's total compensation. *Industry pay gap 2*$_{t-1}$ is the difference between the highest CEO total compensation in the industry and the CEO's total compensation. *Industry pay gap 3*$_{t-1}$ is the difference between the highest CEO total compensation in the industry and size group and the CEO's total compensation. *Industry pay gap 4*$_{t-1}$ is the difference between the total compensation of the CEO 50 percentile points higher in the distribution and the CEO's total compensation and for a CEO above the median it is the difference between the maximal CEO compensation in the industry and the CEO's total compensation. The industry tournament incentive measures and industry instruments are based on the Fama-French 30-industry classification. All variables are defined in the Appendix. All continuous variables are winsorized at 1% and 99% and all dollar-value variables are expressed in 2003 dollars.

Variable	Mean	Median	Min	P10	P90	Max	Std. Dev.	N
Compensation variables								
Industry pay gap 1$_{t-1}$ (in 000s)	26320.0000	14724.0000	0.0000	3641.9088	59773.0000	147182.0000	32525.0000	18,641
Industry pay gap 2$_{t-1}$ (in 000s)	55059.0000	24379.0000	0.0000	7367.3440	118602.0000	640187.0000	98501.0000	18,641
Industry pay gap 3$_{t-1}$ (in 000s)	32144.0000	12954.0000	0.0000	2295.7166	70570.0000	383849.0000	59633.0000	18,641
Industry pay gap 4$_{t-1}$ (in 000s)	31825.0000	9441.4050	0.0000	2025.6199	68386.0000	601488.0000	75632.0000	18,641
Firm pay gap$_{t-1}$ (in 000s)	3062.4224	1437.3982	0.0198	284.0885	7186.6904	39206.0000	4665.2022	18,641
CEO delta$_{t-1}$ (in 000s)	428.0463	161.6080	0.0000	4.4110	1085.5496	5733.1710	756.8602	18,641
CEO vega$_{t-1}$ (in 000s)	197.6172	72.5251	0.0000	2.4116	509.0131	2491.5888	346.0760	18,641
Firm characteristics								
$Cash/Assets_t$	0.2405	0.0753	0.0006	0.0081	0.6254	2.7754	0.4389	18,374
$Assets_{t-1}$ (in 000,000s)	4223.6965	1060.2549	26.3776	159.0839	10844.0000	60326.0000	9010.1650	18,374
Book leverage$_{t-1}$	0.2522	0.2344	0.0000	0.0000	0.5026	1.1144	0.2121	18,309
Cash value regression variables								
$R_{i,t} - R^B_{i,t}$	0.0146	-0.0398	-0.8803	-0.4732	0.5290	1.9515	0.4596	17,837
$\Delta C_t/MVE_{t-1}$	0.0098	0.0023	-0.3090	-0.0614	0.0859	0.4325	0.0901	18,296
C_{t-1}/MVE_{t-1}	0.1197	0.0611	0.0006	0.0081	0.2936	1.0066	0.1661	18,322
$\Delta E_t/MVE_{t-1}$	0.0108	0.0052	-0.6140	-0.0897	0.0913	1.0472	0.1738	16,942
$\Delta NA_t/MVE_{t-1}$	0.0158	0.0192	-1.4637	-0.2038	0.2449	1.2974	0.3175	18,301
$\Delta RD_t/MVE_{t-1}$	-0.0001	0.0000	-0.0778	-0.0038	0.0064	0.0488	0.0130	18,327
$\Delta I_t/MVE_{t-1}$	0.0008	0.0000	-0.0521	-0.0074	0.0101	0.0611	0.0127	16,942
$\Delta D_t/MVE_{t-1}$	-0.0003	0.0000	-0.0394	-0.0008	0.0020	0.0155	0.0056	18,245
L_t	0.2065	0.1552	0.0000	0.0000	0.4997	0.8555	0.2022	18,306
NF_t/MVE_{t-1}	0.0080	-0.0030	-0.4490	-0.0931	0.1311	0.6396	0.1359	15,581
Instruments								
Number of CEOs within each industry$_{t-1}$	101.6394	69.0000	8.0000	28.0000	218.0000	243.0000	71.7479	18,641
Ln(Sum of CEO compensation within each industry$_{t-1}$*)*	12.4877	12.4718	9.8994	11.2548	13.6734	14.4232	1.0167	18,602
Ln(Average CEO compensation of geographically-close firms$_{t-2}$*)*	8.5269	8.6730	7.7042	7.8679	8.9448	9.2932	0.4049	15,917

Table 3. The marginal value of cash and industry tournament incentives (*ITI*): Using primary *ITI* measure

This table presents results of OLS and instrumental variables (IV) estimation of *ITI* on the marginal value of cash using ExecuComp firms from 1994 – 2009. Financial firms and utilities are excluded. The dependent variable is the annual excess stock return of the firm relative to the Fama and French (1993) 25 size and book-to-market portfolios. *Industry pay gap* 1_{t-1} is the difference between the second highest CEO total compensation in the industry and the CEO's total compensation. Models 1 and 6 are the benchmark Faulkender and Wang (2006) specification. Models 2, 3, 7, and 8 use dummy *Industry pay gap* 1_{t-1}, where *Industry pay gap* 1_{t-1} is equal to one if its continuous value is above the sample median and zero otherwise. Models 4, 5, 9, and 10 use the natural logarithm of continuous *Industry pay gap* 1_{t-1}. All other incentive variables and control variables are defined in the Appendix. Models 1 – 5 contain year fixed effects and two-digit SIC industry fixed effects, and Models 6 – 10 contain year fixed effects and firm fixed effects. All continuous variables are winsorized at 1% and 99% and all dollar-value variables are expressed in 2003 dollars. p-values based on robust standard errors clustered by firm are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Fixed effects	Industry fixed effects					Firm fixed effects				
ITI measure		*Dummy industry pay gap* 1_{t-1}		*Continuous industry pay gap* 1_{t-1}			*Dummy industry pay gap* 1_{t-1}		*Continuous industry pay gap* 1_{t-1}	
Estimation type	FW Model	OLS	2SLS	OLS	2SLS	FW Model	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\Delta C_t/MVE_{t-1}$	1.8818***	1.6820***	1.3556***	0.7651	-0.3396	2.0699***	1.9030***	1.3973***	0.9854	0.4213
	(0.0000)	(0.0000)	(0.0004)	(0.2917)	(0.6726)	(0.0000)	(0.0000)	(0.0004)	(0.1409)	(0.5911)
Ln(Industry pay gap 1_{t-1} *)*x $\Delta C_t/MVE_{t-1}$		0.1211	0.4980***	0.0900	0.1942***		0.0875	0.4506***	0.0985*	0.1503**
		(0.2763)	(0.0025)	(0.1556)	(0.0071)		(0.4127)	(0.0072)	(0.0941)	(0.0387)
Ln(Industry pay gap 1_{t-1}*)*		-0.0222**	-0.0833***	-0.0218***	-0.0387***		-0.0060	-0.4330***	-0.0117*	-0.2037***
		(0.0127)	(0.0002)	(0.0000)	(0.0003)		(0.5774)	(0.0002)	(0.0517)	(0.0002)
Ln(Firm gap gap_{t-1}*)*x $\Delta C_t/MVE_{t-1}$		0.0099	0.0231	0.0250	0.0350		0.0012	0.0314	0.0041	0.0116
		(0.8506)	(0.6553)	(0.6528)	(0.5308)		(0.9817)	(0.5616)	(0.9415)	(0.8344)
Ln(Firm pay gap_{t-1}*)*		0.0081**	0.0048	0.0066*	0.0042		-0.0191***	-0.0345***	-0.0186***	-0.0390***
		(0.0149)	(0.1620)	(0.0609)	(0.2519)		(0.0000)	(0.0000)	(0.0002)	(0.0000)
CEO $delta_{t-1}$ x $\Delta C_t/MVE_{t-1}$		0.0003***	0.0003***	0.0003***	0.0003**		0.0003***	0.0002*	0.0003**	0.0003**
		(0.0034)	(0.0063)	(0.0073)	(0.0142)		(0.0096)	(0.0511)	(0.0312)	(0.0488)
CEO $delta_{t-1}$		-0.0000***	-0.0000**	-0.0000***	-0.0000***		-0.0000***	-0.0000***	-0.0000***	-0.0000***
		(0.0064)	(0.0124)	(0.0047)	(0.0080)		(0.0003)	(0.0018)	(0.0003)	(0.0018)
CEO $vega_{t-1}$ x $\Delta C_t/MVE_{t-1}$		-0.0004	-0.0004	-0.0005	-0.0005		-0.0003	-0.0003	-0.0003	-0.0004
		(0.1508)	(0.2154)	(0.1365)	(0.1746)		(0.2767)	(0.4423)	(0.3489)	(0.2593)
CEO $vega_{t-1}$		-0.0000	-0.0000*	-0.0000*	-0.0000**		-0.0001***	-0.0002***	-0.0002***	-0.0002***
		(0.1041)	(0.0614)	(0.0762)	(0.0482)		(0.0000)	(0.0000)	(0.0000)	(0.0000)
$\Delta E_t/MVE_{t-1}$	0.5207***	0.5192***	0.5119***	0.5255***	0.5232***	0.3973***	0.3948***	0.3880***	0.4028***	0.4018***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
$\Delta NA_t/MVE_{t-1}$	0.1948***	0.1931***	0.1920***	0.1905***	0.1895***	0.1317***	0.1289***	0.1245***	0.1265***	0.1140***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
$\Delta RD_t/MVE_{t-1}$	0.4676	0.4717	0.4734	0.5166	0.5024	-0.1571	-0.1403	-0.1844	-0.1269	-0.1764

	(0.2714)	(0.2654)	(0.2635)	(0.2272)	(0.2408)	(0.7183)	(0.7465)	(0.6868)	(0.7716)	(0.6891)
$\Delta I_t/MVE_{t-1}$	-2.2860***	-2.2408***	-2.2335***	-2.2093***	-2.2069***	-1.0729**	-0.9412*	-1.0134**	-0.9665*	-0.8780*
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0319)	(0.0557)	(0.0406)	(0.0542)	(0.0846)
$\Delta D_t/MVE_{t-1}$	0.2598	0.3411	0.4882	0.3790	0.4116	-1.5023**	-1.2076	-0.8469	-1.2726	-1.2962
	(0.7191)	(0.6368)	(0.4942)	(0.6175)	(0.5865)	(0.0494)	(0.1108)	(0.2710)	(0.1024)	(0.1123)
C_{t-1}/MVE_{t-1}	0.4869***	0.4838***	0.4989***	0.4904***	0.4984***	1.2174***	1.1479***	1.1414***	1.1656***	1.1661***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
L_t	-0.5293***	-0.5471***	-0.5613***	-0.5525***	-0.5599***	-1.1590***	-1.2063***	-1.2222***	-1.2018***	-1.2247***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
NF_t/MVE_{t-1}	-0.1766***	-0.1730***	-0.1685***	-0.1749***	-0.1722***	-0.0821*	-0.0671	-0.0551	-0.0661	-0.0438
	(0.0000)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0703)	(0.1388)	(0.2453)	(0.1447)	(0.3467)
C_{t-1}/MVE_{t-1} x *$\Delta C_t/MVE_{t-1}$*	-0.2848	-0.2617	-0.2920	-0.2676	-0.3031	-0.5685***	-0.5287**	-0.4931**	-0.5870***	-0.6259***
	(0.1887)	(0.2268)	(0.1792)	(0.2487)	(0.1905)	(0.0070)	(0.0116)	(0.0195)	(0.0086)	(0.0048)
L_t x $\Delta C_t/MVE_{t-1}$	-1.7639***	-1.7135***	-1.5487***	-1.6773***	-1.5735***	-1.6468***	-1.5755***	-1.3729***	-1.5507***	-1.5234***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Constant	0.0982***	0.0520*	0.0708**	0.2479***	0.4076***					
	(0.0000)	(0.0653)	(0.0137)	(0.0000)	(0.0001)					
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
Firm Fixed Effects	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Number of Observations	13,917	13,917	13,882	13,326	13,326	13,917	13,917	13,669	13,326	13,102
R^2	0.220	0.222	0.218	0.223	0.222	0.275	0.286	0.189	0.288	0.230
1st Stage: Dependent variable is *Ln(Industry pay gap 1_{t-1})x $\Delta C_t/MVE_{t-1}$*										
Number of CEOs within each industry$_{t-1}$ x *$\Delta C_t/MVE_{t-1}$*			-0.0005		-0.0034***			-0.0004		-0.0032***
			(0.1693)		(0.0000)			(0.3159)		(0.0000)
Number of CEOs within each industry$_{t-1}$			0.0000*		0.0000*			0.0001***		0.0002***
			(0.0972)		(0.0516)			(0.0012)		(0.0000)
Ln(Sum of CEO compensation within each industry$_{t-1}$) x *$\Delta C_t/MVE_{t-1}$*			0.3858***		1.0418***			0.3763***		1.0225***
			(0.0000)		(0.0000)			(0.0000)		(0.0000)
1st Stage: Dependent variable is *Ln(Industry pay gap 1_{t-1})*										
Number of CEOs within each industry$_{t-1}$ x *$\Delta C_t/MVE_{t-1}$*			-0.0018**		-0.0020			-0.0010		-0.0007
			(0.0175)		(0.2094)			(0.1827)		(0.6614)
Number of CEOs within each industry$_{t-1}$			0.0042***		0.0091***			0.0033***		0.0069***

	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Ln(Sum of CEO compensation within each industry$_{t-1}$) x $\Delta C_t/MVE_{t-1}$	0.1788***	0.1548	0.1387**	0.1042
	(0.0008)	(0.2025)	(0.0101)	(0.4032)
Anderson-Rubin Wald F-statistic for joint relevance	7.846***	7.132***	6.396***	5.786***
Hansen's J-statistic	0.0204	0.282	0.130	0.756
Difference in Sargan-Hansen statistics (test for endogeneity)	17.10***	9.567***	17.25***	12.95***
First-stage F-statistics:				
*Ln(Industry pay gap 1$_{t-1}$)*x $\Delta C_t/MVE_{t-1}$	363.93***	394.86***	352.35***	351.00***
Ln(Industry pay gap 1$_{t-1}$)	693.37***	915.94***	52.61***	89.77***
The marginal value of cash for the average firm:				
Marginal value of $1 (average firm)	$1.43		$1.53	
Marginal value of $1 (high industry pay gap)	$1.68		$1.76	
Marginal value of $1 (low industry pay gap)	$1.18		$1.31	

Table 4. The marginal value of cash and industry tournament incentives (*ITI*): Using alternative *ITI* measures

This table presents results of OLS and instrumental variables (IV) estimation of *ITI* on the marginal value of cash using alternative *ITI* measures and ExecuComp firms from 1994 – 2009. Financial firms and utilities are excluded. The dependent variable is the annual excess stock return of the firm relative to the Fama and French (1993) 25 size and book-to-market portfolios. Models 1 and 4 use *Industry pay gap* 2_{t-1}; Models 2 and 5 use *Industry pay gap* 3_{t-1}; Models 3 and 6 use *Industry pay gap* 4_{t-1}. Models 1 – 3 contain year fixed effects and two-digit SIC industry fixed effects, and Models 4 – 6 contain year fixed effects and firm fixed effects. All variables are defined in the Appendix. The continuous variables are winsorized at 1% and 99% and all dollar-value variables are expressed in 2003 dollars. p-values based on robust standard errors clustered by firm are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Industry fixed effects			Firm fixed effects		
	Industry pay gap 2_{t-1}	*Industry pay gap* 3_{t-1}	*Industry pay gap* 4_{t-1}	*Industry pay gap* 2_{t-1}	*Industry pay gap* 3_{t-1}	*Industry pay gap* 4_{t-1}
Estimation type	(1)	(2)	(3)	(4)	(5)	(6)
Ln(Industry pay gap 2_{t-1}*)* x $\Delta C_t/MVE_{t-1}$	0.2066***			0.1287*		
	(0.0067)			(0.0987)		
Ln(Industry pay gap 2_{t-1}*)*	-0.0384***			-0.1561***		
	(0.0003)			(0.0003)		
Ln(Industry pay gap 3_{t-1}*)* x $\Delta C_t/MVE_{t-1}$		0.2215***			0.1445*	
		(0.0033)			(0.0563)	
Ln(Industry pay gap 3_{t-1}*)*		-0.0372***			-0.1456***	
		(0.0002)			(0.0002)	
Ln(Industry pay gap 4_{t-1}*)* x $\Delta C_t/MVE_{t-1}$			0.3123***			0.2287*
			(0.0076)			(0.0520)
Ln(Industry pay gap 4_{t-1}*)*			-0.0527***			-0.1930***
			(0.0003)			(0.0005)
$\Delta C_t/MVE_{t-1}$	-0.5397	-0.2327	0.2609	0.4493	0.5873	0.8531
	(0.5364)	(0.7515)	(0.6891)	(0.6050)	(0.4147)	(0.1833)
Constant	0.4250***	0.3511***	0.2808***			
	(0.0001)	(0.0001)	(0.0001)			
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	No	No	No
Firm Fixed Effects	No	No	No	Yes	Yes	Yes
Number of Observations	13,626	13,349	13,626	13,405	13,121	13,405
R^2	0.222	0.212	0.208	0.242	0.223	0.169
Anderson-Rubin Wald F-statistic for joint relevance	7.365***	8.325***	7.365***	6.108***	6.222***	6.108***
Hansen's J-statistic	0.203	0.00151	0.0128	1.439	0.256	0.599
Difference in Sargan-Hansen statistics (test for endogeneity)	9.720***	32.00***	21.60***	12.44***	17.61***	16.18***
First-stage F-statistics:						
Ln(Industry pay gap$_{t-1}$*)* x $\Delta C_t/MVE_{t-1}$	197.09***	151.54***	84.86***	173.62***	133.13***	73.57***
Ln(Industry pay gap$_{t-1}$*)*	643.53***	223.43***	142.67***	106.26***	68.57***	29.18***
Instruments used in IV (2SLS)	*Number of CEOs within each industry*$_{t-1}$ *Number of CEOs within each industry*$_{t-1}$ x $\Delta C_t/MVE_{t-1}$ *Ln(Sum of CEO compensation within each industry* $_{t-1}$*)* x $\Delta C_t/MVE_{t-1}$					

Table 5. The marginal value of cash and industry tournament incentives (*ITI*): Using difference-in-differences (tariff cut) specifications and primary *ITI* measure

This table presents results of OLS difference-in-differences estimation of *ITI* on the marginal value of cash following large reductions in import tariffs using ExecuComp firms from 1994 – 2006. Tariff data are available for manufacturing firms (2000-3999 SIC range) until 2006. The dependent variable is the annual excess stock return of the firm relative to the Fama and French (1993) 25 size and book-to-market portfolios. *Ln(Industry pay gap 1)*$_{t-1}$ is the natural logarithm of *Industry pay gap 1*$_{t-1}$, where *Industry pay gap 1*$_{t-1}$ is the difference between the second highest CEO total compensation in the industry and the CEO's total compensation. Following Fresard (2010), we define tariff reductions (*Cut dummy*) using three different cut-offs. Specifically, a tariff "cut" occurs in a specific industry-year when a negative change in the tariff rate is 2 (Models 1 and 4), 2.5 (Models 2 and 5), or 3 times (Models 3 and 6) larger than its median change. For these three definitions, *Cut dummy*$_t$ = 1 if an industry had experienced a tariff cut in the year. To make sure that large tariff reductions truly reflect non-transitory changes in the competitive environment, we exclude tariff cuts that are followed by equivalently large increases in tariffs over the two subsequent years. All other incentive variables and control variables are defined in the Appendix. Models 1 – 3 contain year fixed effects and two-digit SIC industry fixed effects. Models 4 – 6 contain year fixed effects and firm fixed effects. All continuous variables are winsorized at 1% and 99% and all dollar-value variables are expressed in 2003 dollars. p-values based on robust standard errors clustered by firm are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Fixed effects	Industry fixed effects			Firm fixed effects		
Cut dummy	CUT 2 x Median Change (1)	CUT 2.5 x Median Change (2)	CUT 3 x Median Change (3)	CUT 2 x Median Change (4)	CUT 2.5 x Median Change (5)	CUT 3 x Median Change (6)
Ln(Industry pay gap 1$_{t-1}$*)* x *$\Delta C_t/MVE_{t-1}$ x Cut dummy$_t$*	0.4602**	0.5720**	0.6341***	0.3807	0.4398*	0.5026*
	(0.0500)	(0.0120)	(0.0060)	(0.1365)	(0.0849)	(0.0550)
Ln(Industry pay gap 1$_{t-1}$*)* x *Cut dummy*$_t$	0.0396**	0.0402**	0.0507***	0.0413**	0.0437**	0.0566***
	(0.0114)	(0.0144)	(0.0025)	(0.0218)	(0.0217)	(0.0042)
Ln(Industry pay gap 1$_{t-1}$*)* x *$\Delta C_t/MVE_{t-1}$*	0.0611	0.0440	0.0363	0.1041	0.0936	0.0820
	(0.6355)	(0.7282)	(0.7736)	(0.3768)	(0.4183)	(0.4776)
Ln(Industry pay gap 1$_{t-1}$*)*	-0.0322***	-0.0316***	-0.0332***	-0.0298**	-0.0291**	-0.0312**
	(0.0005)	(0.0006)	(0.0003)	(0.0180)	(0.0205)	(0.0123)
Cut dummy$_t$ x ΔC_t/MVEt$_{-1}$	-3.9503*	-5.0196**	-5.6307**	-3.0658	-3.6453	-4.3049*
	(0.0852)	(0.0238)	(0.0124)	(0.2130)	(0.1372)	(0.0886)
Cut dummy$_t$	-0.3352**	-0.3407**	-0.4353***	-0.3322**	-0.3553**	-0.4769***
	(0.0200)	(0.0257)	(0.0049)	(0.0456)	(0.0442)	(0.0093)
Ln(Firm gap gap$_{t-1}$*)* x *$\Delta C_t/MVE_{t-1}$*	0.1917*	0.1872*	0.1840*	0.1330	0.1291	0.1259
	(0.0788)	(0.0849)	(0.0901)	(0.2416)	(0.2545)	(0.2670)
Ln(Firm pay gap$_{t-1}$*)*	0.0110	0.0108	0.0109	-0.0249**	-0.0248**	-0.0242**
	(0.1338)	(0.1384)	(0.1359)	(0.0195)	(0.0197)	(0.0231)
CEO delta$_{t-1}$ x *$\Delta C_t/MVE_{t-1}$*	0.0007**	0.0007**	0.0007**	0.0004	0.0004	0.0004
	(0.0354)	(0.0414)	(0.0443)	(0.1624)	(0.1766)	(0.1796)
CEO delta$_{t-1}$	-0.0000*	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000
	(0.0987)	(0.1055)	(0.1109)	(0.1301)	(0.1355)	(0.1321)
CEO vega$_{t-1}$ x *$\Delta C_t/MVE_{t-1}$*	-0.0014*	-0.0013*	-0.0013*	-0.0007	-0.0007	-0.0006
	(0.0514)	(0.0577)	(0.0681)	(0.3806)	(0.3873)	(0.4151)
CEO vega$_{t-1}$	-0.0000	-0.0000	-0.0000	-0.0002***	-0.0002***	-0.0002***
	(0.5818)	(0.5687)	(0.5393)	(0.0000)	(0.0000)	(0.0000)
$\Delta C_t/MVE_{t-1}$	-0.0846	0.1355	0.2412	-0.1109	0.0551	0.2149
	(0.9537)	(0.9250)	(0.8668)	(0.9316)	(0.9656)	(0.8660)
$\Delta E_t/MVE_{t-1}$	0.5919***	0.5912***	0.5926***	0.4493***	0.4503***	0.4521***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)

$\Delta NA_t/MVE_{t-1}$	0.2490***	0.2505***	0.2502***	0.1783***	0.1809***	0.1813***
	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0001)	(0.0001)
$\Delta RD_t/MVE_{t-1}$	0.7466	0.7479	0.7588	0.1558	0.1628	0.1601
	(0.2187)	(0.2180)	(0.2110)	(0.8013)	(0.7928)	(0.7951)
$\Delta I_t/MVE_{t-1}$	-3.6986***	-3.7271***	-3.7118***	-1.6584	-1.6855*	-1.6569
	(0.0001)	(0.0001)	(0.0001)	(0.1049)	(0.0998)	(0.1048)
$\Delta D_t/MVE_{t-1}$	0.0216	-0.0102	-0.0079	-1.8381	-1.8577	-1.8912
	(0.9864)	(0.9936)	(0.9950)	(0.1626)	(0.1594)	(0.1533)
C_{t-1}/MVE_{t-1}	0.3875***	0.3856***	0.3832***	1.3670***	1.3676***	1.3611***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
L_t	-0.6322***	-0.6285***	-0.6310***	-1.4985***	-1.4935***	-1.4978***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
NF_t/MVE_{t-1}	0.0023	0.0048	0.0046	0.1364	0.1376	0.1373
	(0.9783)	(0.9537)	(0.9556)	(0.1099)	(0.1056)	(0.1066)
C_{t-1}/MVE_{t-1} x $\Delta C_t/MVE_{t-1}$	-0.9216**	-0.9384**	-0.9427**	-0.9766**	-1.0002**	-1.0132**
	(0.0427)	(0.0387)	(0.0382)	(0.0193)	(0.0160)	(0.0148)
$L_t \times \Delta C_t/MVE_{t-1}$	-2.5549***	-2.5711***	-2.5730***	-1.8767***	-1.9054***	-1.9236***
	(0.0000)	(0.0000)	(0.0000)	(0.0002)	(0.0001)	(0.0001)
Constant	0.2811***	0.2751***	0.2880***	0.5557***	0.5496***	0.5668***
	(0.0078)	(0.0092)	(0.0061)	(0.0001)	(0.0001)	(0.0001)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	No	No	No
Firm Fixed Effects	No	No	No	Yes	Yes	Yes
Number of Observations	3,983	3,983	3,983	3,983	3,983	3,983
R^2	0.230	0.231	0.232	0.307	0.308	0.308

Table 6. The marginal value of cash and industry tournament incentives (*ITI*): Using difference-in-differences (tariff cut) specifications and alternative *ITI* measures

This table presents results of OLS difference-in-differences estimation of *ITI* on the marginal value of cash following large reductions in import tariffs using alternative ITI measures and ExecuComp firms from 1994 – 2006. Tariff data are available for manufacturing firms (2000-3999 SIC range) until 2006. The dependent variable is the annual excess return of the firm relative to the Fama and French (1993) 25 size and book-to-market portfolios. Model 1 – 3, 4 – 6, and 7 – 9 use *Industry pay gap* 2_{t-1}, *Industry pay gap* 3_{t-1}, and *Industry pay gap* 4_{t-1}, respectively. *Ln(Industry pay gap* 2_{t-1}*)* is the natural logarithm of *Industry pay gap* 2_{t-1}, where *Industry pay gap* 2_{t-1} is the difference between the highest CEO total compensation in the industry and the CEO's total compensation. *Ln(Industry pay gap* 3_{t-1}*)* the natural logarithm of *Industry pay gap* 3_{t-1}, where *Industry pay gap* 3_{t-1} is the difference between the highest CEO total compensation in the industry and size group and the CEO's total compensation. *Ln(Industry pay gap* 4_{t-1}*)* the natural logarithm of *Industry pay gap* 4_{t-1}, where *Industry pay gap* 4_{t-1} is the difference between the total compensation of the CEO 50 percentile points higher in the distribution and the CEO's total compensation and for a CEO above the median it is the difference between the maximal CEO compensation in the industry and the CEO's total compensation. Following Fresard (2010), we define tariff reductions (*Cut dummy*) using three different cut-offs. Specifically, a tariff "cut" occurs in a specific industry-year when a negative change in the tariff rate is 2 (Models 1, 4 and 7), 2.5 (Models 2, 5 and 8), or 3 times (Models 3, 6 and 9) larger than its median change. For these three definitions, *Cut dummy*$_t$ = 1 if an industry had experienced a tariff cut in the year. To make sure that large tariff reductions truly reflect non-transitory changes in the competitive environment, we exclude tariff cuts that are followed by equivalently large increases in tariffs over the two subsequent years. All other incentive variables and control variables are defined in the Appendix. In Panel A, all models contain year fixed effects and two-digit SIC industry fixed effects. In Panel B, all models contain year fixed effects and firm fixed effects. All continuous variables are winsorized at 1% and 99% and all dollar-value variables are expressed in 2003 dollars. p-values based on robust standard errors clustered by firm are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Industry and year fixed effects

ITI measure	*Industry pay gap* 2_{t-1}			*Industry pay gap* 3_{t-1}			*Industry pay gap* 4_{t-1}		
Cut dummy	CUT 2 x Median Change	CUT 2.5 x Median Change	CUT 3 x Median Change	CUT 2 x Median Change	CUT 2.5 x Median Change	CUT 3 x Median Change	CUT 2 x Median Change	CUT 2.5 x Median Change	CUT 3 x Median Change
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ln(Industry pay gap 2_{t-1}*)* x $\Delta C_t/MVE_{t-1}$ x *Cut dummy*$_t$	0.6687***	0.7745***	0.8340***						
	(0.0043)	(0.0007)	(0.0003)						
Ln(Industry pay gap 2_{t-1}*)* x *Cut dummy*$_t$	0.0454***	0.0498***	0.0630***						
	(0.0051)	(0.0048)	(0.0011)						
Ln(Industry pay gap 2_{t-1}*)* x $\Delta C_t/MVE_{t-1}$	-0.0380	-0.0501	-0.0498						
	(0.7703)	(0.6970)	(0.6961)						
Ln(Industry pay gap 2_{t-1}*)*	-0.0417***	-0.0413***	-0.0423***						
	(0.0000)	(0.0000)	(0.0000)						
Ln(Industry pay gap 3_{t-1}*)* x $\Delta C_t/MVE_{t-1}$ x *Cut dummy*$_t$				0.4340**	0.4034**	0.4459**			
				(0.0261)	(0.0448)	(0.0301)			
Ln(Industry pay gap 3_{t-1}*)* x *Cut dummy*$_t$				0.0268*	0.0288*	0.0396**			
				(0.0661)	(0.0624)	(0.0124)			
Ln(Industry pay gap 3_{t-1}*)* x				0.0100	0.0206	0.0161			

ΔC$_t$/MVE$_{t-1}$									
				(0.9249)	(0.8414)	(0.8751)			
Ln(Industry pay gap 3$_{t-1}$)				0.0013	0.0015	0.0006			
				(0.8191)	(0.7939)	(0.9136)			
Ln(Industry pay gap 4$_{t-1}$) x *ΔC$_t$/MVE$_{t-1}$* x *Cut dummy$_t$*							0.3859**	0.3950**	0.4027**
							(0.0416)	(0.0352)	(0.0456)
Ln(Industry pay gap 4$_{t-1}$) x *Cut dummy$_t$*							0.0269*	0.0287*	0.0387**
							(0.0723)	(0.0686)	(0.0179)
Ln(Industry pay gap 4$_{t-1}$) x *ΔC$_t$/MVE$_{t-1}$*							-0.0181	-0.0179	-0.0146
							(0.8820)	(0.8829)	(0.9042)
Ln(Industry pay gap 4$_{t-1}$)							-0.0073	-0.0073	-0.0082
							(0.3098)	(0.3077)	(0.2539)
Cut dummy$_t$ x *ΔC$_t$/MVE$_{t-1}$*	-6.3777***	-7.4472***	-8.0308***	-3.6266*	-3.3341*	-3.7484*	-3.1279*	-3.2121*	-3.3135*
	(0.0082)	(0.0015)	(0.0008)	(0.0556)	(0.0872)	(0.0608)	(0.0783)	(0.0666)	(0.0813)
Cut dummy$_t$	-0.4164***	-0.4619***	-0.5881***	-0.2150	-0.2323	-0.3309**	-0.2182	-0.2349	-0.3245**
	(0.0083)	(0.0079)	(0.0018)	(0.1108)	(0.1055)	(0.0233)	(0.1141)	(0.1092)	(0.0315)
ΔC$_t$/MVE$_{t-1}$	0.9305	1.0920	1.1131	0.5584	0.4931	0.5490	1.0412	1.0409	1.0245
	(0.5358)	(0.4649)	(0.4536)	(0.6520)	(0.6821)	(0.6455)	(0.3302)	(0.3234)	(0.3238)
Constant	0.4091***	0.4057***	0.4165***	-0.0310	-0.0318	-0.0260	0.0201	0.0205	0.0227
	(0.0001)	(0.0001)	(0.0001)	(0.6916)	(0.6842)	(0.7397)	(0.7734)	(0.7696)	(0.7457)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	4,066	4,066	4,066	3,914	3,914	3,914	3,983	3,983	3,983
R^2	0.233	0.234	0.236	0.230	0.230	0.231	0.227	0.227	0.228

Panel B. Firm and year fixed effects

ITI measure	*Industry pay gap 2$_{t-1}$*			*Industry pay gap 3$_{t-1}$*			*Industry pay gap 4$_{t-1}$*		
Cut dummy	CUT 2 x Median Change	CUT 2.5 x Median Change	CUT 3 x Median Change	CUT 2 x Median Change	CUT 2.5 x Median Change	CUT 3 x Median Change	CUT 2 x Median Change	CUT 2.5 x Median Change	CUT 3 x Median Change
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ln(Industry pay gap 2$_{t-1}$) x *ΔC$_t$/MVE$_{t-1}$* x *Cut dummy$_t$*	0.6093***	0.6823***	0.7555***						
	(0.0073)	(0.0025)	(0.0012)						
Ln(Industry pay gap 2$_{t-1}$) x *Cut dummy$_t$*	0.0483***	0.0539***	0.0685***						
	(0.0066)	(0.0055)	(0.0013)						
Ln(Industry pay gap 2$_{t-1}$) x	0.0199	0.0107	0.0051						

$\Delta C_t/MVE_{t-1}$									
	(0.8637)	(0.9262)	(0.9645)						
Ln(Industry pay gap 2_{t-1})	-0.0423***	-0.0414***	-0.0425***						
	(0.0001)	(0.0001)	(0.0000)						
Ln(Industry pay gap 3_{t-1}) x *$\Delta C_t/MVE_{t-1}$* x *Cut dummy$_t$*				0.3921**	0.3730*	0.4535**			
				(0.0447)	(0.0643)	(0.0296)			
Ln(Industry pay gap 3_{t-1}) x *Cut dummy$_t$*				0.0409**	0.0437**	0.0569***			
				(0.0180)	(0.0175)	(0.0031)			
Ln(Industry pay gap 3_{t-1}) x *$\Delta C_t/MVE_{t-1}$*				0.0146	0.0195	0.0066			
				(0.8750)	(0.8278)	(0.9409)			
Ln(Industry pay gap 3_{t-1})				-0.0163**	-0.0156*	-0.0164**			
				(0.0415)	(0.0523)	(0.0418)			
Ln(Industry pay gap 4_{t-1}) x *$\Delta C_t/MVE_{t-1}$ x Cut dummy$_t$*							0.3606*	0.3682**	0.4373**
							(0.0511)	(0.0486)	(0.0307)
Ln(Industry pay gap 4_{t-1}) x *Cut dummy$_t$*							0.0378**	0.0404**	0.0521***
							(0.0319)	(0.0301)	(0.0083)
Ln(Industry pay gap 4_{t-1}) x *$\Delta C_t/MVE_{t-1}$*							-0.0653	-0.0666	-0.0767
							(0.5730)	(0.5617)	(0.5025)
Ln(Industry pay gap 4_{t-1})							-0.0179**	-0.0178**	-0.0180**
							(0.0466)	(0.0473)	(0.0441)
Cut dummy$_t$ x *$\Delta C_t/MVE_{t-1}$*	-5.6241**	-6.3722***	-7.1525***	-3.1340*	-2.9645	-3.7727*	-2.7988	-2.8820*	-3.5917*
	(0.0149)	(0.0054)	(0.0027)	(0.0930)	(0.1222)	(0.0595)	(0.1038)	(0.0964)	(0.0604)
Cut dummy$_t$	-0.4280**	-0.4876**	-0.6319***	-0.3301**	-0.3568**	-0.4808***	-0.3033*	-0.3285*	-0.4375**
	(0.0132)	(0.0103)	(0.0025)	(0.0386)	(0.0365)	(0.0068)	(0.0620)	(0.0575)	(0.0166)
$\Delta C_t/MVE_{t-1}$	0.6930	0.8419	0.9435	0.9051	0.8988	1.0509	1.5884	1.6099	1.7054*
	(0.6031)	(0.5271)	(0.4748)	(0.4444)	(0.4325)	(0.3518)	(0.1283)	(0.1145)	(0.0872)
Constant	0.6995***	0.6920***	0.7008***	0.4251***	0.4186***	0.4225***	0.3635***	0.3628***	0.3613***
	(0.0000)	(0.0000)	(0.0000)	(0.0002)	(0.0002)	(0.0002)	(0.0000)	(0.0000)	(0.0000)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	4,066	4,066	4,066	3,914	3,914	3,914	3,983	3,983	3,983
R^2	0.310	0.311	0.312	0.311	0.311	0.312	0.306	0.306	0.307

Table 7. The marginal value of cash and industry tournament incentive (ITI): using difference-in-differences (non-competition agreement enforceability) specifications

This table presents results of OLS difference-in-difference estimation of ITI on the marginal value of cash following the change in non-competition agreement enforceability using ExecuComp firms from 1994 – 2009. The dependent variable is the annual excess stock return of the firm relative to the Fama and French (1993) 25 size and book-to-market portfolios. *Ln(Industry pay gap 1)*$_{t-1}$ is the natural logarithm of *Industry pay gap 1*$_{t-1}$, where *Industry pay gap 1*$_{t-1}$ is the difference between the second highest CEO total compensation in the industry and the CEO's total compensation. *Ln(Industry pay gap 2*$_{t-1}$*)* is the natural logarithm of *Industry pay gap 2*$_{t-1}$, where *Industry pay gap 2*$_{t-1}$ is the difference between the highest CEO total compensation in the industry and the CEO's total compensation. *Ln(Industry pay gap 3*$_{t-1}$*)* the natural logarithm of *Industry pay gap 3*$_{t-1}$, where *Industry pay gap 3*$_{t-1}$ is the difference between the highest CEO total compensation in the industry and size group and the CEO's total compensation. *Ln(Industry pay gap 4*$_{t-1}$*)* the natural logarithm of *Industry pay gap 4*$_{t-1}$, where *Industry pay gap 4*$_{t-1}$ is the difference between the total compensation of the CEO 50 percentile points higher in the distribution and the CEO's total compensation and for a CEO above the median it is the difference between the maximal CEO compensation in the industry and the CEO's total compensation. Consistent with Garmaise (2011), *Increased enforceability*$_{t-1}$ takes the value of one for firms in Florida from 1997 on, takes the value of negative one for firms in Texas from 1995 on and for firms in Louisiana in 2002-2003, and is set equal to zero otherwise. *#in-state competitors* is the number of firms within the same industry and state. We also include as additional controls *State unemployment rate* and *State personal per capita income* in the year provided by the Bureau of Economic Analysis. All other incentive variables and control variables are defined in the Appendix. All continuous variables are winsorized at 1% and 99% and all dollar-value variables are expressed in 2003 dollars. p-values based on robust standard errors clustered by firm are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	#in-state competitors > 10				*#in-state competitors > 30*				*#in-state competitors > 100*			
	Industry pay gap1 (1)	*Industry pay gap2* (2)	*Industry pay gap3* (3)	*Industry pay gap4* (4)	*Industry pay gap1* (5)	*Industry pay gap2* (6)	*Industry pay gap3* (7)	*Industry pay gap4* (8)	*Industry pay gap1* (9)	*Industry pay gap2* (10)	*Industry pay gap3* (11)	*Industry pay gap4* (12)
Ln(Industry pay gap 1$_{t-1}$*)* x $\Delta C_t/MVE_{t-1}$ x *Increased enforceability*$_{t-1}$	-0.4549*				-0.5861*				-1.1823*			
	(0.0587)				(0.0548)				(0.0568)			
Ln(Industry pay gap 1$_{t-1}$*)* x *Increased enforceability*$_{t-1}$	0.0315**				0.0138				0.1507***			
	(0.0248)				(0.6231)				(0.0020)			
Ln(Industry pay gap 1$_{t-1}$*)* x $\Delta C_t/MVE_{t-1}$	0.0146				-0.0411				0.0056			
	(0.9071)				(0.8015)				(0.9878)			
Ln(Industry pay gap 1$_{t-1}$*)*	-0.0019				0.0042				0.0194			
	(0.8194)				(0.7319)				(0.4333)			
Ln(Industry pay gap 2$_{t-1}$*)* x $\Delta C_t/MVE_{t-1}$ x *Increased enforceability*$_{t-1}$		-0.2148				-0.6085*				-1.0436*		
		(0.3068)				(0.0896)				(0.0568)		
Ln(Industry pay gap 2$_{t-1}$*)* x *Increased enforceability*$_{t-1}$		0.0255*				0.0004				0.1348***		
		(0.0811)				(0.9878)				(0.0028)		
Ln(Industry pay gap 2$_{t-1}$*)* x $\Delta C_t/MVE_{t-1}$		0.0521				-0.0483				0.0724		
		(0.6028)				(0.7351)				(0.8081)		
Ln(Industry pay gap 2$_{t-1}$*)*		-0.0024				0.0011				0.0265		
		(0.7332)				(0.9197)				(0.2424)		

Ln(Industry pay gap 3$_{t-1}$) x *ΔC$_t$/MVE$_{t-1}$ x Increased enforceability$_{t-1}$*			-0.4577***				-0.7634***				-1.1312**	
			(0.0080)				(0.0082)				(0.0295)	
Ln(Industry pay gap 3$_{t-1}$) x *Increased enforceability$_{t-1}$*			0.0285**				0.0359				0.2231***	
			(0.0125)				(0.1065)				(0.0000)	
Ln(Industry pay gap 3$_{t-1}$) x *ΔC$_t$/MVE$_{t-1}$*			-0.0125				-0.0736				0.0170	
			(0.8885)				(0.5804)				(0.9493)	
Ln(Industry pay gap 3$_{t-1}$)			0.0114*				0.0307***				0.0366*	
			(0.0536)				(0.0023)				(0.0744)	
Ln(Industry pay gap 4$_{t-1}$) x *ΔC$_t$/MVE$_{t-1}$ x Increased enforceability$_{t-1}$*				-0.0483				0.1638				0.3160
				(0.7572)				(0.4243)				(0.4640)
Ln(Industry pay gap 4$_{t-1}$) x *Increased enforceability$_{t-1}$*				0.0222**				0.0170				0.1210***
				(0.0278)				(0.2579)				(0.0004)
Ln(Industry pay gap 4$_{t-1}$) x *ΔC$_t$/MVE$_{t-1}$*				0.0170				-0.0361				0.3245*
				(0.8412)				(0.7471)				(0.0982)
Ln(Industry pay gap 4$_{t-1}$)				0.0129**				0.0256**				0.0501**
				(0.0497)				(0.0118)				(0.0126)
Increased enforceability$_{t-1}$ x ΔC$_t$/MVEt$_{-1}$	4.4725*	2.1550	4.3971**	0.2557	5.7783*	6.3986	7.4487**	-1.9152	12.6467*	11.4984*	11.1724**	-2.6459
	(0.0791)	(0.3436)	(0.0122)	(0.8740)	(0.0780)	(0.1042)	(0.0127)	(0.3751)	(0.0549)	(0.0537)	(0.0367)	(0.5283)
Increased enforceability$_{t-1}$	-0.3501**	-0.3043*	-0.3161***	-0.2435**	-0.1543	-0.0137	-0.3778	-0.1819	-1.4454***	-1.3351***	-2.0316***	-1.0324***
	(0.0138)	(0.0526)	(0.0069)	(0.0144)	(0.6034)	(0.9617)	(0.1086)	(0.2340)	(0.0027)	(0.0039)	(0.0001)	(0.0011)
C$_{t-1}$/MVE$_{t-1}$	0.4316***	0.4343***	0.4330***	0.4287***	0.5945***	0.5887***	0.5875***	0.5913***	0.6141***	0.6047***	0.6344***	0.6178***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0005)	(0.0006)	(0.0004)	(0.0009)
State unemployment rate$_{t-1}$	-0.0054	-0.0064	-0.0059	-0.0052	-0.0028	-0.0031	-0.0009	-0.0003	0.0068	0.0080	0.0054	0.0097
	(0.1645)	(0.1051)	(0.1316)	(0.1833)	(0.6716)	(0.6415)	(0.8907)	(0.9596)	(0.6778)	(0.6279)	(0.7348)	(0.5362)
State personal income per capita$_{t-1}$	-0.0558	-0.0514	-0.0546	-0.0593	-0.1882**	-0.1719*	-0.1425	-0.1588*	-0.1857	-0.1390	-0.1076	-0.1755
	(0.2501)	(0.2926)	(0.2694)	(0.2264)	(0.0365)	(0.0559)	(0.1129)	(0.0759)	(0.4048)	(0.5281)	(0.6366)	(0.4289)
Constant	0.5498	0.5204	0.4271	0.4993	1.8267*	1.7042*	1.1337	1.4225	1.2660	0.7229	0.4834	1.1153
	(0.2818)	(0.3114)	(0.4170)	(0.3329)	(0.0676)	(0.0895)	(0.2589)	(0.1549)	(0.5902)	(0.7586)	(0.8456)	(0.6344)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	5,075	5,149	5,079	5,149	2,390	2,412	2,377	2,412	760	765	754	765
R^2	0.203	0.202	0.205	0.202	0.209	0.209	0.216	0.210	0.259	0.258	0.271	0.263

Table 8. Cash holdings and industry tournament incentives (*ITI*)

This table presents results on the relation between cash holdings and industry tournament incentives (*ITI*). The dependent variable is *Cash/Assets$_t$*. Model 1-2, 3-4, 5-6, and 7-8 use *Industry pay gap 1*, *Industry pay gap 2*, *Industry pay gap 3*, and *Industry pay gap 4*, respectively. *Ln(Industry pay gap 1)* is the natural logarithm of *Industry pay gap 1*, where *Industry pay gap 1* is the difference between the second highest CEO total compensation in the industry and the CEO's total compensation. *Ln(Industry pay gap 2)* is the natural logarithm of *Industry pay gap 2*, where *Industry pay gap 2* is the difference between the highest CEO total compensation in the industry and the CEO's total compensation. *Ln(Industry pay gap 3)* the natural logarithm of *Industry pay gap 3*, where *Industry pay gap 3* is the difference between the highest CEO total compensation in the industry and size group and the CEO's total compensation. *Ln(Industry pay gap 4)* the natural logarithm of *Industry pay gap 4*, where *Industry pay gap 4* is the difference between the total compensation of the CEO 50 percentile points higher in the distribution and the CEO's total compensation and for a CEO above the median it is the difference between the maximal CEO compensation in the industry and the CEO's total compensation. All other incentive variables are defined in the Appendix, and the other control variables are consistent with those used in Bates, Kahle, and Stulz (2009). All continuous variables are winsorized at 1% and 99% and all dollar-value variables are expressed in 2003 dollars. p-values based on robust standard errors clustered by firm are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Industry and year fixed effects

ITI measure	*Industry pay gap1 $_{t-1}$*		*Industry pay gap2 $_{t-1}$*		*Industry pay gap3 $_{t-1}$*		*Industry pay gap4 $_{t-1}$*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln(Industry pay gap 1$_{t-1}$)	0.0128**	0.0581***						
	(0.0429)	(0.0040)						
Ln(Industry pay gap 2$_{t-1}$)			0.0135***	0.0582***				
			(0.0054)	(0.0036)				
Ln(Industry pay gap 3$_{t-1}$)					0.0140***	0.0521***		
					(0.0003)	(0.0036)		
Ln(Industry pay gap 4$_{t-1}$)							0.0143***	0.0794***
							(0.0001)	(0.0038)
Ln(Firm pay gap$_{t-1}$)	0.0198***	0.0260***	0.0191***	0.0232***	0.0200***	0.0241***	0.0104**	-0.0240
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0112)	(0.1285)
CEO vega$_{t-1}$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.4809)	(0.5368)	(0.5292)	(0.5546)	(0.7339)	(0.9469)	(0.5389)	(0.6549)
CEO delta$_{t-1}$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.5113)	(0.8290)	(0.5715)	(0.8994)	(0.2640)	(0.4079)	(0.4419)	(0.2426)
Industry sigma$_t$	0.0272	0.0202	0.0310	0.0366	0.0277	0.0281	0.0312	0.0407*
	(0.1988)	(0.4064)	(0.1317)	(0.1302)	(0.1822)	(0.2421)	(0.1287)	(0.0931)
Market-to-book$_t$	0.0660***	0.0651***	0.0656***	0.0644***	0.0658***	0.0640***	0.0654***	0.0624***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Ln(Assets$_t$)	-0.0869***	-0.0855***	-0.0859***	-0.0850***	-0.0911***	-0.1018***	-0.0881***	-0.0969***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Cash flow/Assets$_t$	0.1284	0.0884	0.1238	0.0898	0.1228	0.0849	0.1181	0.0588
	(0.1246)	(0.3406)	(0.1368)	(0.3325)	(0.1452)	(0.3646)	(0.1547)	(0.5110)
NWC/Assets$_t$	-0.3654***	-0.3868***	-0.3653***	-0.3833***	-0.3586***	-0.3696***	-0.3633***	-0.3728***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
CAPX/Assets$_t$	-0.3547***	-0.4222***	-0.3516***	-0.4301***	-0.3227***	-0.3834***	-0.3517***	-0.4501***

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(0.0004)	(0.0004)	(0.0003)	(0.0003)	(0.0008)	(0.0010)	(0.0003)	(0.0002)
Book leverage$_t$	-0.0146	-0.0272	-0.0154	-0.0274	-0.0104	-0.0227	-0.0161	-0.0251
	(0.7269)	(0.5508)	(0.7089)	(0.5433)	(0.8033)	(0.6192)	(0.6979)	(0.5744)
R&D/Sales$_t$	1.1374***	1.1098***	1.1377***	1.1211***	1.1389***	1.1327***	1.1337***	1.0870***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Dividend dummy$_t$	0.0036	0.0119	0.0034	0.0118	0.0040	0.0100	0.0031	0.0128
	(0.7020)	(0.2707)	(0.7189)	(0.2731)	(0.6719)	(0.3447)	(0.7367)	(0.2519)
Acquisition/Assets$_t$	-0.3654***	-0.3530***	-0.3622***	-0.3550***	-0.3639***	-0.3354***	-0.3627***	-0.3707***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Constant	0.4095***	0.0042	0.3926***	-0.0222	0.4283***	0.1821	0.4706***	0.2545**
	(0.0000)	(0.9825)	(0.0000)	(0.9101)	(0.0000)	(0.1630)	(0.0000)	(0.0208)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	14,877	11,874	15,188	12,130	14,881	11,898	15,188	12,130
R^2	0.590	0.593	0.590	0.590	0.591	0.589	0.590	0.576
Anderson-Rubin Wald F-statistic for joint relevance		4.497***		4.532***		4.612***		4.532***
Hansen J-statistic		1.091		0.713		1.132		0.901
Difference in Sargan-Hansen statistics (test for endogeneity)		8.074***		6.991***		6.115***		5.942***
First-stage F-statistics:								
Ln(Industry pay gap$_{t-1}$)		1279***		1023***		464.2***		191.4***
Instruments used in IV (2SLS)	*Number of CEOs within each industry$_{t-1}$* *Ln(Average CEO compensation of geographically-close firms$_{t-2}$)*							

Panel B. Firm and year fixed effects

ITI measure	*Industry pay gap1 $_{t-1}$*		*Industry pay gap2 $_{t-1}$*		*Industry pay gap3 $_{t-1}$*		*Industry pay gap4 $_{t-1}$*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln(Industry pay gap 1$_{t-1}$)	0.0077**	0.1042***						
	(0.0269)	(0.0041)						
Ln(Industry pay gap 2$_{t-1}$)			0.0072***	0.0912***				
			(0.0094)	(0.0063)				
Ln(Industry pay gap 3$_{t-1}$)					0.0086***	0.0798***		
					(0.0005)	(0.0027)		
Ln(Industry pay gap 4$_{t-1}$)							0.0077***	0.1039***
							(0.0009)	(0.0068)
Ln(Firm pay gap$_{t-1}$)	0.0126***	0.0227***	0.0120***	0.0167***	0.0127***	0.0199***	0.0080***	-0.0359**
	(0.0001)	(0.0000)	(0.0001)	(0.0000)	(0.0000)	(0.0000)	(0.0057)	(0.0402)

CEO vega$_{t-1}$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.5108)	(0.4211)	(0.5394)	(0.3220)	(0.5084)	(0.5862)	(0.5529)	(0.4999)
CEO delta$_{t-1}$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000*
	(0.1128)	(0.2572)	(0.1821)	(0.3513)	(0.1382)	(0.2035)	(0.1551)	(0.0763)
Industry sigma$_t$	0.0140	0.0184	0.0154	0.0417**	0.0154	0.0337*	0.0153	0.0396**
	(0.3758)	(0.2733)	(0.3189)	(0.0284)	(0.3284)	(0.0568)	(0.3225)	(0.0370)
Market-to-book$_t$	0.0509***	0.0475***	0.0506***	0.0477***	0.0502***	0.0467***	0.0505***	0.0471***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Ln(Assets$_t$)	-0.1523***	-0.1608***	-0.1510***	-0.1598***	-0.1538***	-0.1806***	-0.1519***	-0.1722***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Cash flow/Assets$_t$	0.0729	0.0822	0.0697	0.0794	0.0623	0.0621	0.0680	0.0551
	(0.2530)	(0.2730)	(0.2735)	(0.2918)	(0.3320)	(0.4106)	(0.2847)	(0.4633)
NWC/Assets$_t$	-0.3473***	-0.4072***	-0.3471***	-0.3875***	-0.3413***	-0.3784***	-0.3468***	-0.3960***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
CAPX/Assets$_t$	0.0495	0.0160	0.0473	-0.0226	0.0669	0.0011	0.0451	-0.0798
	(0.5250)	(0.8622)	(0.5380)	(0.8136)	(0.3906)	(0.9911)	(0.5567)	(0.4685)
Book leverage$_t$	0.1727***	0.1699***	0.1714***	0.1688***	0.1729***	0.1661***	0.1719***	0.1796***
	(0.0001)	(0.0004)	(0.0001)	(0.0003)	(0.0001)	(0.0005)	(0.0001)	(0.0001)
R&D/Sales$_t$	0.4568***	0.5046***	0.4497***	0.4817***	0.4643***	0.5454***	0.4507***	0.4789***
	(0.0007)	(0.0008)	(0.0006)	(0.0018)	(0.0006)	(0.0003)	(0.0006)	(0.0013)
Dividend dummy$_t$	0.0488***	0.0524***	0.0478***	0.0492***	0.0469***	0.0450***	0.0473***	0.0426***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.0009)
Acquisition/Assets$_t$	-0.1909***	-0.1839***	-0.1910***	-0.1905***	-0.2008***	-0.1710***	-0.1923***	-0.2070***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Constant	0.8937***		0.8940***		0.9025***		0.9293***	
	(0.0000)		(0.0000)		(0.0000)		(0.0000)	
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	14,877	11,622	15,188	11,883	14,881	11,649	15,188	11,883
R^2	0.300	0.250	0.299	0.236	0.300	0.233	0.299	0.164
Anderson-Rubin Wald F-statistic for joint relevance		4.217***		3.838***		4.677***		3.838***
Hansen J-statistic		0.356		0.0553		0.144		0.0360
Difference in Sargan-Hansen statistics (test for endogeneity)		7.316***		6.950***		7.965***		6.892***
First-stage F-statistics:								
Ln(Industry pay gap$_{t-1}$)		110.5***		129.5***		134.0***		41.49***
Instruments used in IV (2SLS)	*Number of CEOs within each industry$_{t-1}$* *Ln(Average CEO compensation of geographically-close firms$_{t-2}$)*							

Table 9. Dissipation/Accumulation of excess cash and industry tournament incentives (*ITI*)

This table presents results on the dissipation/accumulation of excess cash motivated by Dittmar and Mahrt-Smith (2007). The sample includes all firms that have positive excess cash at date t. In Panel A, the dependent variable is the past change in excess cash relative to assets (ratio at t minus ratio at t-1), and in Panel B, the dependent variable is the future change in excess cash relative to assets (ratio at t+1 minus ratio at t). Model 1-2, 3-4, 5-6, and 7-8 of both panels use *Industry pay gap* 1_{t-1}, *Industry pay gap* 2_{t-1}, *Industry pay gap* 3_{t-1}, and *Industry pay gap* 4_{t-1}, respectively. *Ln(Industry pay gap* 1_{t-1}*)* is the natural logarithm of *Industry pay gap* 1_{t-1}, where *Industry pay gap* 1_{t-1} is the difference between the second highest CEO total compensation in the industry and the CEO's total compensation. *Ln(Industry pay gap* 2_{t-1}*)* is the natural logarithm of *Industry pay gap* 2_{t-1}, where *Industry pay gap* 2_{t-1} is the difference between the highest CEO total compensation in the industry and the CEO's total compensation. *Ln(Industry pay gap* 3_{t-1}*)* the natural logarithm of *Industry pay gap* 3_{t-1}, where *Industry pay gap* 3_{t-1} is the difference between the highest CEO total compensation in the industry and size group and the CEO's total compensation. *Ln(Industry pay gap* 4_{t-1}*)* the natural logarithm of *Industry pay gap* 4_{t-1}, where *Industry pay gap* 4_{t-1} is the difference between the total compensation of the CEO 50 percentile points higher in the distribution and the CEO's total compensation and for a CEO above the median it is the difference between the maximal CEO compensation in the industry and the CEO's total compensation. *Industry average change in excess cash*$_t$ is the past industry average change in excess cash divided by assets (ratio at t minus ratio at t-1). All other incentive variables are defined in the Appendix. *Excess cash* is the residual from Panel A Model 9 by regressing *Cash/Assets*$_t$ on the median industry standard deviation of the past 10 year cash flow over assets (*Industry sigma*$_t$), market-to-book ratio (*Market-to-book*$_t$), natural logarithm of firm real assets (*Ln(Assets)*$_t$), cash flow to assets (*Cash flow/Assets*$_t$), net working capital to assets (*NWC/Assets*$_t$), R&D to sales (*R&D/Sales*$_t$), capital expenditures to assets (*CAPX/Assets*$_t$), long-term debt plus short-term debt divided by assets (*Book leverage*$_t$), a dummy variable if the firm pays dividends (*Dividend dummy*$_t$), year dummies, and two-digit SIC industry dummies. All continuous variables are winsorized at 1% and 99% and all dollar-value variables are expressed in 2003 dollars. p-values based on robust standard errors clustered by firm are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Accumulation of excess cash

ITI measure	*Industry pay gap1*$_{t-1}$		*Industry pay gap2*$_{t-1}$		*Industry pay gap3*$_{t-1}$		*Industry pay gap4*$_{t-1}$		*Excess cash* estimation	
Estimation type	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		(9)
Ln(Industry pay gap 1_{t-1}*)*	0.0174***	0.0308***							*Industry sigma*$_t$	0.0219
	(0.0000)	(0.0000)								(0.2319)
Ln(Industry pay gap 2_{t-1}*)*			0.0142***	0.0319***					*Market-to-book*$_t$	0.0632***
			(0.0000)	(0.0000)						(0.0000)
Ln(Industry pay gap 3_{t-1}*)*					0.0025	0.0348***			*Ln(Assets*$_t$*)*	-0.0721***
					(0.2382)	(0.0000)				(0.0000)
Ln(Industry pay gap 4_{t-1}*)*							0.0058**	0.0425***	*Cash flow/Assets*$_t$	0.1227
							(0.0410)	(0.0000)		(0.1274)
Ln(Firm pay gap$_{t-1}$*)*	-0.0110***	-0.0098***	-0.0116***	-0.0103***	-0.0139***	-0.0161***	-0.0160***	-0.0365***	*NWC/Assets*$_t$	-0.3515***
	(0.0016)	(0.0047)	(0.0005)	(0.0018)	(0.0000)	(0.0000)	(0.0000)	(0.0000)		(0.0000)
CEO delta$_{t-1}$	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	0.0000	-0.0000	*R&D/Sales*$_t$	1.1936***
	(0.7472)	(0.8982)	(0.5932)	(0.8197)	(0.5321)	(0.8202)	(0.5202)	(0.8379)		(0.0000)
CEO vega$_{t-1}$	0.0000**	0.0000**	0.0000*	0.0000*	0.0000*	0.0000	0.0000*	0.0000**	*CAPX/Assets*$_t$	-0.2066**
	(0.0362)	(0.0408)	(0.0921)	(0.0916)	(0.0843)	(0.2508)	(0.0798)	(0.0302)		(0.0253)
Industry average change in	1.2016***	1.1893***	1.1807***	1.1509***	1.1948***	1.1123***	1.2032***	1.1508***	*Book*	-0.0187

excess cash$_t$									*leverage$_t$*	
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)		(0.6361)
									Dividend dummy$_t$	-0.0045
										(0.6341)
Constant	-0.0553	-0.1916***	-0.0279	-0.2167***	0.1085***	-0.1845***	0.0928***	-0.1006**	Constant	0.5409***
	(0.1675)	(0.0006)	(0.4945)	(0.0002)	(0.0008)	(0.0016)	(0.0037)	(0.0220)		(0.0000)
Number of Observations	4,896	4,794	5,060	4,949	4,965	4,855	5,060	4,949		16,469
R^2	0.054	0.050	0.053	0.044	0.047	0.014	0.048	0.010		0.582
Anderson-Rubin Wald F-statistic for joint relevance		18.50***		18.76***		18.84***		18.76***		
Hansen's J-statistic		0.00324		0.0240		0.935		0.632		
Difference in Sargan-Hansen statistics (test for endogeneity)		17.65***		23.99***		34.94***		35.58***		
First-stage F-statistics:										
Ln(Industry pay gap$_{t-1}$)		1084***		921.3***		302.7***		263.4***		
Instruments used in IV (2SLS)	*Number of CEOs within each industry$_t$*									
	Ln(Average CEO compensation of geographically-close firms$_{t-1}$)									

Panel B. Dissipation of excess cash

ITI measure	*Industry pay gap1$_t$*		*Industry pay gap2$_t$*		*Industry pay gap3$_t$*		*Industry pay gap4$_t$*	
Estimation type	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln(Industry pay gap 1$_t$)	-0.0144***	-0.0381***						
	(0.0000)	(0.0000)						
Ln(Industry pay gap 2$_t$)			-0.0120***	-0.0403***				
			(0.0000)	(0.0000)				
Ln(Industry pay gap 3$_t$)					-0.0001	-0.0476***		
					(0.9562)	(0.0000)		
Ln(Industry pay gap 4$_t$)							-0.0061**	-0.0545***
							(0.0242)	(0.0000)
Ln(Firm pay gap$_t$)	0.0048	0.0017	0.0058*	0.0031	0.0068**	0.0097***	0.0101***	0.0358***
	(0.1309)	(0.6001)	(0.0577)	(0.3168)	(0.0276)	(0.0050)	(0.0024)	(0.0000)
CEO delta$_t$	0.0045	0.0055	0.0060	0.0084**	0.0047	0.0105***	0.0057	0.0117***
	(0.2163)	(0.1350)	(0.1039)	(0.0279)	(0.2191)	(0.0098)	(0.1314)	(0.0036)
CEO vega$_t$	-0.0003	0.0016	-0.0029	-0.0041	-0.0025	0.0070	-0.0029	-0.0101
	(0.9766)	(0.8853)	(0.7691)	(0.7003)	(0.8084)	(0.5308)	(0.7648)	(0.3668)

Industry average change in excess cash$_{t+1}$	1.2963***	1.3062***	1.2750***	1.3017***	1.2475***	1.3429***	1.2734***	1.3066***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Constant	0.0627*	0.3125***	0.0399	0.3462***	-0.0874***	0.3431***	-0.0561**	0.2080***
	(0.0709)	(0.0000)	(0.2559)	(0.0000)	(0.0038)	(0.0000)	(0.0391)	(0.0000)
Number of Observations	5,715	5,569	5,897	5,744	5,788	5,639	5,897	5,744
R^2	0.041	0.030	0.040	0.022	0.035	-0.026	0.038	-0.017
Anderson-Rubin Wald F-statistic for joint relevance		26.86***		27.68***		27.93***		27.68***
Hansen's J-statistic		0.173		0.082		0.739		0.020
Difference in Sargan-Hansen statistics (test for endogeneity)		41.02***		40.95***		55.14***		53.97***
First-stage F-statistics:								
Ln(Industry pay gap$_t$)		996.20***		737.10***		250.90***		273.80***
Instruments used in IV (2SLS)	*Number of CEOs within each industry$_t$*							
	Ln(Average CEO compensation of geographically-close firms$_{t-1}$)							

Table 10. Impact of industry tournament incentives (*ITI*) on the uses of excess cash for investment and distribution purposes

This table presents results to examine how firms disgorge excess cash. The sample includes all firms that have positive excess cash at date t. The dependent variables are R&D expenditures (*R&D/Assets$_t$*), capital expenditures (*CAPX/Assets$_t$*), acquisitions (*Acquisitions/Assets$_t$*), focused acquisition expenditures (*Focused acquisitions/Assets$_t$*), and payout ((*Div+Rep*)/*Net income$_t$*). Focused acquisitions involve acquirer and target firms that operate in the same industry based on Fama-French 30-industry classification. *Ln(Industry pay gap1$_{t-1}$)* is the natural logarithm of *Industry pay gap1$_{t-1}$*, where *Industry pay gap1$_{t-1}$* is the difference between the second highest CEO total compensation in the industry and the CEO's total compensation. All other incentive variables are defined in Appendix. The control variables include natural logarithm of firm real assets (*Ln(Assets$_{t-1}$)*), cash flow to assets (*Cash flow/Assets$_{t-1}$*), the median industry standard deviation of the past 10-year cash flow over assets (*Industry sigma$_{t-1}$*), sales growth (*Sales growth$_{t-1}$*), and long-term debt plus short-term debt divided by assets (*Book leverage$_{t-1}$*). *Excess cash* is the residual from Table 8 Model 9 by regressing *Cash/Assets$_t$* on the median industry standard deviation of the past 10 year cash flow over assets (*Industry sigma$_t$*), market-to-book ratio (*Market-to-book$_t$*), natural logarithm of firm real assets (*Ln(Assets$_t$)*), cash flow to assets (*Cash flow/Assets$_t$*), net working capital to assets (*NWC/Assets$_t$*), R&D to assets (*R&D/Assets$_t$*), capital expenditures to assets (*CAPX/Assets$_t$*), long-term debt plus short-term debt divided by assets (*Book leverage$_t$*), a dummy variable if the firm pays dividends (*Dividend dummy$_t$*), year dummies, and two-digit SIC industry dummies. All continuous variables are winsorized at 1% and 99% and all dollar-value variables are expressed in 2003 dollars. p-values based on robust standard errors clustered by firm are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Investment Decisions								Payout Decisions	
	R&D/Assets$_t$		*CAPX/Assets$_t$*		*Acquisitions/Assets$_t$*		*Focused Acquisitions/Assets$_t$*		*(Div+Rep)/Net income$_t$*	
Estimation type	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Outcome variable$_{t-1}$	0.8626***	0.8600***	0.6431***	0.6416***	0.0478***	0.0470***	0.0353**	0.0349*	0.1055***	0.1050***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0012)	(0.0014)	(0.0491)	(0.0516)	(0.0000)	(0.0000)
Ln(Industry pay gap1$_{t-1}$)	0.0013**	0.0057***	-0.0002	0.0012	0.0050**	0.0108***	0.0053***	0.0106***	-0.0454**	-0.0711**
	(0.0304)	(0.0000)	(0.7181)	(0.2191)	(0.0293)	(0.0035)	(0.0068)	(0.0013)	(0.0297)	(0.0351)
Ln(Firm pay gap$_{t-1}$)	-0.0001	0.0004	0.0005	0.0006	0.0084***	0.0090***	0.0066***	0.0071***	0.0212	0.0185
	(0.8850)	(0.5173)	(0.3353)	(0.2050)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.1277)	(0.1947)
CEO delta$_{t-1}$	-0.0000	-0.0000	0.0000	0.0000	0.0000*	0.0000*	-0.0000	-0.0000	0.0000	0.0000
	(0.4091)	(0.3345)	(0.6371)	(0.6648)	(0.0739)	(0.0784)	(0.1577)	(0.1382)	(0.3184)	(0.3070)
CEO vega$_{t-1}$	0.0000***	0.0000***	0.0000	0.0000	0.0000	0.0000	0.0000**	0.0000**	0.0001	0.0001
	(0.0011)	(0.0008)	(0.3365)	(0.3150)	(0.9303)	(0.9134)	(0.0416)	(0.0377)	(0.4344)	(0.4372)
Ln(Assets$_{t-1}$)	-0.0021***	-0.0018***	-0.0023***	-0.0022***	-0.0098***	-0.0094***	-0.0060***	-0.0056***	-0.0003	-0.0022
	(0.0002)	(0.0008)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.9835)	(0.8585)
Cash flow/Assets$_{t-1}$	-0.0129	-0.0137	0.0150***	0.0150***	0.0329*	0.0330*	0.0328*	0.0331*	0.6879***	0.6883***
	(0.1944)	(0.1690)	(0.0084)	(0.0078)	(0.0985)	(0.0955)	(0.0745)	(0.0689)	(0.0000)	(0.0000)
Industry sigma$_{t-1}$	0.0077**	0.0074**	0.0028	0.0027	0.0162*	0.0158*	0.0267***	0.0260***	-0.0388	-0.0380
	(0.0130)	(0.0161)	(0.2137)	(0.2317)	(0.0545)	(0.0594)	(0.0027)	(0.0030)	(0.6474)	(0.6538)
Sales growth$_{t-1}$	-0.0097**	-0.0094**	0.0076***	0.0077***	0.0503***	0.0506***	0.0144	0.0148	-0.3542***	-0.3561***

	(0.0217)	(0.0243)	(0.0058)	(0.0049)	(0.0000)	(0.0000)	(0.1424)	(0.1300)	(0.0000)	(0.0000)
Book leverage$_{t-1}$	0.0036	0.0041	-0.0019	-0.0018	-0.0012	-0.0007	0.0120	0.0123	-0.2340***	-0.2369***
	(0.4607)	(0.4073)	(0.5447)	(0.5670)	(0.9070)	(0.9494)	(0.2497)	(0.2351)	(0.0025)	(0.0021)
Dividend dummy$_{t-1}$	-0.0034***	-0.0029***	-0.0013	-0.0011	-0.0122***	-0.0115***	-0.0128***	-0.0122***	0.3107***	0.3080***
	(0.0002)	(0.0010)	(0.1910)	(0.2509)	(0.0011)	(0.0022)	(0.0001)	(0.0003)	(0.0000)	(0.0000)
Constant	0.0076	-0.0351***	0.0460***	0.0325***	-0.0088	-0.0654*	-0.0154	-0.1092***	0.3479	0.5997*
	(0.2806)	(0.0006)	(0.0000)	(0.0011)	(0.7326)	(0.0824)	(0.5244)	(0.0035)	(0.1480)	(0.0989)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	8,638	8,638	8,490	8,490	8,638	8,638	6,255	6,255	7,917	7,917
R^2	0.871	0.870	0.632	0.632	0.063	0.062	0.044	0.043	0.066	0.066
Anderson-Rubin Wald F-statistic for joint relevance		13.42***		2.116		4.293***		5.891***		3.386**
Hansen's J-statistic		0.590		1.828		0.315		1.603		2.505
Difference in Sargan-Hansen statistics (test for endogeneity)		37.59***		4.678**		5.173***		5.676**		0.764
First-stage F-statistics:										
Ln(Industry pay gap1$_{t-1}$)		605.9***		607.5***		618.4***		392.1***		564.2***
Instruments used in IV (2SLS)	*Number of CEOs within each industry$_{t-1}$* *Ln(Sum of CEO compensation within each industry$_{t-1}$)*									

Table 11. The impact of cash holdings on market share growth conditional on industry tournament incentives (*ITI*): using primary *ITI* measures.

This table presents results of instrumental variables (IV) estimation examining the effect of relative-to-rivals cash holdings on market share growth conditional on industry tournament incentives motivated by Fresard (2010). The dependent variable is a firm's market share growth at time t [(Market $share_t$ - Market $share_{t-1}$)/Market $share_{t-1}$] in Models 1 – 4, and a firm's industry-adjusted sales growth at time t [($Sales_t$ - $Sales_{t-1}$)/$Sales_{t-1}$] in Models 5 – 8. *Ln(Industry pay gap 1_{t-1})* is the natural logarithm of *Industry pay gap 1_{t-1}*, where *Industry pay gap 1_{t-1}* is the difference between the second highest CEO total compensation in the industry and the CEO's total compensation. *$Cash_{t-1}$* is *Industry-adjusted $cash_{t-1}$* in Models 1 – 2 and 5 – 6, and *$ZCash_{t-1}$* in Models 3 – 4 and 7 – 8. *Industry-adjusted $cash_{t-1}$* is computed by subtracting from the *Cash/Assets* ratio its industry-year mean. *$ZCash_{t-1}$* is computed by subtracting from the *Cash/Assets* ratio its industry-year mean and dividing the difference by the industry-year standard deviation. All other incentive variables are defined in Appendix. *Ln($Assets_{t-1}$)* is the natural logarithm of firm real assets. *Book $leverage_{t-1}$* is long-term debt plus short-term debt divided by assets. *$Tangibility_{t-1}$* is computed as 0.715*Receivables plus 0.547*Inventories plus 0.535*Fixed capital (see Berger, Ofek, and Swary, 1996). Consistent with Fresard (2010), all models include firm fixed effects and year fixed effects. All continuous variables are winsorized at 1% and 99% and all dollar-value variables are expressed in 2003 dollars. p-values based on robust standard errors clustered by firm are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Market share growth measure	*Market share $growth_t$*				*Industry-adjusted sales $growth_t$*			
Cash measure	*Industry-adjusted $cash_{t-1}$*		*$ZCash_{t-1}$*		*Industry-adjusted $cash_{t-1}$*		*$ZCash_{t-1}$*	
Estimation type	Fresard's (2010) Model	2SLS	Fresard's (2010) Model	2SLS	Fresard's (2010) Model	2SLS	Fresard's (2010) Model	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln(Industry pay gap 1 $_{t-1}$) x $Cash_{t-1}$		0.7981***		0.1583***		0.3583**		0.0791***
		(0.0032)		(0.0006)		(0.0285)		(0.0046)
Ln(Industry pay gap 1 $_{t-1}$)		0.0458**		0.0471**		0.0185		0.0220*
		(0.0487)		(0.0280)		(0.1790)		(0.0876)
Ln(Firm pay gap $_{t-1}$)		-0.0015		-0.0010		-0.0009		-0.0007
		(0.6917)		(0.7923)		(0.6838)		(0.7513)
CEO $delta_{t-1}$		0.0157**		0.0147**		0.0112***		0.0107***
		(0.0144)		(0.0210)		(0.0016)		(0.0028)
CEO $vega_{t-1}$		0.0789***		0.0803***		0.0529***		0.0535***
		(0.0002)		(0.0002)		(0.0000)		(0.0000)
$Cash_{t-1}$	0.5573***	-7.4743***	0.1078***	-1.4662***	0.3987***	-3.2276*	0.0776***	-0.7127**
	(0.0001)	(0.0069)	(0.0001)	(0.0014)	(0.0000)	(0.0545)	(0.0000)	(0.0113)
Ln($Assets_{t-1}$)	-0.0648***	-0.0878***	-0.0643***	-0.0870***	-0.0640***	-0.0779***	-0.0635***	-0.0778***

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Book leverage$_{t-1}$	0.2407***	0.2511***	0.2523***	0.2578***	0.1437***	0.1574***	0.1519***	0.1622***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Book leverage$_{t-2}$	-0.1829***	-0.1706***	-0.1883***	-0.1794***	-0.1334***	-0.1355***	-0.1373***	-0.1411***
	(0.0000)	(0.0004)	(0.0000)	(0.0001)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Market share growth$_{t-1}$	-0.0659***	-0.0767***	-0.0655***	-0.0755***				
	(0.0000)	(0.0000)	(0.0000)	(0.0000)				
Market share growth$_{t-2}$	-0.0585***	-0.0661***	-0.0582***	-0.0674***				
	(0.0000)	(0.0000)	(0.0000)	(0.0000)				
Industry-adjusted sales growth$_{t-1}$					0.0809***	0.0694***	0.0811***	0.0699***
					(0.0000)	(0.0000)	(0.0000)	(0.0000)
Industry-adjusted sales growth$_{t-2}$					-0.0579***	-0.0661***	-0.0592***	-0.0670***
					(0.0000)	(0.0000)	(0.0000)	(0.0000)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	16,996	16,175	16,996	16,175	17,087	16,266	17,087	16,262
Anderson-Rubin Wald F-statistic for joint relevance		10.22***		10.22***		10.96***		10.96***
Hansen J-statistic		0.786		2.326		0.0565		0.530
Difference in Sargan-Hansen statistics (test for endogeneity)		40.18***		36.12***		44.40***		40.74***
First-stage F-statistics:								
Ln(Industry pay gap 1 $_{t-1}$) x *Cash$_{t-1}$*		92.08***		141.47***		131.66***		149.40***
Ln(Industry pay gap 1 $_{t-1}$)		17.72***		17.72***		18.31***		18.31***
Cash$_{t-1}$		117.57***		135.07***		127.81***		144.86***

Instruments used in IV (2SLS):

Number of CEOs within each industry$_{t-1}$ x *Tangibility$_{t-1}$*

Ln(Sum of CEO compensation within each industry$_{t-1}$) x *Tangibility$_{t-1}$*

Number of CEOs within each industry$_{t-1}$

Tangibility$_{t-1}$

Table 12. The impact of cash holdings on market share growth conditional on industry tournament incentives (*ITI*): Using alternative *ITI* measures

This table presents results of instrumental variables (IV) estimation examining the effect of relative-to-rivals cash holdings on market share growth conditional on industry tournament incentives motivated by Fresard (2010) using alternative *ITI* measures. The dependent variable is a firm's market share growth at time t [(Market $share_t$ - Market $share_{t-1}$)/Market $share_{t-1}$] in Panel A, and a firm's industry-adjusted sales growth at time t [($Sales_t$ - $Sales_{t-1}$)/$Sales_{t-1}$] in Panel B. $Cash_{t-1}$ is *Industry-adjusted* $cash_{t-1}$ in Models 1 – 3, and $ZCash_{t-1}$ in Models 4 – 6. *Industry-adjusted* $cash_{t-1}$ is computed by subtracting from the Cash/Assets ratio its industry-year mean. $ZCash_{t-1}$ is computed by subtracting from the Cash/Assets ratio its industry-year mean and dividing the difference by the industry-year standard deviation. *Ln(Industry pay gap* 2_{t-1}*)* is the natural logarithm of *Industry pay gap* 2_{t-1}, where *Industry pay gap* 2_{t-1} is the difference between the highest CEO total compensation in the industry and the CEO's total compensation. *Ln(Industry pay gap* 3_{t-1}*)* the natural logarithm of *Industry pay gap* 3_{t-1}, where *Industry pay gap* 3_{t-1} is the difference between the highest CEO total compensation in the industry and size group and the CEO's total compensation. *Ln(Industry pay gap* 4_{t-1}*)* the natural logarithm of *Industry pay gap* 4_{t-1}, where *Industry pay gap* 4_{t-1} is the difference between the total compensation of the CEO 50 percentile points higher in the distribution and the CEO's total compensation and for a CEO above the median it is the difference between the maximal CEO compensation in the industry and the CEO's total compensation. All other incentive variables are defined in the Appendix. The control variables include *Ln(Firm pay* gap_{t-1}*)*, *CEO* $delta_{t-1}$, *CEO* $vega_{t-1}$, *Ln(*$Assets_{t-1}$*)*, *Book* $leverage_{t-1}$, and *Book* $leverage_{t-2}$. $Tangibility_{t-1}$ is computed as 0.715*Receivables plus 0.547*Inventories plus 0.535*Fixed capital (see Berger, Ofek, and Swary, 1996). Consistent with Fresard (2010), all models include firm fixed effects and year fixed effects. All continuous variables are winsorized at 1% and 99% and all dollar-value variables are expressed in 2003 dollars. p-values based on robust standard errors clustered by firm are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Dependent variable is *Market share* $growth_t$						
Cash measure	*Industry-adjusted* $cash_{t-1}$			$ZCash_{t-1}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Ln(Industry pay gap $_{t-1}$*)* x $Cash_{t-1}$	1.1415***			0.1910***		
	(0.0088)			(0.0009)		
Ln(Industry pay gap 2_{t-1}*)*	0.0726**			0.0571**		
	(0.0391)			(0.0217)		
Ln(Industry pay gap 3_{t-1}*)* x $Cash_{t-1}$		0.9031***			0.1896***	
		(0.0080)			(0.0014)	
Ln(Industry pay gap 3_{t-1}*)*		0.0497*			0.0474*	
		(0.0824)			(0.0617)	
Ln(Industry pay gap 4_{t-1}*)* x $Cash_{t-1}$			0.8287**			0.1900**
			(0.0256)			(0.0115)
Ln(Industry pay gap 4_{t-1}*)*			0.0410			0.0486
			(0.2432)			(0.1813)
$Cash_{t-1}$	-11.5858**	-8.0214**	-7.2251**	-1.8993***	-1.6811***	-1.6628**
	(0.0132)	(0.0143)	(0.0399)	(0.0018)	(0.0028)	(0.0176)
Market share $growth_{t-1}$	-0.0756***	-0.0783***	-0.0732***	-0.0746***	-0.0803***	-0.0740***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Market share $growth_{t-2}$	-0.0697***	-0.0546***	-0.0711***	-0.0697***	-0.0560***	-0.0704***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	16,539	16,192	16,539	16,539	16,192	16,539
Anderson-Rubin Wald F-statistic for joint relevance	10.44***	10.20***	10.44***	10.44***	10.20***	10.44***
Hansen J-statistic	0.794	0.249	1.977	2.552	1.321	3.796*
Difference in Sargan-Hansen	38.19***	37.16***	37.70***	32.66***	32.45***	31.26***

statistics (test for endogeneity)

	(1)	(2)	(3)	(4)	(5)	(6)
<u>First-stage F-statistics:</u>						
Ln(Industry pay gap $_{t-1}$) x *Cash$_{t-1}$*	125.65***	121.52***	119.78***	143.65***	138.85***	139.87***
Ln(Industry pay gap $_{t-1}$)	20.60***	45.59***	12.80***	20.60***	45.59***	12.80***
Cash$_{t-1}$	120.40***	116.42***	120.40***	138.08***	133.46***	138.08***

<u>Instruments used in IV (2SLS):</u>
Number of CEOs within each industry$_{t-1}$ x *Tangibility$_{t-1}$*
Ln(Sum of CEO compensation within each industry $_{t-1}$) x *Tangibility$_{t-1}$*
Number of CEOs within each industry$_{t-1}$
Tangibility$_{t-1}$

Panel B. Dependent variable is *Industry-adjusted sales growth$_{t-1}$*

Cash measure	*Industry-adjusted cash$_{t-1}$*			*ZCash$_{t-1}$*		
	(1)	(2)	(3)	(4)	(5)	(6)
Ln(Industry pay gap 2$_{t-1}$) x *Cash$_{t-1}$*	0.4489*			0.0896***		
	(0.0505)			(0.0080)		
Ln(Industry pay gap 2$_{t-1}$)	0.0225			0.0217		
	(0.2084)			(0.1275)		
Ln(Industry pay gap 3$_{t-1}$) x *Cash$_{t-1}$*		0.3729**			0.0904***	
		(0.0474)			(0.0081)	
Ln(Industry pay gap 3$_{t-1}$)		0.0168			0.0196	
		(0.2741)			(0.1682)	
Ln(Industry pay gap 4$_{t-1}$) x *Cash$_{t-1}$*			0.3551*			0.0915**
			(0.0707)			(0.0201)
Ln(Industry pay gap 4$_{t-1}$)			0.0100			0.0163
			(0.5832)			(0.3940)
Cash$_{t-1}$	-4.3864*	-3.1629*	-2.9469	-0.8656**	-0.7798**	-0.7773**
	(0.0764)	(0.0820)	(0.1165)	(0.0157)	(0.0165)	(0.0357)
Industry-adjusted sales growth$_{t-1}$	0.0705***	0.0679***	0.0704***	0.0706***	0.0667***	0.0700***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0000)
Industry-adjusted sales growth$_{t-2}$	-0.0699***	-0.0593***	-0.0732***	-0.0693***	-0.0597***	-0.0736***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	16,627	16,274	16,627	16,627	16,274	16,627
Anderson-Rubin Wald F-statistic for joint relevance	11.61***	11.32***	11.61***	11.61***	11.32***	11.61***
Hansen J-statistic	0.0114	0.00183	0.200	0.394	0.210	0.909
Difference in Sargan-Hansen statistics (test for endogeneity)	45.57***	43.80***	46.37***	42.15***	40.11***	41.84***
<u>First-stage F-statistics:</u>						
Ln(Industry pay gap$_{t-1}$) x *Cash$_{t-1}$*	135.57***	130.90***	129.19***	153.16***	147.82***	149.50***
Ln(Industry pay gap$_{t-1}$)	21.40***	48.66***	13.68***	21.40***	48.66***	13.68***
Cash$_{t-1}$	131.59***	126.63***	131.59***	149.07***	143.43***	149.07***

<u>Instruments used in IV (2SLS):</u>
Number of CEOs within each industry$_{t-1}$ x *Tangibility$_{t-1}$*
Ln(Sum of CEO compensation within each industry$_{t-1}$) x *Tangibility$_{t-1}$*
Number of CEOs within each industry$_{t-1}$
Tangibility$_{t-1}$

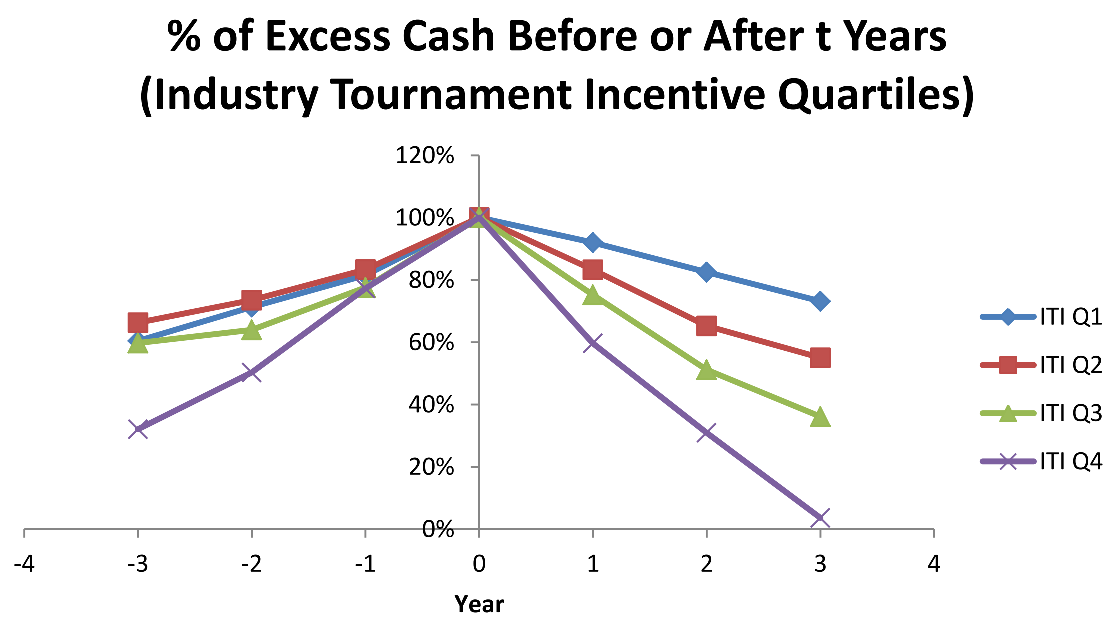

Fig. 1. Accumulation and dissipation of excess cash. This figure shows the change in excess cash for the median firm over time. All firms with positive excess cash based on Table 8 (Model 9) are included. The year with positive excess cash is considered year 0. The ratio plotted is the amount of excess cash in year t divided by the amount of excess cash in year 0. Industry tournament incentive (*ITI*) is measured as the difference between the second highest CEO total compensation in the industry and the CEO's total compensation (*Industry pay gap 1*). *ITI* Q4 is the top quartile, while Q1 is the bottom quartile.