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Industry Tournament Incentives and the Product Market Benefits of Corporate Liquidity

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INTERNET APPENDIX TABLE 1

Cash Holdings and Industry Tournament Incentives (ITI): Using Dummy ITI Measures

This table presents results of instrumental variables (IV) estimation of the relation between cash holdings and industry tournament incentives (ITI) using ExecuComp firms from 1992–2014. Financial firms and utilities are excluded. The dependent variable is $CASH/ASSETS_t$. $DUM_IND_PAY_GAP_1_{t-1}$ takes the value of 1 if its continuous value is above the median and 0 otherwise. $IND_PAY_GAP_1_{t-1}$ is the difference between the second highest CEO total compensation in the industry and the CEO's total compensation. All other 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.

Fixed effects	Industry fixed effects		CEO-firm fixed effects	
	<i>Dummy ITI</i>	<i>Dummy ITI</i>	<i>Dummy ITI</i>	<i>Dummy ITI</i>
	based on FF30 (1)	based on SIC3 (2)	based on FF30 (3)	based on SIC3 (4)
ITI measures				
$DUM_IND_PAY_GAP_1_{t-1}$	0.1116*** (0.0026)	0.0584*** (0.0000)	0.0661*** (0.0056)	0.0664** (0.0353)
$LN(FIRM_PAY_GAP_{t-1})$	0.0241*** (0.0000)	0.0062*** (0.0008)	0.0170*** (0.0000)	0.0201*** (0.0000)
CEO_VEGA_{t-1}	-0.0000 (0.9392)	0.0000 (0.2324)	0.0000 (0.2431)	0.0000 (0.1907)
CEO_DELTA_{t-1}	0.0001*** (0.0000)	0.0000 (0.3354)	0.0001*** (0.0004)	0.0001*** (0.0002)
IND_SIGMA_t	0.0227 (0.1742)	0.1417** (0.0345)	-0.0340** (0.0286)	-0.0272 (0.1801)
$MARKET_TO_BOOK_t$	0.0708*** (0.0000)	0.0256*** (0.0000)	0.0591*** (0.0000)	0.0604*** (0.0000)
$LN(ASSETS_t)$	-0.0916*** (0.0000)	-0.0255*** (0.0000)	-0.1936*** (0.0000)	-0.2187*** (0.0000)
$CASH_FLOW/ASSETS_t$	0.0166 (0.8170)	-0.0264 (0.3600)	0.0922 (0.1065)	0.0913 (0.1465)
$NWC/ASSETS_t$	-0.3631*** (0.0000)	-0.3014*** (0.0000)	-0.3601*** (0.0000)	-0.3431*** (0.0000)
$CAPX/ASSETS_t$	-0.3551*** (0.0001)	-0.4672*** (0.0000)	-0.0506 (0.5217)	-0.0514 (0.5747)
$LEVERAGE_t$	0.0029 (0.9352)	-0.2018*** (0.0000)	0.2652*** (0.0000)	0.3091*** (0.0000)
$RD/SALES_t$	1.1728*** (0.0000)	0.3958*** (0.0000)	0.4113*** (0.0086)	0.4435*** (0.0051)
DIV_DUMMY_t	0.0167* (0.0909)	-0.0144*** (0.0014)	0.0453*** (0.0001)	0.0522*** (0.0003)
$ACQ/ASSETS_t$	-0.2954*** (0.0000)	-0.2638*** (0.0000)	-0.1062*** (0.0000)	-0.1225*** (0.0000)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	No	No
CEO-Firm Fixed Effects	No	No	Yes	Yes
Number of Observations	21,301	15,998	20,478	15,080
R ²	0.584	0.579	0.313	0.335
Anderson-Rubin Wald F -statistic for joint relevance	9.037***	33.62***	7.819***	4.416***
Difference in Sargan-Hansen statistics (test for endogeneity)	9.155***	29.52***	8.467***	5.663***
First-stage F -statistics:				
$LN(IND_PAY_GAP_{t-1})$	2177***	4287***	848.8***	514.6***
Instruments used in IV (2SLS)	$LN(SUM_CEO_COMP_IND_{t-1})$			

INTERNET APPENDIX TABLE 2

The Probability of Observing Liquidity Covenants in Bank Loans and Industry Tournament Incentives (ITI)

This table presents results of OLS estimation of the relation between the probability of observing liquidity covenants in bank loans and industry tournament incentives (ITI). The dependent variable is LIQ_COV_DUM which takes the value of one with the presence of liquidity covenant in new bank loans, and zero otherwise. We collect bank loan data from the DealScan database of the Loan Pricing Corporation, which contains information on the commercial loan issuance market and focuses primarily on bank debt with longer maturities. We classify a bank loan as including liquidity covenant if the loan document specifies a minimum current ratio, minimum quick ratio, or a minimum interest, debt service, or fixed charge coverage ratio. $\text{LN}(\text{IND_PAY_GAP}_{1,t-1})$ is the natural logarithm of $\text{IND_PAY_GAP}_{1,t-1}$, where $\text{IND_PAY_GAP}_{1,t-1}$ is the difference between the second highest CEO total compensation in the industry and the CEO's total compensation. All other 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.

Fixed effects ITI measures	Industry fixed effects		CEO-firm fixed effects	
	ITI based on FF30 (1)	ITI based on SIC3 (2)	ITI based on FF30 (3)	ITI based on SIC3 (4)
$\text{LN}(\text{IND_PAY_GAP}_{1,t-1})$	0.0045 (0.6042)	-0.0005 (0.9400)	-0.0062 (0.5423)	-0.0098 (0.3425)
$\text{LN}(\text{FIRM_PAY_GAP}_{1,t-1})$	0.0032 (0.6375)	0.0017 (0.8355)	0.0065 (0.4990)	-0.0019 (0.8756)
$\text{CEO_VEGA/TDC1}_{t-1}$	0.2046 (0.2237)	0.0619 (0.7548)	0.5343*** (0.0035)	0.5579 (0.1058)
$\text{CEO_DELTA/TDC1}_{t-1}$	0.0002 (0.9710)	0.0008 (0.8625)	-0.0014 (0.8719)	0.0003 (0.9711)
$\text{LN}(\text{ASSETS}_t)$	-0.0957*** (0.0000)	-0.0965*** (0.0000)	-0.0276 (0.2081)	-0.0124 (0.6571)
MARKET_TO_BOOK_t	-0.0173** (0.0128)	-0.0166** (0.0292)	-0.0095 (0.4201)	-0.0065 (0.6431)
IND_SIGMA_t	-0.2707 (0.3829)	-0.3815 (0.3166)	-0.9855* (0.0539)	-1.1027* (0.0769)
LEVERAGE_t	0.1281*** (0.0028)	0.0640 (0.1920)	0.0646 (0.4177)	0.0600 (0.5319)
$\text{LN}(\text{MATURITY}_t)$	0.0927*** (0.0000)	0.0894*** (0.0000)	0.0662*** (0.0000)	0.0630*** (0.0000)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	No	No
CEO-Firm Fixed Effects	No	No	Yes	Yes
Number of Observations	7,545	5,256	7,545	5,256
R^2	0.183	0.182	0.064	0.058

INTERNET APPENDIX TABLE 3

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 models 1-2 of each panel, the dependent variable is the past change in excess cash relative to assets (ratio at t minus ratio at $t-1$), and in models 3-4 of each panel, the dependent variable is the future change in excess cash relative to assets (ratio at $t+1$ minus ratio at t). $\text{LN}(\text{IND_PAY_GAP}_{1,t-1})$ is the natural logarithm of $\text{IND_PAY_GAP}_{1,t-1}$, where $\text{IND_PAY_GAP}_{1,t-1}$ is the difference between the second highest CEO total compensation in the industry and the CEO's total compensation. $\text{IND_AVG_}\Delta\text{EXCESS_CASH}_t$ is the past industry average change in excess cash divided by assets (ratio at t minus ratio at $t-1$). EXCESS_CASH is the residual from model 5 of each panel by regressing CASH/ASSETS_t on the median industry standard deviation of the past 10 year cash flow over assets (IND_SIGMA_t), market-to-book ratio (MARKET_TO_BOOK_t), natural logarithm of firm real assets ($\text{LN}(\text{ASSETS}_t)$), cash flow-to-assets ($\text{CASH_FLOW/ASSETS}_t$), net working capital-to-assets (NWC/ASSETS_t), R&D-to-sales (RD/SALES_t), capital expenditures-to-assets (CAPX/ASSETS_t), long-term debt plus short-term debt divided by assets (LEVERAGE_t), a dummy variable if the firm pays dividends (DIV_DUMMY_t), year dummies, and industry dummies. All other 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.

Panel A. ITI based on FF30 industry classification

	Accumulation of excess cash			Dissipation of excess cash		Excess cash estimation	
Dependent variable	Past change in excess cash relative to assets (ratio at t minus ratio at t-1)			Future change in excess cash relative to assets (ratio at t+1 minus ratio at t)			CASH/ ASSETS _t
Estimation type	OLS	2SLS		OLS	2SLS		OLS
	(1)	(2)		(3)	(4)		(5)
LN(IND_PAY_GAP_1 _{t-1})	0.0165*** (0.0000)	0.0218*** (0.0000)	LN(IND_PAY_GAP_1 _t)	-0.0141*** (0.0000)	-0.0301*** (0.0000)	IND_SIGMA _t	0.0284* (0.0673)
LN(FIRM_PAY_GAP _{t-1})	-0.0066** (0.0201)	-0.0059** (0.0415)	LN(FIRM_PAY_GAP _t)	0.0062** (0.0257)	0.0037 (0.1809)	MARKET_TO_BOOK _t	0.0717*** (0.0000)
CEO_DELTA _{t-1}	0.0000 (0.2752)	0.0000 (0.3072)	CEO_DELTA _t	-0.0000 (0.9722)	0.0000 (0.8964)	LN(ASSETS _t)	-0.0742*** (0.0000)
CEO_VEGA _{t-1}	0.0000 (0.7643)	0.0000 (0.7073)	CEO_VEGA _t	0.0000** (0.0127)	0.0000** (0.0129)	CASH_FLOW/ASSETS _t	0.0372 (0.6097)
IND_AVG_ΔEXCESS_CASH _t	1.2390*** (0.0000)	1.2354*** (0.0000)	IND_AVG_ΔEXCESS_CASH _{t+1}	1.4591*** (0.0000)	1.4556*** (0.0000)	NWC/ASSETS _t	-0.3849*** (0.0000)
						RD/SALES _t	1.2758*** (0.0000)
						CAPX/ASSETS _t	-0.2782*** (0.0018)
						LEVERAGE _t	-0.0086 (0.8096)
						DIV_DUMMY _t	0.0093 (0.3245)
Observations	7,165	7,115		8,224	8,165		23,554
R-squared	0.047	0.046		0.048	0.043		0.578
Anderson-Rubin Wald F-statistic for joint relevance		14.55***			34.01***		
Hansen's J-statistic		3.109*			0.412		
Difference in Sargan-Hansen statistics (test for endogeneity)		2.522			38.09***		
<u>First-stage F-statistics:</u>							
LN(IND_PAY_GAP _{t-1})		593.2***	LN(IND_PAY_GAP _t)		1067***		
Instruments used in IV (2SLS)	LN(NO HIGHER PAID IND			LN(NO HIGHER PAID IND			

CEOS _{<i>t-1</i>}) LN(SUM_CEO_COMP_IND _{<i>t-1</i>})			CEOS _{<i>t</i>}) LN(AVG_CEO_COMP_CLOSE_FIRMS _{<i>t</i>})				
Panel B. ITI based on SIC3 industry classification							
Dependent variable	Accumulation of excess cash			Dissipation of excess cash		Excess cash estimation	
	Past change in excess cash relative to assets (ratio at t minus ratio at t-1)			Future change in excess cash relative to assets (ratio at t+1 minus ratio at t)		CASH/ASSETS _{<i>t</i>}	
Estimation type	OLS (1)	2SLS (2)		OLS (3)	2SLS (4)		OLS (5)
LN(IND_PAY_GAP_1 _{<i>t-1</i>})	0.0157*** (0.0000)	0.0251*** (0.0000)	LN(IND_PAY_GAP_1 _{<i>t</i>})	-0.0184*** (0.0000)	-0.0339*** (0.0000)	IND_SIGMA _{<i>t</i>}	0.0284* (0.0673)
LN(FIRM_PAY_GAP _{<i>t-1</i>})	1.4108*** (0.0000)	1.4018*** (0.0000)	LN(FIRM_PAY_GAP _{<i>t</i>})	1.6510*** (0.0000)	1.6735*** (0.0000)	MARKET_TO_BOOK _{<i>t</i>}	0.0717*** (0.0000)
CEO_DELTA _{<i>t-1</i>}	-0.0060 (0.1035)	-0.0060 (0.1030)	CEO_DELTA _{<i>t</i>}	0.0046 (0.1999)	0.0038 (0.2929)	LN(ASSETS _{<i>t</i>})	-0.0742*** (0.0000)
CEO_VEGA _{<i>t-1</i>}	0.0000 (0.2179)	0.0000 (0.2491)	CEO_VEGA _{<i>t</i>}	-0.0000 (0.7941)	-0.0000 (0.7353)	CASH_FLOW/ASSETS _{<i>t</i>}	0.0372 (0.6097)
IND_AVG_ΔEXCESS_CASH _{<i>t</i>}	-0.0000 (0.9701)	-0.0000 (0.8500)	IND_AVG_ΔEXCESS_CASH _{<i>t+1</i>}	0.0001*** (0.0041)	0.0001*** (0.0008)	NWC/ASSETS _{<i>t</i>}	-0.3849*** (0.0000)
						RD/SALES _{<i>t</i>}	1.2758*** (0.0000)
						CAPX/ASSETS _{<i>t</i>}	-0.2782*** (0.0018)
						LEVERAGE _{<i>t</i>}	-0.0086 (0.8096)
						DIV_DUMMY _{<i>t</i>}	0.0093 (0.3245)
Observations	5,026	4,993		5,845	5,805		23,554
R-squared	0.048	0.046		0.049	0.044		0.578
Anderson-Rubin Wald <i>F</i> -statistic for joint relevance		23.15***			33.18***		
Hansen's <i>J</i> -statistic		2.260			0.203		
Difference in Sargan-Hansen		12.68***			39.42***		
<u>First-stage <i>F</i>-statistics:</u>							
LN(IND_PAY_GAP _{<i>t-1</i>})		1004***	LN(IND_PAY_GAP _{<i>t</i>})		1405***		
<u>Instruments used in IV (2SLS)</u>		LN(NO_HIGHER_PAID_IND_CEOS _{<i>t-1</i>}) LN(AVG_CEO_COMP_CLOSE_FIRMS _{<i>t-1</i>})			LN(NO_OF_HIGHER_PAID_CEOS _{<i>t</i>}) LN(AVG_CEO_COMP_CLOSE_FIRMS _{<i>t</i>})		

INTERNET APPENDIX TABLE 4

The Marginal Value of Cash and Industry Tournament Incentives (ITI): Using Dummy ITI Measures

This table presents results of instrumental variables (IV) estimation of ITI on the marginal value of cash using ExecuComp firms from 1992–2014. Financial firms and utilities are excluded. The dependent variable, $R_{i,t} - R_{i,t}^B$ is the annual excess stock return of the firm relative to the Fama and French (1993) 25 size and book-to-market portfolios. DUM_IND_PAY_GAP_1_{*t-1*} takes the value of 1 if its continuous value is above the median and 0 otherwise. IND_PAY_GAP_1_{*t-1*} is the difference between the second highest CEO total compensation in the industry and the CEO's compensation. $\Delta C_t/MVE_{t-1}$ represents the change in firm cash holdings during fiscal year *t* scaled by the market value of equity at end of period *t-1*. All other variables are defined in Appendix. Models 1-2 contain year fixed effects and industry fixed effects, and models 3-4 contain year fixed effects and CEO-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		CEO-firm fixed effects	
	Dummy ITI based on	Dummy ITI based on	Dummy ITI based on	Dummy ITI based on
	FF30 industry	SIC3 industry	FF30 industry	SIC3 industry
ITI measures	(1)	(2)	(3)	(4)
DUMMY_IND_PAY_GAP_1 _{<i>t-1</i>} * $\Delta C_t/MVE_{t-1}$	0.2476** (0.0415)	0.2245* (0.0866)	0.3067** (0.0131)	0.3393** (0.0116)
DUMMY_IND_PAY_GAP_1 _{<i>t-1</i>}	-0.0659*** (0.0000)	-0.0379*** (0.0099)	-0.0858*** (0.0058)	-0.0482 (0.2805)
LN(FIRM_PAY_GAP_1 _{<i>t-1</i>}) * $\Delta C_t/MVE_{t-1}$	-0.0206 (0.6135)	-0.0010 (0.9834)	0.0067 (0.8707)	0.0210 (0.6641)
LN(FIRM_PAY_GAP_1 _{<i>t-1</i>})	0.0038 (0.2057)	0.0072** (0.0354)	-0.0335*** (0.0000)	-0.0334*** (0.0000)
CEO_DELTA _{<i>t-1</i>} * $\Delta C_t/MVE_{t-1}$	0.0001 (0.1604)	0.0000 (0.5629)	0.0001** (0.0234)	0.0001* (0.0834)
CEO_DELTA _{<i>t-1</i>}	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)
CEO_VEGA _{<i>t-1</i>} * $\Delta C_t/MVE_{t-1}$	-0.0004 (0.3273)	-0.0009** (0.0464)	-0.0006* (0.0729)	-0.0011** (0.0253)
CEO_VEGA _{<i>t-1</i>}	-0.0001*** (0.0021)	-0.0000** (0.0497)	-0.0001** (0.0230)	-0.0001** (0.0241)
$\Delta C_t/MVE_{t-1}$	1.5365*** (0.0000)	1.5588*** (0.0000)	1.4414*** (0.0000)	1.4214*** (0.0000)
$\Delta E_t/MVE_{t-1}$	0.5300*** (0.0000)	0.5151*** (0.0000)	0.4059*** (0.0000)	0.4060*** (0.0000)
$\Delta NA_t/MVE_{t-1}$	0.1819*** (0.0000)	0.1728*** (0.0000)	0.0942*** (0.0000)	0.0846*** (0.0001)
$\Delta RD_t/MVE_{t-1}$	0.6468* (0.0546)	0.5043 (0.1585)	0.2629 (0.4683)	0.3205 (0.4066)
$\Delta I_t/MVE_{t-1}$	-1.7731*** (0.0000)	-1.7364*** (0.0003)	0.0084 (0.9839)	-0.0585 (0.9099)
$\Delta D_t/MVE_{t-1}$	0.5658 (0.2379)	0.3716 (0.5151)	-1.2144** (0.0200)	-1.4453** (0.0251)
C_{t-1}/MVE_{t-1}	0.3602*** (0.0000)	0.3603*** (0.0000)	1.0682*** (0.0000)	1.0859*** (0.0000)
L_t	-0.4953*** (0.0000)	-0.5089*** (0.0000)	-1.3358*** (0.0000)	-1.3741*** (0.0000)
NF_t/MVE_{t-1}	-0.1203*** (0.0002)	-0.0876** (0.0194)	0.0191 (0.5953)	0.0436 (0.3147)
C_{t-1}/MVE_{t-1} * $\Delta C_t/MVE_{t-1}$	-0.5182*** (0.0008)	-0.6686*** (0.0002)	-0.7816*** (0.0000)	-0.8404*** (0.0000)
L_t * $\Delta C_t/MVE_{t-1}$	-1.0576*** (0.0000)	-1.1900*** (0.0000)	-0.9996*** (0.0000)	-1.0759*** (0.0000)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	No	No
CEO-Firm Fixed Effects	No	No	Yes	Yes
Number of Observations	18,126	13,553	17,230	12,588
R ²	0.243	0.246	0.325	0.328
Anderson-Rubin Wald <i>F</i> -statistic for joint relevance	6.863***	3.010**	4.258***	2.427*
Hansen's <i>J</i> -statistic	1.003	0.515	0.452	0.281
Difference in Sargan-Hansen stat. (test for endogeneity)	13.58***	3.629	7.600***	1.652
<u>First-stage <i>F</i>-statistics:</u>				
ITI _{<i>t-1</i>} * $\Delta C_t/MVE_{t-1}$	539.04***	679.07***	536.58***	548.52***
ITI _{<i>t-1</i>}	768.38***	1448.49***	301.46***	144.88***
<u>Instruments used in IV (2SLS)</u>				
	LN(SUM_CEO_COMP_IND _{<i>t-1</i>}) * $\Delta C_t/MVE_{t-1}$			
	LN(NO_HIGHER_PAID_IND_CEOS _{<i>t-1</i>}) * $\Delta C_t/MVE_{t-1}$			
	LN(SUM_CEO_COMP_IND _{<i>t-1</i>})			

INTERNET APPENDIX TABLE 5

Cash Holdings and Industry Tournament Incentives (ITI): Using Difference-in-Differences (Non-Competition Agreement Enforceability) Specifications Evaluated over Different Post-Enforcement Periods

This table presents results of OLS difference-in-difference estimation of ITI on cash holdings following the change in non-competition agreement enforceability using ExecuComp firms. The dependent variable is CASH/ASSETS_{*t*}. LN(IND_PAY_GAP_1_{*t-1*}) is the natural logarithm of IND_PAY_GAP_1_{*t-1*}, where IND_PAY_GAP_1_{*t-1*} is the difference between the second highest CEO total compensation in the industry and the CEO's total compensation. Based on Garmaise (2011), Jeffers (2017), and hand-collected data, POST (*I*) takes a value of +1 (-1) if the year is one year after the year of the most recent increase (decrease) in state-level enforceability of non-compete agreements, and is 0 otherwise. POST (2-3) [POST (4-5)] takes the value of +1 (-1) if the year is either two or three (four or five) years after the year of the most recent increase (decrease) in state-level enforceability of non-compete agreements, and is 0 otherwise. Finally, POST (*after 5*) takes the value of +1 (-1) if the year is more than five years after the year of the most recent increase (decrease) in state-level enforceability of non-compete agreements, and is zero otherwise. The variable #IN_STATE_COMP is the number of firms within the same industry and state. All other 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.

ITI measure	ITI based on FF30 industries			ITI based on SIC3 industries		
	#IN_STATE_COMP > 20	#IN_STATE_COMP > 40	#IN_STATE_COMP > 60	#IN_STATE_COMP > 20	#IN_STATE_COMP > 40	#IN_STATE_COMP > 60
Variable	(1)	(2)	(3)	(4)	(5)	(6)
LN(IND_PAY_GAP_1 _{<i>t-1</i>})*POST(<i>I</i>)	0.0068 (0.7897)	0.0170 (0.6586)	0.0423 (0.4881)	0.0185 (0.2673)	0.0151 (0.4681)	0.0144 (0.6802)
LN(IND_PAY_GAP_1 _{<i>t-1</i>})*POST(2-3)	-0.0711*** (0.0005)	-0.1174*** (0.0000)	-0.1374*** (0.0000)	-0.0422** (0.0412)	-0.0743*** (0.0049)	-0.1062*** (0.0002)
LN(IND_PAY_GAP_1 _{<i>t-1</i>})*POST(4-5)	-0.0470** (0.0342)	-0.1040*** (0.0002)	-0.1316*** (0.0000)	-0.0468** (0.0284)	-0.0830*** (0.0001)	-0.0817*** (0.0015)
LN(IND_PAY_GAP_1 _{<i>t-1</i>})*POST(<i>after 5</i>)	0.0165 (0.3498)	-0.0034 (0.8722)	-0.0049 (0.8424)	0.0208 (0.1853)	0.0244 (0.1950)	0.0266 (0.2178)
LN(IND_PAY_GAP_1 _{<i>t-1</i>})	0.0007 (0.9409)	0.0087 (0.4998)	0.0085 (0.5786)	0.0201*** (0.0093)	0.0255** (0.0154)	0.0290** (0.0229)
POST(<i>I</i>)	-0.0650 (0.7904)	-0.1431 (0.7007)	-0.3646 (0.5183)	-0.1464 (0.2809)	-0.1079 (0.5623)	-0.1088 (0.7264)
POST(2-3)	0.7302*** (0.0003)	1.2192*** (0.0000)	1.4008*** (0.0000)	0.4299** (0.0217)	0.7714*** (0.0018)	1.0659*** (0.0001)
POST(4-5)	0.5139** (0.0181)	1.1259*** (0.0000)	1.3869*** (0.0000)	0.4962*** (0.0079)	0.8785*** (0.0000)	0.8728*** (0.0002)
POST(<i>after 5</i>)	-0.2454 (0.1651)	-0.0783 (0.7170)	-0.0805 (0.7483)	-0.2769** (0.0479)	-0.3592** (0.0394)	-0.3839* (0.0554)
LN(FIRM_PAY_GAP _{<i>t-1</i>})	0.0254*** (0.0025)	0.0312*** (0.0028)	0.0302*** (0.0073)	0.0278*** (0.0024)	0.0310*** (0.0048)	0.0304*** (0.0094)
CEO_VEGA _{<i>t-1</i>}	-0.0000 (0.1235)	-0.0000** (0.0392)	-0.0000* (0.0592)	-0.0000** (0.0444)	-0.0000** (0.0395)	-0.0000** (0.0462)
CEO_DELTA _{<i>t-1</i>}	0.0003*** (0.0000)	0.0004*** (0.0000)	0.0004*** (0.0000)	0.0004*** (0.0000)	0.0005*** (0.0000)	0.0005*** (0.0000)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	6,410	4,027	3,270	5,505	3,674	3,053
R ²	0.638	0.642	0.642	0.639	0.643	0.642

INTERNET APPENDIX TABLE 6

Cash Holdings and Industry Tournament Incentives (ITI): Robustness Tests with Scaled ITI Measures and ITI Measure Based on FF48 Industry Classification

This table presents results of instrumental variables (IV) estimation of the relation between cash holdings and industry tournament incentives (ITI) using ExecuComp firms from 1992–2014. Financial firms and utilities are excluded. The dependent variable is CASH/ASSETS_{*t*}. The models represent the following robustness tests. In models 1, 2, 4, and 5, ITI_{*t-1*} is IND_PAY_GAP_1_{*t-1*} scaled by TDC1_{*t-1*}, where IND_PAY_GAP_1_{*t-1*} is the difference between the second highest CEO total compensation in the industry based on Fama French 30 or 3-digit SIC industry classification and the CEO's total compensation. In models 3 and 6, ITI_{*t-1*} is LN(IND_PAY_GAP_1_{*t-1*}), where IND_PAY_GAP_1_{*t-1*} is the difference between the second highest CEO total compensation in the industry based on Fama French 48 industry classification and the CEO's total compensation. All other 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.

Fixed effects ITI measure	Industry fixed effects			CEO-firm fixed effects		
	ITI based on FF30 scaled by TDC1	ITI based on SIC3 scaled by TDC1	ITI based on FF48	ITI based on FF30 scaled by TDC1	ITI based on SIC3 scaled by TDC1	ITI based on FF48
	(1)	(2)	(3)	(4)	(5)	(6)
ITI _{<i>t-1</i>}	0.0033*** (0.0024)	0.0042*** (0.0000)	0.0207*** (0.0000)	0.0012*** (0.0050)	0.0094*** (0.0040)	0.0157* (0.0682)
LN(FIRM_PAY_GAP _{<i>t-1</i>})	0.0586*** (0.0000)	0.0247*** (0.0000)	0.0053*** (0.0034)	0.0255*** (0.0000)	0.0561*** (0.0004)	0.0174*** (0.0000)
CEO_VEGA _{<i>t-1</i>}	-0.0000 (0.4460)	0.0000 (0.1310)	0.0000 (0.1432)	0.0000 (0.9341)	-0.0000 (0.7172)	0.0000 (0.1638)
CEO_DELTA _{<i>t-1</i>}	0.0001*** (0.0027)	-0.0000 (0.2906)	0.0000 (0.1477)	0.0001** (0.0299)	0.0001* (0.0687)	0.0001*** (0.0002)
IND_SIGMA _{<i>t</i>}	0.0199 (0.2385)	0.0630 (0.3085)	0.1796*** (0.0024)	-0.0391** (0.0198)	-0.0447** (0.0113)	-0.0334** (0.0360)
MARKET_TO_BOOK _{<i>t</i>}	0.0689*** (0.0000)	0.0232*** (0.0000)	0.0245*** (0.0000)	0.0561*** (0.0000)	0.0571*** (0.0000)	0.0594*** (0.0000)
LN(ASSETS _{<i>t</i>})	-0.0916*** (0.0000)	-0.0225*** (0.0000)	-0.0226*** (0.0000)	-0.1930*** (0.0000)	-0.1828*** (0.0000)	-0.1949*** (0.0000)
CASH_FLOW/ASSETS _{<i>t</i>}	0.0596 (0.4426)	0.0087 (0.7663)	-0.0213 (0.4349)	0.0980* (0.0839)	0.1024* (0.0741)	0.0889 (0.1204)
NWC/ASSETS _{<i>t</i>}	-0.3824*** (0.0000)	-0.2593*** (0.0000)	-0.2813*** (0.0000)	-0.3699*** (0.0000)	-0.3601*** (0.0000)	-0.3636*** (0.0000)
CAPX/ASSETS _{<i>t</i>}	-0.3953*** (0.0000)	-0.4357*** (0.0000)	-0.4481*** (0.0000)	-0.0610 (0.4299)	-0.0445 (0.5739)	-0.0637 (0.4226)
LEVERAGE _{<i>t</i>}	0.0128 (0.7233)	-0.1827*** (0.0000)	-0.1964*** (0.0000)	0.2715*** (0.0000)	0.2950*** (0.0000)	0.2650*** (0.0000)
RD/SALES _{<i>t</i>}	1.2257*** (0.0000)	0.4291*** (0.0000)	0.4405*** (0.0000)	0.4502*** (0.0035)	0.4470*** (0.0043)	0.4234*** (0.0072)
DIV_DUMMY _{<i>t</i>}	0.0148 (0.1255)	-0.0194*** (0.0000)	-0.0195*** (0.0000)	0.0458*** (0.0000)	0.0483*** (0.0001)	0.0447*** (0.0001)
ACQ/ASSETS _{<i>t</i>}	-0.3049*** (0.0000)	-0.2472*** (0.0000)	-0.2467*** (0.0000)	-0.1144*** (0.0000)	-0.1325*** (0.0000)	-0.1158*** (0.0000)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	No	No	No
CEO-Firm Fixed Effects	No	No	No	Yes	Yes	Yes
Number of Observations	21,304	22,153	20,829	21,355	21,355	20,006
R ²	0.565	0.502	0.569	0.313	0.203	0.325
Anderson-Rubin Wald <i>F</i> -statistic for joint relevance	9.424***	22.83***	20.39***	7.991***	9.853***	3.334*
Difference in Sargan-Hansen statistics (test for endogeneity)	8.632***	20.33***	9.692***	7.290***	9.806***	3.581*
First-stage <i>F</i> -statistics:						
LN(IND_PAY_GAP _{<i>t-1</i>})	306.4***	123.2***	2208***	338.4***	32.69***	2132***
Instruments used in IV (2SLS)	LN(SUM_CEO_COMP_IND _{<i>t-1</i>})					

INTERNET APPENDIX TABLE 7

The Marginal Value of Cash and Industry Tournament Incentives (ITI): Robustness Tests Based on Scaled ITI Measures and ITI Measure Based on FF48 Industry Classification

This table presents results of instrumental variables (IV) estimation of ITI on the marginal value of cash using ExecuComp firms from 1992–2014. Financial firms and utilities are excluded. The dependent variable, $R_{i,t} - R_{i,t}^B$ is the annual excess stock return of the firm relative to the Fama and French (1993) 25 size and book-to-market portfolios. The models represent the following robustness tests. In models 1, 2, 4, and 5, ITI_{t-1} is $IND_PAY_GAP_1_{t-1}$ scaled by $TDC1_{t-1}$, where $IND_PAY_GAP_1_{t-1}$ is the difference between the second highest CEO total compensation in the industry based on Fama French 30 or 3-digit SIC industry classification and the CEO's total compensation. In models 3 and 6, ITI_{t-1} is $LN(IND_PAY_GAP_1_{t-1})$, where $IND_PAY_GAP_1_{t-1}$ is the difference between the second highest CEO total compensation in the industry based on Fama French 48 industry classification and the CEO's total compensation. $\Delta C_t/MVE_{t-1}$ represents the change in firm cash holdings during fiscal year t scaled by the market value of equity at end of period $t-1$. All other 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.

Fixed effects	Industry fixed effects			CEO-firm fixed effects		
	ITI based on FF30 scaled by TDC1 (1)	ITI based on SIC3 scaled by TDC1 (2)	ITI based on FF48 (3)	ITI based on FF30 scaled by TDC1 (4)	ITI based on SIC3 scaled by TDC1 (5)	ITI based on FF48 (6)
$ITI_{t-1} * \Delta C_t/MVE_{t-1}$	0.0097** (0.0184)	0.0154*** (0.0027)	0.1257* (0.0747)	0.0110** (0.0121)	0.0205*** (0.0004)	0.1568** (0.0322)
ITI_{t-1}	-0.0021*** (0.0000)	0.0009 (0.4619)	-0.0233*** (0.0003)	-0.0015*** (0.0042)	0.0021 (0.7848)	-0.0209* (0.0532)
$LN(FIRM_PAY_GAP_{t-1}) * \Delta C_t/MVE_{t-1}$	0.0931 (0.1610)	0.0601 (0.2356)	-0.0174 (0.6809)	0.1275* (0.0585)	0.1110** (0.0299)	0.0071 (0.8656)
$LN(FIRM_PAY_GAP_{t-1})$	-0.0193*** (0.0021)	0.0119 (0.1106)	0.0030 (0.3439)	-0.0456*** (0.0000)	-0.0199 (0.5916)	-0.0332*** (0.0000)
$CEO_DELTA_{t-1} * \Delta C_t/MVE_{t-1}$	0.0001 (0.1700)	0.0001* (0.0949)	0.0001 (0.1872)	0.0001** (0.0253)	0.0001*** (0.0078)	0.0001** (0.0179)
CEO_DELTA_{t-1}	-0.0000*** (0.0006)	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)
$CEO_VEGA_{t-1} * \Delta C_t/MVE_{t-1}$	-0.0006* (0.0881)	-0.0005 (0.1015)	-0.0005 (0.1759)	-0.0007** (0.0273)	-0.0007** (0.0244)	-0.0007** (0.0485)
CEO_VEGA_{t-1}	-0.0000 (0.2033)	-0.0000** (0.0198)	-0.0001*** (0.0025)	-0.0000 (0.2438)	-0.0000 (0.1995)	-0.0001*** (0.0080)
$\Delta C_t/MVE_{t-1}$	0.6750 (0.2046)	0.9658** (0.0110)	0.4900 (0.5311)	0.5375 (0.3250)	0.6911* (0.0794)	0.1523 (0.8479)
$\Delta E_t/MVE_{t-1}$	0.5264*** (0.0000)	0.5249*** (0.0000)	0.5319*** (0.0000)	0.4071*** (0.0000)	0.4058*** (0.0000)	0.4096*** (0.0000)
$\Delta NA_t/MVE_{t-1}$	0.1748*** (0.0000)	0.1816*** (0.0000)	0.1785*** (0.0000)	0.0904*** (0.0000)	0.0916*** (0.0000)	0.0928*** (0.0000)
$\Delta RD_t/MVE_{t-1}$	0.3673 (0.2831)	0.5614* (0.0996)	0.5870* (0.0844)	0.0739 (0.8424)	0.2790 (0.4886)	0.2061 (0.5732)
$\Delta I_t/MVE_{t-1}$	-1.8385*** (0.0000)	-1.8705*** (0.0000)	-1.7697*** (0.0000)	0.0516 (0.8990)	-0.0238 (0.9537)	-0.0605 (0.8857)
$\Delta D_t/MVE_{t-1}$	0.5781 (0.2098)	0.4800 (0.2913)	0.5054 (0.2942)	-1.3028*** (0.0093)	-1.3720*** (0.0067)	-1.2621** (0.0162)
C_{t-1}/MVE_{t-1}	0.3658*** (0.0000)	0.3473*** (0.0000)	0.3525*** (0.0000)	1.0662*** (0.0000)	1.0593*** (0.0000)	1.0585*** (0.0000)
L_t	-0.4957*** (0.0000)	-0.4781*** (0.0000)	-0.4903*** (0.0000)	-1.3403*** (0.0000)	-1.3265*** (0.0000)	-1.3328*** (0.0000)
NF_t/MVE_{t-1}	-0.1068*** (0.0010)	-0.1260*** (0.0001)	-0.1153*** (0.0005)	0.0169 (0.6307)	0.0153 (0.6643)	0.0211 (0.5675)
$C_{t-1}/MVE_{t-1} * \Delta C_t/MVE_{t-1}$	-0.5402*** (0.0003)	-0.5754*** (0.0003)	-0.5426*** (0.0005)	-0.7640*** (0.0000)	-0.8035*** (0.0000)	-0.7827*** (0.0000)
$L_t * \Delta C_t/MVE_{t-1}$	-0.9973*** (0.0000)	-0.9713*** (0.0000)	-1.1159*** (0.0000)	-0.9499*** (0.0000)	-0.8997*** (0.0000)	-1.0947*** (0.0000)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	No	No	No
CEO-Firm Fixed Effects	No	No	No	Yes	Yes	Yes
Number of Observations	18,827	18,827	17,697	17,957	17,957	16,801
R ²	0.233	0.242	0.244	0.324	0.323	0.328
Anderson-Rubin Wald F -statistic for joint relevance	8.064***	3.681**	4.933***	4.271***	4.481***	2.568*
Hansen's J -statistic	0.235	0.187	0.928	0.0482	0.0929	0.480
Difference in Sargan-Hansen statistics (test for endogeneity)	21.87***	5.577*	5.933*	10.14***	4.546*	4.939*
First-stage F -statistics:						

$ITI_{t-1} * \Delta C_t / MVE_{t-1}$	60.15***	82.46***	153.55***	56.74***	81.42***	126.97***
ITI_{t-1}	105.57***	51.43***	686.97***	106.07***	10.34***	588.98***
<u>Instruments used in IV (2SLS)</u>	$LN(SUM_CEO_COMP_IND_{t-1}) * \Delta C_t / MVE_{t-1}$ $LN(NO_HIGHER_PAID_IND_CEOS_{t-1}) * \Delta C_t / MVE_{t-1}$ $LN(SUM_CEO_COMP_IND_{t-1})$					

INTERNET APPENDIX TABLE 8

Cash Holdings and Industry Tournament Incentives (ITI): Using Alternative ITI Measures

This table presents results of instrumental variables (IV) estimation of the relation between cash holdings and industry tournament incentives (ITI). The dependent variable is CASH/ASSETS_{*t*}. Models 1 and 4 use IND_PAY_GAP_2. Models 2 and 5 use IND_PAY_GAP_3. Models 3 and 6 use IND_PAY_GAP_4. LN(IND_PAY_GAP_2_{*t-1*}) is the natural logarithm of IND_PAY_GAP_2_{*t-1*}, where IND_PAY_GAP_2_{*t-1*} is the difference between the highest CEO total compensation in the industry and size group and the CEO's total compensation. LN(IND_PAY_GAP_3_{*t-1*}) the natural logarithm of IND_PAY_GAP_3_{*t-1*}, where IND_PAY_GAP_3_{*t-1*} is the difference between the highest CEO total compensation in the industry and the CEO's total compensation. LN(IND_PAY_GAP_4_{*t-1*}) the natural logarithm of IND_PAY_GAP_4_{*t-1*}, where IND_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 variables are defined in the Appendix. Panel A presents results with industry and year fixed effects, and Panel B presents results with CEO-firm 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. Industry and year fixed effects

ITI measure	ITI based on FF30 industry classification			ITI based on SIC3 industry classification		
	IND_PAY_ GAP_2 _{<i>t-1</i>} (1)	IND_PAY_ GAP_3 _{<i>t-1</i>} (2)	IND_PAY_ GAP_4 _{<i>t-1</i>} (3)	IND_PAY_ GAP_2 _{<i>t-1</i>} (4)	IND_PAY_ GAP_3 _{<i>t-1</i>} (5)	IND_PAY_ GAP_4 _{<i>t-1</i>} (6)
LN(IND_PAY_GAP_2 _{<i>t-1</i>})	0.0284*** (0.0000)			0.0234*** (0.0000)		
LN(IND_PAY_GAP_3 _{<i>t-1</i>})		0.0265*** (0.0000)			0.0163*** (0.0000)	
LN(IND_PAY_GAP_4 _{<i>t-1</i>})			0.0409*** (0.0000)			0.0264*** (0.0000)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
CEO-Firm Fixed Effects	No	No	No	No	No	No
Number of Observations	20,431	21,747	21,304	12,096	18,740	15,998
R ²	0.549	0.562	0.543	0.588	0.574	0.572
Anderson-Rubin Wald <i>F</i> -statistic for joint relevance	33.21***	29.20***	28.07***	35.40***	43.13***	33.62***
Difference in Sargan-Hansen statistics (test for endogeneity)	33.74***	22.62***	21.35***	34.66***	40.64***	31.10***
First-stage <i>F</i> -statistics:						
LN(IND_PAY_GAP _{<i>t-1</i>})	1085***	1695***	738.0***	1347***	7290***	1691***
Instruments used in IV (2SLS)	LN(SUM_CEO_COMP_IND _{<i>t-1</i>})					

Panel B. CEO-firm and year fixed effects

ITI measure	ITI based on FF30 industry classification			ITI based on SIC3 industry classification		
	IND_PAY_ GAP_2 _{t-1}	IND_PAY_ GAP_3 _{t-1}	IND_PAY_ GAP_4 _{t-1}	IND_PAY_ GAP_2 _{t-1}	IND_PAY_ GAP_3 _{t-1}	IND_PAY_GAP_4 _{t-1}
	(1)	(2)	(3)	(4)	(5)	(6)
LN(IND_PAY_GAP_2 _{t-1})	0.0294*** (0.0028)			0.0180* (0.0793)		
LN(IND_PAY_GAP_3 _{t-1})		0.0153*** (0.0043)			0.0091** (0.0141)	
LN(IND_PAY_GAP_4 _{t-1})			0.0338*** (0.0055)			0.0236** (0.0365)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	No	No	No	No	No	No
CEO-Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	19,582	20,933	20,478	11,234	17,854	15,080
R ²	0.324	0.320	0.317	0.346	0.329	0.339
Anderson-Rubin Wald <i>F</i> -statistic for joint relevance	9.020***	8.127***	7.819***	3.057	5.959	4.416
Difference in Sargan-Hansen statistics (test for endogeneity)	6.400***	8.671***	5.789***	1.833	11.63	4.458
<u>First-stage <i>F</i>-statistics:</u>						
LN(IND_PAY_GAP _{t-1})	941.9***	7604***	734.4***	546.0	3030	644.5
<u>Instruments used in IV (2SLS)</u>	LN(SUM CEO COMP IND _{t-1})					

INTERNET APPENDIX TABLE 9

The Marginal Value of Cash and Industry Tournament Incentives (ITI): Using Alternative ITI Measures

This table presents results of instrumental variables (IV) estimation of ITI on the marginal value of cash. The dependent variable, $R_{i,t} - R^B_{i,t}$ 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 $IND_PAY_GAP_2_{t-1}$. Models 2 and 5 use $IND_PAY_GAP_3_{t-1}$. Models 3 and 6 use $IND_PAY_GAP_4_{t-1}$. $LN(IND_PAY_GAP_2_{t-1})$ is the natural logarithm of $IND_PAY_GAP_2_{t-1}$, where $IND_PAY_GAP_2_{t-1}$ is the difference between the highest CEO total compensation in the industry and size group and the CEO's total compensation. $LN(IND_PAY_GAP_3_{t-1})$ the natural logarithm of $IND_PAY_GAP_3_{t-1}$, where $IND_PAY_GAP_3_{t-1}$ is the difference between the highest CEO total compensation in the industry and the CEO's total compensation. $LN(IND_PAY_GAP_4_{t-1})$ the natural logarithm of $IND_PAY_GAP_4_{t-1}$, where $IND_PAY_GAP_4_{t-1}$ 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. $\Delta C_t/MVE_{t-1}$ represents the change in firm cash holdings during fiscal year t scaled by the market value of equity at end of period $t-1$. All other variables are defined in the Appendix. Panel A presents results with industry and year fixed effects, and Panel B presents results with CEO-firm 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. Industry and year fixed effects

ITI measure	ITI based on FF30 industry classification			ITI based on SIC3 industry classification		
	$IND_PAY_GAP_2_{t-1}$ (1)	$IND_PAY_GAP_3_{t-1}$ (2)	$IND_PAY_GAP_4_{t-1}$ (3)	$IND_PAY_GAP_2_{t-1}$ (4)	$IND_PAY_GAP_3_{t-1}$ (5)	$IND_PAY_GAP_4_{t-1}$ (6)
$LN(IND_PAY_GAP_2_{t-1}) * \Delta C_t/MVE_{t-1}$	0.1297** (0.0420)			0.0456 (0.4630)		
$LN(IND_PAY_GAP_2_{t-1})$	-0.0303*** (0.0000)			-0.0201*** (0.0020)		
$LN(IND_PAY_GAP_3_{t-1}) * \Delta C_t/MVE_{t-1}$		0.1169** (0.0482)			0.0899** (0.0297)	
$LN(IND_PAY_GAP_3_{t-1})$		-0.0265*** (0.0000)			-0.0060 (0.1139)	
$LN(IND_PAY_GAP_4_{t-1}) * \Delta C_t/MVE_{t-1}$			0.1835* (0.0522)			0.1257* (0.0865)
$LN(IND_PAY_GAP_4_{t-1})$			-0.0419*** (0.0000)			-0.0176*** (0.0079)
$\Delta C_t/MVE_{t-1}$	0.7548 (0.2133)	0.4956 (0.4765)	0.7963 (0.1627)	1.4700** (0.0112)	0.7712 (0.1164)	0.9628* (0.0783)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
CEO-Firm Fixed Effects	No	No	No	No	No	No
Number of Observations	17,348	18,494	18,126	10,238	15,899	13,553
R ²	0.238	0.244	0.238	0.245	0.245	0.244
Anderson-Rubin Wald F -statistic for joint relevance	7.278***	6.826***	6.863***	3.239**	2.323*	3.010**
Hansen's J -statistic	0.707	0.953	0.933	0.0632	0.773	0.365
Difference in Sargan-Hansen statistics (test for endogeneity)	33.00***	10.79***	20.35***	18.15***	2.058	8.569**
<u>First-stage F-statistics:</u>						
$LN(IND_PAY_GAP_{t-1}) * \Delta C_t/MVE_{t-1}$	121.53***	244.88***	104.43***	95.03***	301.57***	145.66***
$LN(IND_PAY_GAP_{t-1})$	287.30***	563.6***	246.98***	366.54***	2618.57***	654.78***
<u>Instruments used in IV (2SLS)</u>						
	$LN(SUM_CEO_COMP_IND_{t-1}) * \Delta C_t/MVE_{t-1}$					
	$LN(NO_HIGHER_PAID_IND_CEOS_{t-1}) * \Delta C_t/MVE_{t-1}$					
	$LN(SUM_CEO_COMP_IND_{t-1})$					

Panel B. CEO-firm and year fixed effects

ITI measure	ITI based on FF30 industry classification			ITI based on SIC3 industry classification		
	$IND_PAY_GAP_2_{t-1}$ (1)	$IND_PAY_GAP_3_{t-1}$ (2)	$IND_PAY_GAP_4_{t-1}$ (3)	$IND_PAY_GAP_2_{t-1}$ (4)	$IND_PAY_GAP_3_{t-1}$ (5)	$IND_PAY_GAP_4_{t-1}$ (6)
$LN(IND_PAY_GAP_2_{t-1}) * \Delta C_t/MVE_{t-1}$	0.2057*** (0.0031)			0.1688** (0.0261)		

	(1)	(2)	(3)	(4)	(5)	(6)
LN(IND_PAY_GAP _{2<i>t-1</i>})	-0.0419*** (0.0010)			-0.0268* (0.0860)		
LN(IND_PAY_GAP _{3<i>t-1</i>})*ΔC _{<i>t-1</i>} /MVE _{<i>t-1</i>}		0.1366** (0.0276)			0.1075** (0.0129)	
LN(IND_PAY_GAP _{3<i>t-1</i>})		-0.0189*** (0.0074)			-0.0031 (0.6106)	
LN(IND_PAY_GAP _{4<i>t-1</i>})*ΔC _{<i>t</i>} /MVE _{<i>t-1</i>}			0.2224** (0.0223)			0.2003** (0.0142)
LN(IND_PAY_GAP _{4<i>t-1</i>})			-0.0448*** (0.0051)			-0.0186 (0.2442)
ΔC _{<i>t</i>} /MVE _{<i>t-1</i>}	0.1035 (0.8711)	0.2108 (0.7693)	0.5132 (0.3783)	0.6704 (0.3222)	0.6410 (0.2101)	0.4603 (0.4456)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	No	No	No	No	No	No
CEO-Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	16,414	17,603	17,230	9,339	14,935	12,588
R ²	0.322	0.327	0.324	0.322	0.329	0.327
<hr/>						
Anderson-Rubin Wald <i>F</i> -statistic for joint relevance	6.944***	3.867***	4.258***	2.675**	2.382*	2.427*
Hansen's <i>J</i> -statistic	0.772	0.657	0.482	0.0335	0.771	0.103
Difference in Sargan-Hansen statistics (test for endogeneity)	18.08***	12.65***	8.990***	10.27***	1.568	4.750*
<u>First-stage <i>F</i>-statistics:</u>						
LN(IND_PAY_GAP _{<i>t-1</i>})*ΔC _{<i>t</i>} /MVE _{<i>t-1</i>}	124.04***	221.00***	101.32***	76.82***	263.27***	118.40***
LN(IND_PAY_GAP _{<i>t-1</i>})	387.52***	2098.03***	244.38***	165.72***	937.63***	184.51***
<u>Instruments used in IV (2SLS)</u>						
	LN(SUM_CEO_COMP_IND _{<i>t-1</i>})*ΔC _{<i>t</i>} /MVE _{<i>t-1</i>}					
	LN(NO_HIGHER_PAID_IND_CEO _{<i>t-1</i>})*ΔC _{<i>t</i>} /MVE _{<i>t-1</i>}					
	LN(SUM_CEO_COMP_IND _{<i>t-1</i>})					

Cash Holdings and Industry Tournament Incentives (ITI): Using Difference-in-Differences (Tariff Cut) Specifications and Alternative ITI Measures

Panel A. ITI based on FF30 industries

[illegible]

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	9,968	9,968	9,968	10,713	10,713	10,713	10,469	10,469	10,469
R ²	0.609	0.609	0.609	0.606	0.606	0.606	0.608	0.607	0.608

Panel B. ITI based on SIC3 industries

ITI measure	IND PAY GAP 2 _{t-l}			IND PAY GAP 3 _{t-l}			IND PAY GAP 4 _{t-l}		
	CUT 2x	CUT 2.5x	CUT 3x	CUT 2x	CUT 2.5x	CUT 3x	CUT 2x	CUT 2.5x	CUT 3x
	Median	Median	Median	Median	Median	Median	Median	Median	Median
	Change	Change	Change	Change	Change	Change	Change	Change	Change
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
LN(IND_PAY_GAP_2 _{t-l}) * CUT_DUMMY _t	-0.0034 (0.6179)	-0.0029 (0.6715)	0.0003 (0.9645)						
LN(IND_PAY_GAP_2 _{t-l})	0.0290*** (0.0000)	0.0288*** (0.0000)	0.0279*** (0.0001)						
LN(IND_PAY_GAP_3 _{t-l}) * CUT_DUMMY _t				-0.0184*** (0.0034)	-0.0199*** (0.0021)	-0.0207*** (0.0018)			
LN(IND_PAY_GAP_3 _{t-l})				0.0225*** (0.0020)	0.0224*** (0.0022)	0.0223*** (0.0024)			
LN(IND_PAY_GAP_4 _{t-l}) * CUT_DUMMY _t							-0.0207*** (0.0066)	-0.0187** (0.0166)	-0.0182** (0.0251)
LN(IND_PAY_GAP_4 _{t-l})							0.0207** (0.0171)	0.0193** (0.0244)	0.0184** (0.0290)
CUT_DUMMY _t	0.0032 (0.9539)	-0.0049 (0.9317)	-0.0346 (0.5532)	0.1457** (0.0108)	0.1571*** (0.0072)	0.1607*** (0.0072)	0.1422** (0.0245)	0.1240* (0.0559)	0.1140* (0.0890)
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	6,583	6,583	6,583	9,471	9,471	9,471	8,281	8,281	8,281
R ²	0.623	0.623	0.623	0.608	0.608	0.608	0.612	0.612	0.612

INTERNET APPENDIX TABLE 11

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-difference estimation of ITI on the marginal value of cash following large reductions in import tariffs using ExecuComp firms from 1997–2014. The sample size is smaller in this table because information to compute tariff rates starts in 1997 and is only available for manufacturing industries. The dependent variable, $R_{i,t} - R_{i,t}^B$, 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 $IND_PAY_GAP_2_{t-1}$, $IND_PAY_GAP_3_{t-1}$, and $IND_PAY_GAP_4_{t-1}$, respectively. $LN(IND_PAY_GAP_2_{t-1})$ is the natural logarithm of $IND_PAY_GAP_2_{t-1}$, where $IND_PAY_GAP_2_{t-1}$ is the difference between the highest CEO total compensation in the industry and size group and the CEO's total compensation. $LN(IND_PAY_GAP_3_{t-1})$ the natural logarithm of $IND_PAY_GAP_3_{t-1}$, where $IND_PAY_GAP_3_{t-1}$ is the difference between the highest CEO total compensation in the industry and the CEO's total compensation. $LN(IND_PAY_GAP_4_{t-1})$ the natural logarithm of $IND_PAY_GAP_4_{t-1}$, where $IND_PAY_GAP_4_{t-1}$ 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. $\Delta C_t/MVE_{t-1}$ represents the change in firm cash holdings during fiscal year t scaled by the market value of equity at end of period t-1. 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 variables are defined in the Appendix. Panel A uses ITI based on FF30 industries, and Panel B uses ITI based on SIC3 industries. 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. ITI based on FF30 industries

ITI measure	IND PAY GAP 2 _{t-1}			IND PAY GAP 3 _{t-1}			IND PAY GAP 4 _{t-1}		
	CUT 2x Median Change (1)	CUT 2.5x Median Change (2)	CUT 3x Median Change (3)	CUT 2x Median Change (4)	CUT 2.5x Median Change (5)	CUT 3x Median Change (6)	CUT 2x Median Change (7)	CUT 2.5x Median Change (8)	CUT 3x Median Change (9)
$LN(IND_PAY_GAP_2_{t-1}) * \Delta C_t/MVE_{t-1} * CUT_DUMMY_t$	0.4871** (0.0480)	0.4443* (0.0750)	0.5121** (0.0427)						
$LN(IND_PAY_GAP_2_{t-1}) * CUT_DUMMY_t$	0.0186 (0.2364)	0.0178 (0.2695)	0.0264* (0.0986)						
$LN(IND_PAY_GAP_2_{t-1}) * \Delta C_t/MVE_{t-1}$	-0.1852 (0.2577)	-0.1701 (0.2936)	-0.1754 (0.2776)						
$LN(IND_PAY_GAP_2_{t-1})$	0.0093 (0.3113)	0.0100 (0.2742)	0.0073 (0.4232)						
$LN(IND_PAY_GAP_3_{t-1}) * \Delta C_t/MVE_{t-1} * CUT_DUMMY_t$				0.2970** (0.0298)	0.3553** (0.0185)	0.3530** (0.0197)			
$LN(IND_PAY_GAP_3_{t-1}) * CUT_DUMMY_t$				0.0749*** (0.0000)	0.0698*** (0.0000)	0.0651*** (0.0000)			
$LN(IND_PAY_GAP_3_{t-1}) * \Delta C_t/MVE_{t-1}$				-0.0620 (0.4658)	-0.0239 (0.7773)	-0.0148 (0.8594)			
$LN(IND_PAY_GAP_3_{t-1})$				-0.0351*** (0.0000)	-0.0291*** (0.0000)	-0.0262*** (0.0000)			
$LN(IND_PAY_GAP_4_{t-1}) * \Delta C_t/MVE_{t-1} * CUT_DUMMY_t$							0.2718	0.2795	0.2746

LN(IND_PAY_GAP_4 _{t-1})*CUT_DUMMY _t							(0.2761)	(0.2670)	(0.2891)
							0.0209	0.0196	0.0254
LN(IND_PAY_GAP_4 _{t-1})*ΔC _t /MVE _{t-1}							(0.2863)	(0.3303)	(0.2186)
							-0.0671	-0.0673	-0.0587
LN(IND_PAY_GAP_4 _{t-1})							(0.6898)	(0.6873)	(0.7252)
							-0.0148	-0.0140	-0.0152
CUT_DUMMY _t *ΔC _t /MVE _{t-1}	-3.9529*	-3.5519	-4.0992*	-2.7691**	-3.3162**	-3.2797**	(0.2047)	(0.2263)	(0.1864)
	(0.0810)	(0.1223)	(0.0772)	(0.0490)	(0.0310)	(0.0333)	-2.0401	-2.0571	-1.9680
CUT_DUMMY _t	-0.1328	-0.1312	-0.2010	-0.6987***	-0.6521***	-0.6108***	(0.3722)	(0.3733)	(0.4084)
	(0.3314)	(0.3520)	(0.1437)	(0.0000)	(0.0000)	(0.0000)	-0.1555	-0.1483	-0.1916
ΔC _t /MVE _{t-1}	2.9495*	2.8078*	2.8133*	2.8436***	2.4460**	2.3425**	(0.3712)	(0.4083)	(0.2929)
	(0.0879)	(0.0996)	(0.0988)	(0.0074)	(0.0198)	(0.0240)	2.1673	2.1476	2.0704
							(0.1467)	(0.1462)	(0.1578)
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	8,083	8,083	8,083	8,701	8,701	8,701	8,506	8,506	8,506
R ²	0.260	0.259	0.258	0.269	0.268	0.266	0.261	0.260	0.260

Panel B. ITI based on SIC3 industries

ITI measure	IND PAY GAP 2 _{t-1}			IND PAY GAP 3 _{t-1}			IND PAY GAP 4 _{t-1}		
	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)	CUT 2 x Median Change (7)	CUT 2.5 x Median Change (8)	CUT 3 x Median Change (9)
LN(IND_PAY_GAP_2 _{t-1})*ΔC _t /MVE _{t-1} * CUT_DUMMY _t	0.2487*	0.3514***	0.2736**						
	(0.0545)	(0.0060)	(0.0385)						
LN(IND_PAY_GAP_2 _{t-1})*CUT_DUMMY _t	0.0115	0.0053	0.0097						
	(0.2758)	(0.6147)	(0.3824)						
LN(IND_PAY_GAP_2 _{t-1})*ΔC _t /MVE _{t-1}	0.0076	-0.0027	0.0251						
	(0.9197)	(0.9712)	(0.7382)						
LN(IND_PAY_GAP_2 _{t-1})	-0.0021	-0.0000	-0.0013						
	(0.6974)	(0.9948)	(0.8139)						
LN(IND_PAY_GAP_3 _{t-1})*ΔC _t /MVE _{t-1} * CUT_DUMMY _t				0.0020	0.1330**	0.1603*			
				(0.9876)	(0.0166)	(0.0574)			
LN(IND_PAY_GAP_3 _{t-1})*CUT_DUMMY _t				0.0455***	0.0396***	0.0413***			
				(0.0000)	(0.0000)	(0.0000)			
LN(IND_PAY_GAP_3 _{t-1})*ΔC _t /MVE _{t-1}				0.0894	0.0654	0.0649			
				(0.1961)	(0.3556)	(0.3552)			
LN(IND_PAY_GAP_3 _{t-1})				-0.0210***	-0.0176***	-0.0173***			
				(0.0001)	(0.0007)	(0.0007)			

LN(IND_PAY_GAP_4 _{t-1})* ΔC_t /MVE _{t-1} *							0.1069	0.0360	0.0946
CUT_DUMMY _t							(0.5040)	(0.8230)	(0.5770)
LN(IND_PAY_GAP_4 _{t-1})*CUT_DUMMY _t							0.0346***	0.0287***	0.0342***
							(0.0014)	(0.0094)	(0.0029)
LN(IND_PAY_GAP_4 _{t-1})* ΔC_t /MVE _{t-1}							0.1084	0.0688	0.0578
							(0.1931)	(0.4221)	(0.4858)
LN(IND_PAY_GAP_4 _{t-1})							-0.0196***	-0.0165***	-0.0174***
							(0.0021)	(0.0079)	(0.0057)
CUT_DUMMY _t * ΔC_t /MVE _{t-1}	-1.8255*	-2.5057**	-1.8531*	0.3722	-0.8307	-1.0598	1.2346	0.0752	-0.3768
	(0.0762)	(0.0138)	(0.0782)	(0.7678)	(0.5098)	(0.4303)	(0.3666)	(0.9562)	(0.7921)
CUT_DUMMY _t	-0.0301	0.0067	-0.0389	-0.3649***	-0.3160***	-0.3385***	-0.2251**	-0.1872**	-0.2381**
	(0.7305)	(0.9392)	(0.6750)	(0.0000)	(0.0004)	(0.0002)	(0.0128)	(0.0421)	(0.0121)
ΔC_t /MVE _{t-1}	2.7340***	2.7521***	2.5547***	1.3265	1.5547*	1.5431*	1.7854**	2.1358**	2.2225***
	(0.0028)	(0.0027)	(0.0058)	(0.1472)	(0.0894)	(0.0892)	(0.0441)	(0.0155)	(0.0100)
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	5,310	5,310	5,310	7,657	7,657	7,657	6,679	6,679	6,679
R ²	0.279	0.279	0.278	0.267	0.266	0.266	0.265	0.264	0.264

INTERNET APPENDIX TABLE 12

Cash Holdings and Industry Tournament Incentives (ITI): Using Difference-in-Differences (Non-Competition Agreement Enforceability) Specifications and Alternative ITI Measures

This table presents results of OLS difference-in-difference estimation of ITI on cash holdings following the change in non-competition agreement enforceability using ExecuComp firms from 1992-2014. The dependent variable is CASH/ASSETS_{*t*}. LN(IND_PAY_GAP_2_{*t-1*}) is the natural logarithm of IND_PAY_GAP_2_{*t-1*}, where IND_PAY_GAP_2_{*t-1*} is the difference between the highest CEO total compensation in the industry and size group and the CEO's total compensation. LN(IND_PAY_GAP_3_{*t-1*}) the natural logarithm of IND_PAY_GAP_3_{*t-1*}, where IND_PAY_GAP_3_{*t-1*} is the difference between the highest CEO total compensation in the industry and the CEO's total compensation. LN(IND_PAY_GAP_4_{*t-1*}) the natural logarithm of IND_PAY_GAP_4_{*t-1*}, where IND_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. Based on Garmaise (2011), Jeffers (2017), and hand-collected data, CHG_ENFORCE_{*t-1*} takes the value of +1 for firms headquartered in Florida from 1997-2014, in Kentucky from 2007-2014, in Oregon and Idaho from 2009-2014, in Texas and Wisconsin from 2010-2014, in Illinois in 2012-2013, in Colorado and Georgia from 2012-2014, and in Virginia in 2014; takes the value of -1 for firms in Texas from 1995-2006, in Louisiana from 2002-2003, in South Carolina from 2011-2014, and in Montana from 2012-2014; and is set equal to 0 otherwise. #IN_STATE_COMP is the number of firms within the same industry and state. All other 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.

Panel A. ITI based on FF30 industry classifications

ITI measure	IND_PAY_GAP_2 _{<i>t-1</i>}			IND_PAY_GAP_3 _{<i>t-1</i>}			IND_PAY_GAP_4 _{<i>t-1</i>}		
	#IN_STATE _COMP > 20 (1)	#IN_STATE _COMP > 40 (2)	#IN_STATE _COMP > 60 (3)	#IN_STATE _COMP > 20 (4)	#IN_STATE _COMP > 40 (5)	#IN_STATE _COMP > 60 (6)	#IN_STATE _COMP > 20 (7)	#IN_STATE _COMP > 40 (8)	#IN_STATE _COMP > 60 (9)
LN(IND_PAY_GAP_2 _{<i>t-1</i>})* CHG_ENFORCE _{<i>t-1</i>}	-0.0149* (0.0661)	-0.0318*** (0.0041)	-0.0272** (0.0257)						
LN(IND_PAY_GAP_2 _{<i>t-1</i>})	0.0118 (0.1056)	0.0194** (0.0472)	0.0217** (0.0410)						
LN(IND_PAY_GAP_3 _{<i>t-1</i>})* CHG_ENFORCE _{<i>t-1</i>}				-0.0111 (0.2508)	-0.0234* (0.0589)	-0.0151 (0.3082)			
LN(IND_PAY_GAP_3 _{<i>t-1</i>})				-0.0043 (0.6446)	0.0071 (0.5603)	0.0119 (0.3994)			
LN(IND_PAY_GAP_4 _{<i>t-1</i>})* CHG_ENFORCE _{<i>t-1</i>}							-0.0133 (0.1259)	-0.0283** (0.0238)	-0.0330** (0.0243)
LN(IND_PAY_GAP_4 _{<i>t-1</i>})							0.0103 (0.2171)	0.0155 (0.1557)	0.0174 (0.1765)
CHG_ENFORCE _{<i>t-1</i>}	0.1509** (0.0481)	0.3198*** (0.0020)	0.2858** (0.0116)	0.1274 (0.2029)	0.2715** (0.0377)	0.1943 (0.2075)	0.1352* (0.0959)	0.2868** (0.0153)	0.3401** (0.0130)
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
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	6,284	3,959	3,209	6,466	4,064	3,303	6,410	4,027	3,270
R ²	0.640	0.641	0.638	0.635	0.639	0.637	0.637	0.641	0.639

Panel B. ITI based on SIC3 industry classifications

ITI measure	IND PAY GAP 2 _{t-1}			IND PAY GAP 3 _{t-1}			IND PAY GAP 4 _{t-1}		
In-state competition	#IN_STATE _COMP > 20 (1)	#IN_STATE _COMP > 40 (2)	#IN_STATE _COMP > 60 (3)	#IN_STATE _COMP > 20 (4)	#IN_STATE _COMP > 40 (5)	#IN_STATE _COMP > 60 (6)	#IN_STATE _COMP > 20 (7)	#IN_STATE _COMP > 40 (8)	#IN_STATE _COMP > 60 (9)
LN(IND_PAY_GAP_2 _{t-1}) * CHG_ENFORCE _{t-1}	-0.0152** (0.0459)	-0.0270*** (0.0097)	-0.0256** (0.0241)						
LN(IND_PAY_GAP_2 _{t-1})	0.0283*** (0.0002)	0.0297*** (0.0030)	0.0316*** (0.0068)						
LN(IND_PAY_GAP_3 _{t-1}) * CHG_ENFORCE _{t-1}				0.0025 (0.7490)	-0.0086 (0.4008)	-0.0150 (0.1761)			
LN(IND_PAY_GAP_3 _{t-1})				0.0097 (0.1163)	0.0143* (0.0791)	0.0176* (0.0688)			
LN(IND_PAY_GAP_4 _{t-1}) * CHG_ENFORCE _{t-1}							-0.0108 (0.2231)	-0.0321** (0.0131)	-0.0346** (0.0177)
LN(IND_PAY_GAP_4 _{t-1})							0.0236*** (0.0021)	0.0312*** (0.0024)	0.0348*** (0.0039)
CHG_ENFORCE _{t-1}	0.1442** (0.0249)	0.2575*** (0.0043)	0.2513** (0.0106)	-0.0091 (0.8994)	0.1161 (0.2564)	0.1886* (0.0880)	0.1101 (0.1476)	0.3123*** (0.0069)	0.3406*** (0.0087)
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
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	4,796	3,325	2,777	5,973	3,878	3,179	5,505	3,674	3,053
R ²	0.636	0.639	0.637	0.636	0.641	0.637	0.639	0.642	0.639

INTERNET APPENDIX TABLE 13

The Marginal Value of Cash and Industry Tournament Incentives (ITI): Using Difference-in-Differences (Non-Competition Agreement Enforceability) Specifications and Alternative ITI Measures

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 1992-2014. The dependent variable, $R_{i,t} - R^B_{i,t}$ is the annual excess stock return of the firm relative to the Fama and French (1993) 25 size and book-to-market portfolios. $\text{LN}(\text{IND_PAY_GAP_2}_{t-1})$ is the natural logarithm of $\text{IND_PAY_GAP_2}_{t-1}$, where $\text{IND_PAY_GAP_2}_{t-1}$ is the difference between the highest CEO total compensation in the industry and size group and the CEO's total compensation. $\text{LN}(\text{IND_PAY_GAP_3}_{t-1})$ the natural logarithm of $\text{IND_PAY_GAP_3}_{t-1}$, where $\text{IND_PAY_GAP_3}_{t-1}$ is the difference between the highest CEO total compensation in the industry and the CEO's total compensation. $\text{LN}(\text{IND_PAY_GAP_4}_{t-1})$ the natural logarithm of $\text{IND_PAY_GAP_4}_{t-1}$, where $\text{IND_PAY_GAP_4}_{t-1}$ 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. $\Delta C_t / \text{MVE}_{t-1}$ represents the change in firm cash holdings during fiscal year t scaled by the market value of equity at end of period $t-1$. Based on Garmaise (2011), Jeffers (2017), and hand-collected data, CHG_ENFORCE_{t-1} takes the value of +1 for firms headquartered in Florida from 1997-2014, in Kentucky from 2007-2014, in Oregon and Idaho from 2009-2014, in Texas and Wisconsin from 2010-2014, in Illinois in 2012-2013, in Colorado and Georgia from 2012-2014, and in Virginia in 2014; takes the value of -1 for firms in Texas from 1995-2006, in Louisiana from 2002-2003, in South Carolina from 2011-2014, and in Montana from 2012-2014; and is set equal to 0 otherwise. $\# \text{IN_STATE_COMP}$ is the number of firms within the same industry and state. All other 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.

Panel A. ITI based on FF30

ITI measure	IND PAY GAP 2 _{<i>t-1</i>}			IND PAY GAP 3 _{<i>t-1</i>}			IND PAY GAP 4 _{<i>t-1</i>}		
	#IN_STATE _COMP > 20 (1)	#IN_STATE _COMP > 40 (2)	#IN_STATE _COMP > 60 (3)	#IN_STATE _COMP > 20 (4)	#IN_STATE _COMP > 40 (5)	#IN_STATE _COMP > 60 (6)	#IN_STATE _COMP > 20 (7)	#IN_STATE _COMP > 40 (8)	#IN_STATE _COMP > 60 (9)
$\text{LN}(\text{IND_PAY_GAP_2}_{t-1}) * \Delta C_t / \text{MVE}_{t-1}$ * CHG_ENFORCE_{t-1}	-0.1901 (0.3325)	-0.4984*** (0.0011)	-0.5968** (0.0110)						
$\text{LN}(\text{IND_PAY_GAP_2}_{t-1}) *$ CHG_ENFORCE_{t-1}	0.0336** (0.0272)	0.0502** (0.0161)	0.0528** (0.0420)						
$\text{LN}(\text{IND_PAY_GAP_2}_{t-1}) * \Delta C_t / \text{MVE}_{t-1}$	0.0633 (0.5462)	0.0092 (0.9424)	-0.0666 (0.6496)						
$\text{LN}(\text{IND_PAY_GAP_2}_{t-1})$	0.0294*** (0.0001)	0.0420*** (0.0001)	0.0499*** (0.0001)						
$\text{LN}(\text{IND_PAY_GAP_3}_{t-1}) * \Delta C_t / \text{MVE}_{t-1}$ * CHG_ENFORCE_{t-1}				-0.3583*** (0.0061)	-0.3499** (0.0162)	-0.4374** (0.0157)			
$\text{LN}(\text{IND_PAY_GAP_3}_{t-1}) *$ CHG_ENFORCE_{t-1}				0.0468*** (0.0006)	0.0594*** (0.0052)	0.0793*** (0.0011)			
$\text{LN}(\text{IND_PAY_GAP_3}_{t-1}) * \Delta C_t / \text{MVE}_{t-1}$				-0.0377 (0.6662)	-0.0876 (0.4369)	-0.1632 (0.1729)			
$\text{LN}(\text{IND_PAY_GAP_3}_{t-1})$				0.0354*** (0.0000)	0.0436*** (0.0000)	0.0446*** (0.0000)			
$\text{LN}(\text{IND_PAY_GAP_4}_{t-1}) * \Delta C_t / \text{MVE}_{t-1}$ * CHG_ENFORCE_{t-1}							-0.2424* (0.0758)	-0.2785* (0.0728)	-0.3586* (0.0958)
$\text{LN}(\text{IND_PAY_GAP_4}_{t-1}) *$ CHG_ENFORCE_{t-1}							0.0375*** (0.0027)	0.0425** (0.0226)	0.0415* (0.0603)
$\text{LN}(\text{IND_PAY_GAP_4}_{t-1}) * \Delta C_t / \text{MVE}_{t-1}$							0.0559 (0.5552)	-0.0074 (0.9508)	-0.0423 (0.7511)
$\text{LN}(\text{IND_PAY_GAP_4}_{t-1})$							0.0247***	0.0234**	0.0202

CHG_ENFORCE _{t-1} *ΔC _t /MVE _{t-1}	2.0425 (0.3367)	5.5291*** (0.0007)	6.4456*** (0.0075)	3.3453*** (0.0079)	3.4041** (0.0132)	4.0659** (0.0139)	(0.0013) 2.2325 (0.1008)	(0.0283) 2.6794* (0.0789)	(0.1078) 3.3507* (0.0886)
CHG_ENFORCE _{t-1}	-0.3546** (0.0246)	-0.5507** (0.0108)	-0.5460** (0.0365)	-0.4304*** (0.0007)	-0.5566*** (0.0046)	-0.7068*** (0.0012)	-0.3526*** (0.0024)	-0.4194** (0.0173)	-0.3883* (0.0595)
C _{t-1} /MVE _{t-1}	1.6574 (0.1869)	2.4037 (0.1088)	3.2730* (0.0557)	2.6804*** (0.0040)	3.3001*** (0.0029)	3.9651*** (0.0008)	2.2403*** (0.0020)	2.6907*** (0.0015)	2.9086*** (0.0025)
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
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	4,438	2,696	2,154	4,312	2,626	2,094	4,404	2,677	2,140
R ²	0.213	0.219	0.217	0.221	0.221	0.219	0.214	0.215	0.211

Panel B. ITI based on SIC3

ITI measure	IND_PAY_GAP_2 _{t-1}			IND_PAY_GAP_3 _{t-1}			IND_PAY_GAP_4 _{t-1}		
	#IN_STATE _COMP > 20 (1)	#IN_STATE _COMP > 40 (2)	#IN_STATE _COMP > 60 (3)	#IN_STATE _COMP > 20 (4)	#IN_STATE _COMP > 40 (5)	#IN_STATE _COMP > 60 (6)	#IN_STATE _COMP > 20 (7)	#IN_STATE _COMP > 40 (8)	#IN_STATE _COMP > 60 (9)
LN(IND_PAY_GAP_2 _{t-1})*ΔC _t /MVE _{t-1} * CHG_ENFORCE _{t-1}	-0.1933 (0.1778)	-0.3575** (0.0232)	-0.5882*** (0.0037)						
LN(IND_PAY_GAP_2 _{t-1}) * CHG_ENFORCE _{t-1}	0.0222** (0.0227)	0.0412** (0.0136)	0.0599*** (0.0074)						
LN(IND_PAY_GAP_2 _{t-1}) *ΔC _t /MVE _{t-1}	0.1560* (0.0621)	0.0989 (0.3002)	0.0911 (0.4070)						
LN(IND_PAY_GAP_2 _{t-1})	-0.0006 (0.9152)	0.0095 (0.2488)	0.0144 (0.1711)						
LN(IND_PAY_GAP_3 _{t-1}) *ΔC _t /MVE _{t-1} * *CHG_ENFORCE _{t-1}				-0.0018 (0.9907)	-0.0605 (0.7330)	-0.3444 (0.1032)			
LN(IND_PAY_GAP_3 _{t-1}) * CHG_ENFORCE _{t-1}				0.0107 (0.3046)	0.0300* (0.0754)	0.0387* (0.0566)			
LN(IND_PAY_GAP_3 _{t-1}) *ΔC _t /MVE _{t-1}				0.0044 (0.9508)	-0.0503 (0.5615)	-0.0786 (0.4206)			
LN(IND_PAY_GAP_3 _{t-1})				0.0222*** (0.0008)	0.0370*** (0.0001)	0.0414*** (0.0001)			
LN(IND_PAY_GAP_4 _{t-1}) *ΔC _t /MVE _{t-1} * *CHG_ENFORCE _{t-1}							-0.2969** (0.0195)	-0.3130** (0.0277)	-0.3957** (0.0279)
LN(IND_PAY_GAP_4 _{t-1}) * CHG_ENFORCE _{t-1}							0.0194* (0.0986)	0.0227 (0.3001)	0.0286 (0.2729)
LN(IND_PAY_GAP_4 _{t-1}) *ΔC _t /MVE _{t-1}							0.0769 (0.3438)	0.0517 (0.6290)	0.0435 (0.7186)
LN(IND_PAY_GAP_4 _{t-1})							0.0037 (0.6069)	0.0041 (0.6909)	0.0053 (0.6672)
CHG_ENFORCE _{t-1} *ΔC _t /MVE _{t-1}	1.8530	3.7174**	6.1666***	-0.0927	0.6415	3.0234*	2.4821**	2.6851**	3.4355**

	(0.2104)	(0.0196)	(0.0018)	(0.9458)	(0.6807)	(0.0750)	(0.0326)	(0.0289)	(0.0210)
CHG_ENFORCE _{<i>t-l</i>}	-0.2179**	-0.4229**	-0.6108***	-0.0700	-0.2348	-0.3022*	-0.1608	-0.1925	-0.2432
	(0.0218)	(0.0120)	(0.0061)	(0.4512)	(0.1103)	(0.0779)	(0.1193)	(0.3241)	(0.2877)
<i>C_{t-l}</i> / <i>MVE_{t-l}</i>	0.7648	1.5582	1.7974	1.9744**	2.7652***	2.9813***	1.9406**	2.3044***	2.4453**
	(0.4509)	(0.1772)	(0.1641)	(0.0225)	(0.0069)	(0.0077)	(0.0123)	(0.0095)	(0.0113)
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
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	4,050	2,557	2,063	3,201	2,167	1,792	3,702	2,412	1,973
R ²	0.220	0.222	0.219	0.227	0.232	0.231	0.220	0.222	0.218

INTERNET APPENDIX TABLE 14

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). The dependent variable is a firm's market share growth at time t $[(\text{MARKET_SHARE}_t - \text{MARKET_SHARE}_{t-1})/\text{MARKET_SHARE}_{t-1}]$. ZCASH_{t-1} is computed by subtracting from the $\text{CASH}/\text{ASSETS}$ ratio its industry-year mean and dividing the difference by the industry-year standard deviation. $\text{IND_PAY_GAP_2}_{t-1}$ is the difference between the highest CEO total compensation in the industry and size group and the CEO's total compensation. $\text{IND_PAY_GAP_3}_{t-1}$ is the difference between the highest CEO total compensation in the industry and the CEO's total compensation. $\text{IND_PAY_GAP_4}_{t-1}$ 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. $\text{LN}(\text{ASSETS}_{t-1})$ is the natural logarithm of firm real assets. LEVERAGE_{t-1} is long-term debt plus short-term debt divided by assets. TANGIBILITY_{t-1} is computed as $0.715 \times \text{Receivables} + 0.547 \times \text{Inventories} + 0.535 \times \text{Fixed capital}$ (see Berger, Ofek, and Swary (1996)). 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.

ITI measure	ITI based on FF30			ITI based on SIC3		
	$\text{LN}(\text{IND_PAY_GAP_2}_{t-1})$	$\text{LN}(\text{IND_PAY_GAP_3}_{t-1})$	$\text{LN}(\text{IND_PAY_GAP_4}_{t-1})$	$\text{LN}(\text{IND_PAY_GAP_2}_{t-1})$	$\text{LN}(\text{IND_PAY_GAP_3}_{t-1})$	$\text{LN}(\text{IND_PAY_GAP_4}_{t-1})$
	(1)	(2)	(3)	(4)	(5)	(6)
$\text{LN}(\text{IND_PAY_GAP_2}_{t-1}) * \text{ZCASH}_{t-1}$	0.0339* (0.0827)			0.0487* (0.0805)		
$\text{LN}(\text{IND_PAY_GAP_2}_{t-1})$	0.0199* (0.0520)			0.0243 (0.1714)		
$\text{LN}(\text{IND_PAY_GAP_3}_{t-1}) * \text{ZCASH}_{t-1}$		0.0279* (0.0746)			0.0256 (0.3508)	
$\text{LN}(\text{IND_PAY_GAP_3}_{t-1})$		0.0100* (0.0839)			0.0121 (0.3807)	
$\text{LN}(\text{IND_PAY_GAP_4}_{t-1}) * \text{ZCASH}_{t-1}$			0.0369* (0.0620)			0.0429 (0.1340)
$\text{LN}(\text{IND_PAY_GAP_4}_{t-1})$			0.0193* (0.0984)			0.0116 (0.4104)
$\text{LN}(\text{FIRM_PAY_GAP}_{t-1})$	-0.2038 (0.2362)	-0.1941 (0.2290)	-0.2410 (0.1758)	0.0045 (0.3923)	0.0040 (0.2625)	-0.0025 (0.5397)
CEO_DELTA_{t-1}	0.0064* (0.0584)	0.0048* (0.0984)	-0.0030 (0.5782)	0.0000*** (0.0005)	0.0000*** (0.0000)	0.0000*** (0.0000)
CEO_VEGA_{t-1}	0.0000*** (0.0000)	0.0000*** (0.0000)	0.0000*** (0.0000)	-0.0000 (0.1872)	-0.0000 (0.7286)	-0.0000 (0.2504)
ZCASH_{t-1}	-0.0000 (0.2873)	-0.0000 (0.4734)	-0.0000 (0.5643)	-0.3070 (0.1790)	-0.1534 (0.5591)	-0.2700 (0.2625)
$\text{LN}(\text{ASSETS}_{t-1})$	-0.0875*** (0.0000)	-0.0884*** (0.0000)	-0.0889*** (0.0000)	-0.0933*** (0.0000)	-0.0868*** (0.0000)	-0.0904*** (0.0000)
LEVERAGE_{t-1}	0.2584*** (0.0000)	0.2442*** (0.0000)	0.2396*** (0.0000)	0.2140*** (0.0000)	0.2345*** (0.0000)	0.2184*** (0.0000)
LEVERAGE_{t-2}	-0.2037*** (0.0000)	-0.1892*** (0.0000)	-0.1923*** (0.0000)	-0.1946*** (0.0000)	-0.1886*** (0.0000)	-0.1831*** (0.0000)
$\text{MARKET_SHARE_GROWTH}_{t-1}$	-0.0727*** (0.0000)	-0.0644*** (0.0000)	-0.0669*** (0.0000)	-0.0834*** (0.0000)	-0.0633*** (0.0000)	-0.0711*** (0.0000)
$\text{MARKET_SHARE_GROWTH}_{t-2}$	-0.0681*** (0.0000)	-0.0677*** (0.0000)	-0.0681*** (0.0000)	-0.0567*** (0.0006)	-0.0635*** (0.0000)	-0.0638*** (0.0000)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
CEO-Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	21,114	22,522	22,028	12,700	19,641	16,736
R^2	0.012	0.024	0.017	0.014	0.027	0.017
Anderson-Rubin Wald F -statistic for joint relevance	10.10***	10.59***	10.13***	5.876***	8.544***	7.936***
Difference in Sargan-Hansen statistics (test for endogeneity)	26.43***	26.60***	25.41***	14.89***	22.07***	18.50***
<u>First-stage F-statistics:</u>						
$\text{LN}(\text{IND_PAY_GAP_1}_{t-1}) * \text{ZCASH}_{t-1}$	154.45***	170.57***	166.68***	87.36***	132.05***	114.97***
$\text{LN}(\text{IND_PAY_GAP_1}_{t-1})$	391.24***	2865.78***	324.19***	74.42***	164.06***	123.39***
ZCASH_{t-1}	155.97***	170.12***	167.28***	92.16***	133.17***	120.60***
<u>Instruments used in IV (2SLS):</u>						
	$\text{LN}(\text{SUM_CEO_COMP_IND}_{t-1}) * \text{TANGIBILITY}_{t-1}$					
	$\text{LN}(\text{SUM_CEO_COMP_IND}_{t-1})$					

