

Firm Interactions and Top Management Incentives

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LSE
22 March 2019





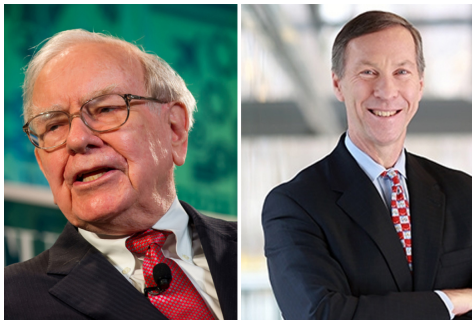
- April 11th stock fell 4% after news - \$1bn loss.
- After CEO apologized, down 1%, \$250m loss.



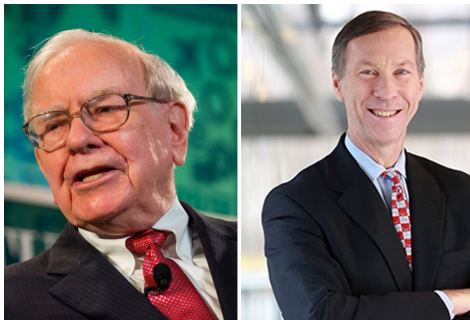
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- Disaster! What would you do if you were the owner of United?

But Who Owns United?

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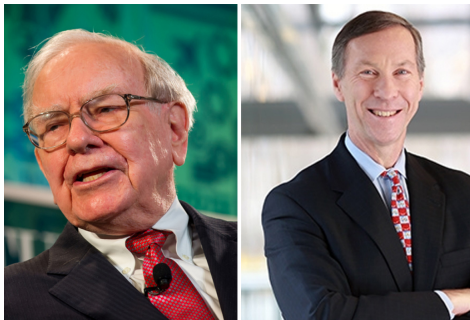


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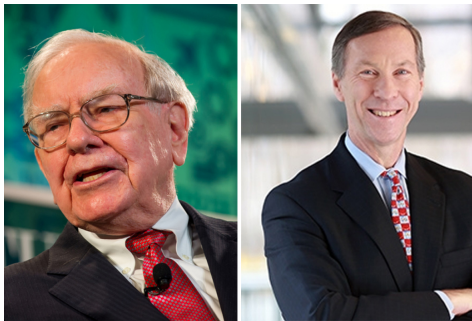
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- But they declined to comment... Because they were happy?

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Company	Closing Price April 10	Closing Price April 11	Δ	Berkshire Hathaway		Vanguard	
				number of shares in millions	win/loss in millions	number of shares in millions	win/loss in millions
United Holdings	\$71,52	\$70,71	-1,13%	29,0	-23,5	21,6	-17,5
American Airlines	\$42,32	\$43,93	3,80%	45,5	73,3	30,4	48,9
Delta Airlines	\$44,97	\$45,29	0,71%	60,0	19,2	46,0	14,7
Southwest	\$54,22	\$55,06	1,55%	43,2	36,3	38,2	32,1
Total					105,4		78,2

Economists believe in virtues of self-interest

- At least since Smith (1776): self-interest → competition → welfare

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- Example of a (presumably) self-interested entrepreneurial firm

Virgin America	[%]
Richard Branson	30.77
Cyrus Capital	23.52
Virgin Group Holdings	15.34
Vanguard	2.89
BlackRock	2.25
Alpine Associates Advisors	2.11
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- Other examples: Tesla, Amazon, Facebook, Uber, Ryanair, ...

But what if no self-interested owner is left?

<u>Delta Air Lines</u>	[%]	<u>Southwest Airlines Co.</u>	[%]	<u>American Airlines</u>	[%]
Berkshire Hathaway	8.25	PRIMECAP	11.78	T. Rowe Price	13.99
BlackRock	6.84	Berkshire Hathaway	7.02	PRIMECAP	8.97
Vanguard	6.31	Vanguard	6.21	Berkshire Hathaway	7.75
State Street Global Advisors	4.28	BlackRock	5.96	Vanguard	6.02
J.P. Morgan Asset Mgt.	3.79	Fidelity	5.53	BlackRock	5.82
Lansdowne Partners Limited	3.60	State Street Global Advisors	3.76	State Street Global Advisors	3.71
PRIMECAP	2.85	J.P. Morgan Asset Mgt.	1.31	Fidelity	3.30
<u>United Continental Holdings</u>	[%]	<u>Alaska Air</u>	[%]	<u>JetBlue Airways</u>	[%]
Berkshire Hathaway	9.20	T. Rowe Price	10.14	Vanguard	7.96
BlackRock	7.11	Vanguard	9.73	Fidelity	7.58
Vanguard	6.88	BlackRock	5.60	BlackRock	7.33
PRIMECAP	6.27	PRIMECAP	4.95	PRIMECAP	5.91
PAR Capital Mgt.	5.18	PAR Capital Mgt.	3.65	Goldman Sachs Asset Mgt.	2.94
State Street Global Advisors	3.45	State Street Global Advisors	3.52	Dimensional Fund Advisors	2.42
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- Would ownership structure affect managers incentives to maximize own firm value?

- Much of corporate finance based on assumption that firms' objective is: maximize own value, independent of shareholder preferences (Fisher 1930).
 - Applications: e.g. Holmstrom (1982)

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- Hart (Etra 1979): shareholders unanimously (if vacuously) agree on firm-value maximization as the optimal policy, IFF firms are perfect competitors
 - See also DeAngelo (AER 1983)
- The assumption may not hold. (Strategy, IO ... exist.) What then?

“To what extent will the conduct of firms be different from the assumed profit maximization behavior in classical theory..”

(Hart & Holmstrom, 1987)

- 1 Is it true that the way shareholders incentivize managers does not depend on shareholder identities / preferences / composition?
- 2 If managerial incentives systematically vary with shareholder preferences, then what alternative theories can help us organize the patterns in the data?

- Shareholder preferences may differ across many dimensions: horizon / internal agency problems (pension funds, mutual fund, hedge fund, conglomerate, SWF...), portfolio selection (active/passive), governance activity
 - We focus on one objectively measurable source of heterogeneity: portfolio composition. Does investor x have economic interests also in other firms?

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 - Correlations likely have a “causal interpretation” in a reduced-form CF sense.

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- Which measure most robustly predicts variation in incentive slopes?
 - Top-5 shareholders' holdings in other firms
 - Antón & Polk (2012)
 - O'Brien & Salop (2000) “**MHHID**” (based on Cournot model)

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 - 1 firms interaction in the product market
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 - Consistent with the premise of Fisch et al. 2018, Bebchuk & Hirst, 2019, etc.
 - What is good (bad) for an individual firm can be bad (good) for a portfolio, when firms interact.

- Provides evidence & theory emphasizing a Vickers (1982)-style paradox: delegation to an agent with different preferences can be beneficial to the principal, *when firms interact* (and therefore can't be *analyzed* independently).
 - Responding to an agency conflict in ways suboptimal from the perspective of the firm can be beneficial to shareholders with stakes in related firms.
 - Empirical evidence emphasizing a general insight with potential implications throughout corporate finance.

Empirics

Data

- ① ExecuComp (S&P1500 + 500)
 - Main results using WPS (Edmans et al. 2009)
 - Auxiliary results on relative performance evaluation

- ② Compustat
 - Sales → market shares

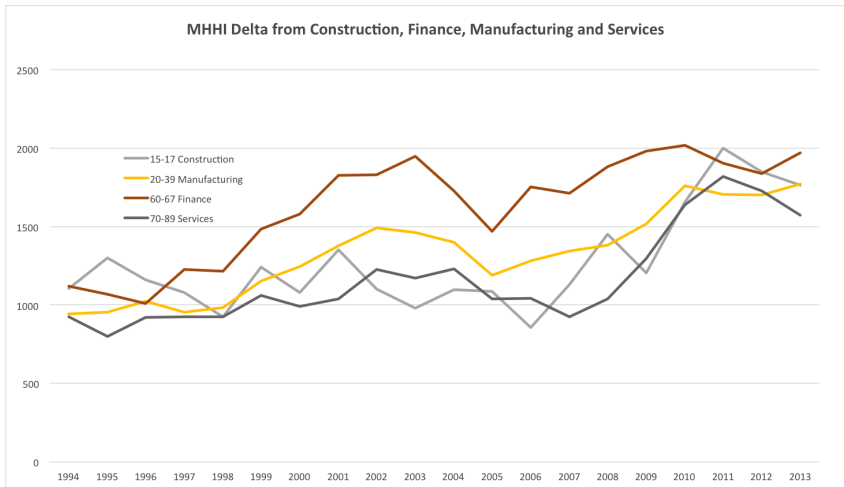
- ③ CRSP
 - Industry definition (4-digit SIC)
 - Performance = market cap increase
 - Rival performance = VW market cap increase (Aggarwal & Samwick 1999)

- ④ 13Fs: ownership, MHHI Delta; firm-level measures

Large institutions have become many firms' largest owners

TOP BLOCKHOLDERS	1995	2000	2005	2010	2015
VANGUARD V VENTURE PTNR LLC	0.0%	12.9%	29.7%	61.1%	71.3%
BLACKROCK INC.	0.0%	0.8%	2.6%	66.2%	67.0%
STATE STREET RSRCH & MGT	5.5%	10.9%	18.4%	36.2%	32.7%
DIMENSIONAL FUND ADVS.	25.4%	32.0%	28.8%	34.1%	32.2%
FMR LLC	22.5%	19.8%	29.0%	29.9%	30.6%
RENAISSANCE TECHNOLOGIES LLC	0.0%	0.2%	0.7%	9.2%	15.9%
WELLINGTON/THORNDIKE	10.5%	11.7%	18.1%	18.8%	17.3%
T. ROWE PRICE ASSOCIATES INC.	4.9%	8.2%	12.2%	15.8%	15.6%
MORGAN J P + CO INC	4.9%	7.8%	8.0%	8.5%	12.5%
Bank of New York Mellon Corp	0.0%	0.0%	0.0%	0.0%	11.1%
THE NORTHERN TRUST COMPANY	0.9%	1.7%	2.9%	11.5%	10.3%
GOLDMAN SACHS GROUP INC	0.1%	4.3%	10.0%	6.8%	9.5%
INVESCO TRUST COMPANY	3.5%	7.1%	5.9%	9.9%	9.9%
FRANKLIN RESOURCES INC.	4.2%	8.9%	9.4%	8.2%	9.1%
WELLS FARGO/FST INTERST.	0.9%	1.1%	7.7%	7.3%	8.3%
BZW BARCLAYS GLBL INVTS	51.9%	33.6%	54.9%	0.0%	0.2%

Common ownership concentration is rising



Common ownership concentration is driven by “Big-3”

Table A10: Top 3 funds and MHHID

Active and passive common ownership, and passive ownership is based on Churn, as in Schmalz et al.

VARIABLES	(2)	(3)	(4)	(5)	(6)
	Dep Variable: MHHID				
BlackRock ave.ind.ownership	0.945*** (10.07)			0.833*** (8.531)	
St.Str ave.ind.ownership		1.056*** (6.419)		0.827*** (4.963)	
Vanguard ave.ind.ownership			0.993*** (5.868)	0.395** (2.221)	
Combined					0.597*** (9.862)
HHI	-0.280*** (-29.33)	-0.282*** (-29.23)	-0.274*** (-28.40)	-0.281*** (-29.38)	-0.279*** (-29.34)
Industry Market Value	9.89e-08*** (5.689)	9.29e-08*** (5.308)	9.62e-08*** (5.492)	9.48e-08*** (5.464)	9.46e-08*** (5.458)
Market to Book	-0.000146 (-0.279)	-0.000230 (-0.437)	-0.000225 (-0.427)	-0.000187 (-0.359)	-0.000199 (-0.382)
Institutional Ownership	0.0917*** (8.758)	0.114*** (11.29)	0.111*** (10.77)	0.0798*** (7.489)	0.0798*** (7.484)
Constant	0.202*** (21.71)	0.187*** (19.96)	0.188*** (20.18)	0.194*** (20.77)	0.192*** (20.87)
Observations	5,328	5,328	5,328	5,328	5,328
R-squared	0.264	0.255	0.254	0.270	0.269
Number of sic	625	625	625	625	625
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.163	0.153	0.151	0.169	0.169

WPS baseline regression

$$WPS_{ijzt} = k_{ij} + \beta \cdot MHHID_{zt} + \gamma \cdot X_{ijzt} + \eta_z + \eta_t + \varepsilon_{ijzt}$$

WPS baseline panel regressions

	Log(Wealth-Performance Sensitivity EGL)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Common Ownership (MHID)	-0.193*** (-2.782)	-0.517*** (-6.653)	-0.259*** (-4.268)	-0.251*** (-3.522)	-0.152** (-2.472)	-0.358*** (-4.094)	-0.224*** (-3.139)
HHI		-0.299*** (-3.832)	-0.217** (-2.506)	-0.120 (-1.515)	-0.0555 (-0.770)	-0.161** (-2.099)	-0.0984 (-1.466)
Size		0.175*** (13.63)	0.512*** (11.98)	0.167*** (12.97)	0.509*** (12.19)	0.175*** (13.43)	0.538*** (12.55)
Volatility		0.768** (2.112)	1.493*** (3.662)	0.861** (2.396)	1.645*** (4.166)	0.504 (1.386)	1.629*** (4.101)
Leverage		-0.793*** (-7.955)	-0.129 (-1.400)	-0.897*** (-8.747)	-0.128 (-1.501)	-0.880*** (-8.213)	-0.0993 (-1.051)
Log (Tenure)		0.463*** (19.03)	0.527*** (14.20)	0.470*** (19.41)	0.529*** (15.40)	0.452*** (18.77)	0.525*** (14.53)
Observations	36,680	36,478	36,216	38,547	38,291	33,920	33,594
R-squared	0.098	0.183	0.650	0.181	0.647	0.187	0.653
Industry Definition	SIC4 CRSP	SIC4 CRSP	SIC4 CRSP	SIC4 COMP	SIC4 COMP	HP-400	HP-400
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry x Year FE	No	No	Yes	No	Yes	No	Yes
FirmFE	No	No	Yes	No	Yes	No	Yes
Number of Firms			3,239		3,285		3,067

Robustness to alternative WPS measures

Dependent Variable	Log(WPS JM)			Log(WPS HL)		
	(1)	(2)	(3)	(4)	(5)	(6)
Common Ownership (MHHD)	-0.208*** (-3.284)	-0.105* (-1.851)	-0.180** (-2.852)	-0.204*** (-3.571)	-0.106* (-1.936)	-0.152** (-2.518)
HHI	-0.215** (-2.697)	-0.0953 (-1.212)	-0.123* (-1.759)	-0.241*** (-3.265)	-0.0755 (-1.052)	-0.128* (-1.911)
Size	0.174*** (3.205)	0.174*** (3.286)	0.219*** (4.068)	0.871*** (24.73)	0.871*** (25.39)	0.899*** (25.69)
Volatility	1.672*** (3.669)	1.836*** (4.230)	1.874*** (4.245)	2.090*** (5.730)	2.202*** (6.278)	2.195*** (6.211)
Leverage	-0.821*** (-8.369)	-0.818*** (-9.038)	-0.775*** (-7.809)	-0.0903 (-1.178)	-0.0882 (-1.252)	-0.0579 (-0.755)
Log(Tenure)	0.454*** (13.18)	0.458*** (14.63)	0.455*** (14.08)	0.473*** (14.04)	0.478*** (15.73)	0.478*** (15.26)
Observations	36,216	38,291	33,594	36,216	38,291	33,594
R-squared	0.780	0.776	0.773	0.788	0.784	0.792
Industry Definition	sich_crsp4	sich_comp4	icode40004	sich_crsp4	sich_comp4	icode40004
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry x Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of gvkey	3,239	3,285	3,067	3,239	3,285	3,067

Robustness to alternative (firm-level!) CO measures

Dependent Variable	Log(Wealth Performance Sensitivity EGL)					
	(1)	(2)	(3)	(4)	(5)	(6)
CO (Top 5 Sh Overlap)	-0.148*** (-3.529)		-0.183*** (-4.661)		-0.149*** (-3.474)	
CO (Anton and Polk measure)		-0.332*** (-4.038)		-0.370*** (-3.827)		-0.403*** (-3.776)
HHI	-0.103 (-1.376)	-0.0936 (-1.216)	-0.00513 (-0.0735)	-0.0240 (-0.358)	0.00384 (0.0702)	-0.0297 (-0.544)
Size	0.515*** (11.83)	0.519*** (12.05)	0.509*** (12.14)	0.519*** (12.48)	0.535*** (12.88)	0.552*** (13.19)
Volatility	1.654*** (4.124)	1.502*** (3.775)	1.688*** (4.310)	1.634*** (4.228)	1.643*** (4.197)	1.593*** (4.108)
Leverage	-0.0787 (-0.881)	-0.108 (-1.179)	-0.106 (-1.207)	-0.114 (-1.332)	-0.0815 (-0.852)	-0.0837 (-0.872)
Log(Tenure)	0.532*** (14.46)	0.533*** (14.66)	0.533*** (15.91)	0.535*** (16.01)	0.532*** (14.90)	0.531*** (15.12)
Observations	35,251	36,083	37,789	38,151	33,207	33,463
R-squared	0.651	0.651	0.649	0.648	0.653	0.653
Industry Def	SIC4 CRSP	SIC4 CRSP	SIC4 COMP	SIC4 COMP	HP-400	HP-400
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry x Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of firms	3,207	3,237	3,274	3,284	3,056	3,063

All executives & alternative CO measure

Dependent Variable	Log(Wealth Performance Sensitivity EGL)					
	(1)	(2)	(3)	(4)	(5)	(6)
CO (MHHID)	-0.0594* (-1.766)		-0.0621** (-2.583)		-0.138*** (-4.147)	
CO (Top 5 Sh Overlap)		-0.0739*** (-4.480)		-0.0826*** (-4.280)		-0.0581*** (-3.159)
HHI	-0.0684** (-2.091)	-0.0354 (-1.319)	0.0205 (0.559)	0.0423 (1.182)	-0.0653** (-2.452)	8.68e-05 (0.00361)
Size	0.573*** (12.69)	0.573*** (12.35)	0.572*** (12.98)	0.573*** (12.83)	0.597*** (11.89)	0.595*** (11.95)
Volatility	-0.126 (-0.424)	-0.125 (-0.420)	-0.0637 (-0.220)	-0.0238 (-0.0822)	-0.0998 (-0.335)	-0.0723 (-0.246)
Leverage	-0.000192 (-0.00359)	0.0147 (0.262)	-0.0203 (-0.393)	-0.00845 (-0.153)	0.00676 (0.114)	0.00740 (0.118)
Log(Tenure)	0.302*** (7.773)	0.306*** (7.994)	0.303*** (8.016)	0.307*** (8.298)	0.290*** (7.458)	0.292*** (7.531)
Observations	189,292	183,707	200,138	197,344	170,593	168,394
R-squared	0.752	0.751	0.750	0.750	0.742	0.742
Industry Def	SIC4 CRSP	SIC4 CRSP	SIC4 COMP	SIC4 COMP	HP-400	HP-400
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry x Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Executive FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of Executives	35,434	34,680	36,728	36,384	32,189	31,896

More robustness

- All results seen are qualitative similar with
 - Non-logged WPS as outcome variable
 - Not rank-transformed Common Ownership variables
 - Coarser industry definitions (3-digit)
 - MHHI calculated with $1/n$ instead of true market shares
 - Lagged CO
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- Open question: do these correlations have a “causal” interpretation?

Difference-in-differences

Treat: implied change in CO due to BLK-BGI (2009); top-vs-bottom-tercile

VARIABLES	Log(WPS EGL)		Log(WPS JM)		Log(WPS HL)	
	MHHID (1)	TOP 5 SH (2)	MHHID (3)	TOP 5 SH (4)	MHHID (5)	TOP 5 SH (6)
Treat	-0.114 (-1.133)	0.122 (0.904)	-0.0170 (-0.159)	0.201 (1.391)	-0.0865 (-1.008)	0.0875 (0.687)
Treat * Post	-0.0699*** (-9.218)	-0.406** (-3.461)	-0.107** (-2.991)	-0.402** (-3.199)	-0.0812* (-2.302)	-0.406** (-3.255)
HHI	-0.174 (-0.963)	-0.123 (-0.684)	-0.106 (-0.563)	-0.228 (-1.225)	-0.252 (-1.477)	-0.230 (-1.373)
Size	0.141** (3.699)	0.198*** (4.832)	-0.325*** (-7.549)	-0.244*** (-5.332)	0.530*** (12.79)	0.579*** (13.94)
Volatility	0.882 (0.951)	2.176 (1.941)	-0.735 (-0.759)	1.101 (1.001)	1.594* (2.053)	3.454** (3.549)
Leverage	-1.025*** (-4.222)	-0.720** (-3.096)	-1.655*** (-5.506)	-1.185*** (-4.027)	-0.120 (-0.492)	-0.0131 (-0.0587)
Log(Tenure)	0.175*** (4.137)	0.173*** (3.751)	0.0834 (1.766)	0.134** (2.633)	0.196*** (4.533)	0.204*** (4.899)
Observations	7,238	6,318	7,238	6,318	7,238	6,318
R-squared	0.133	0.161	0.351	0.297	0.380	0.423
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Theory

Is there a model that can help organize the patterns in the data?

Model objectives and ingredients

- Objective: incentivize manager, in the cheapest possible way, such that she sets the desired product market strategy

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- Ingredients
 - 1 Imperfect competition: managers can affect industry profits
 - Strategic complements (differentiated Bertrand)
 - Strategic substitutes (differentiated Cournot)
 - 2 Diversified shareholders: incentivize managers to maximize shareholder value, not own-firm profits in isolation

Setup

- 2 firms
 - Inverse demand: $P_i(q_i, q_j) = A - bq_i - aq_j$
 - Marginal cost: $c_i = \bar{c} - e_i$
 - Pre-wage profit: $\pi_i = (A - bq_i - aq_j - c_i)q_i + \epsilon_i$

- 2 stages. At $t = 1$: 2 shareholders set (public) incentive contracts
 - Linear contract: $w_i = s_i + \alpha_i \pi_i$
 - A owns $x \geq 1/2$ of firm 1 and $1 - x$ of firm 2
 - B owns $1 - x$ of firm 1 and x of firm 2
 - What is the optimal s_i, α_i as a function of ownership?

- At $t = 2$: 2 risk-averse managers exert costly private effort e_i and set q_i (or p_i) in accordance with incentives given by contracts
 - Incentive slope α_i determines managerial behavior

Managers

- Exponential utility: $-\exp[-r(w_i - kq_i e_i^2/2)]$
 - $\epsilon_i \sim \mathcal{N}(0, \sigma^2)$ so rewrite in certainty equivalent form
 - Higher output makes it more costly for the manager to reduce marginal cost

- Manager i chooses e_i and sets q_i (or p_i) to maximize

$$\max_{e_i, q_i} s_i + \alpha_i [A - bq_i - aq_j - (\bar{c} - e_i)]q_i - \frac{r}{2}\alpha_i^2\sigma^2 - \frac{k}{2}q_i e_i^2$$

Shareholders

- Shareholder A's maximization problem is given by

$$\max_{s_i, \alpha_i} (\pi_i - w_i) + \lambda(\pi_j - w_j)$$

$$\text{subject to } w_i \geq w_i'$$

$$\text{and } (e_i^*, q_i^*) \in \arg \max_{e_i, q_i} w_i \quad \text{or} \quad (e_i^*, p_i^*) \in \arg \max_{e_i, p_i} w_i$$

Managerial Effort and Product Market Choices

- Manager i 's optimal choices given by

$$e_i = \frac{\alpha_i}{k}$$
$$q_i = \frac{A - (\bar{c} - e_i) - aq_j}{2b}$$

- Higher α_i leads to higher e_i
- Higher α_i leads to higher q_i (lower p_i)
 - Higher e_i means lower c_i which encourages higher production
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- Product market equilibrium in $t = 2$: solve system of managerial best response functions $e_i(\alpha_1, \alpha_2)$, $q_i(\alpha_1, \alpha_2)$ for $i = 1, 2$

Optimal incentive contracts

- In $t = 1$ majority owner(s) of firm i sets
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 - Hence, removing an active shareholder that wants high α_i with a (truly) passive shareholder has the same effect as active involvement by a passive shareholder.
- Solve for symmetric equilibrium incentive slope $\alpha_i^* = \alpha^*$

$$\alpha^* = \frac{2k(A - \bar{c})(8b^2 - a^2 - 2\lambda ab)}{\lambda a(4b + a) + a^2 - 2ab - 12b^2 + 4(4b^2 - a^2)(2b + a)(1 + kr\sigma^2)k}$$

Predictions

Proposition (Common Ownership and Incentives)

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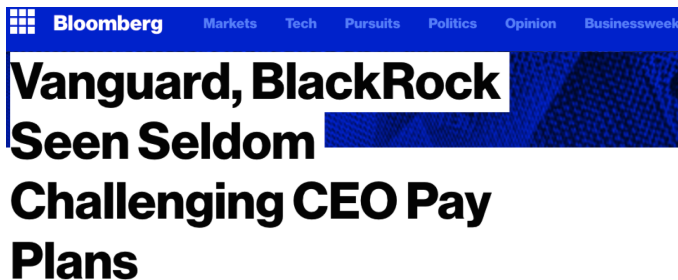
The equilibrium incentives α^ given to managers decrease with the degree of common ownership λ , that is $\frac{\partial \alpha^*}{\partial \lambda} < 0$.*

- Higher λ means owner cares less for aggressive competition
- Lower α_i induce less competitive firm behavior because lower e_i means higher c' and lower q_i (& higher p_i)

“Direct evidence”

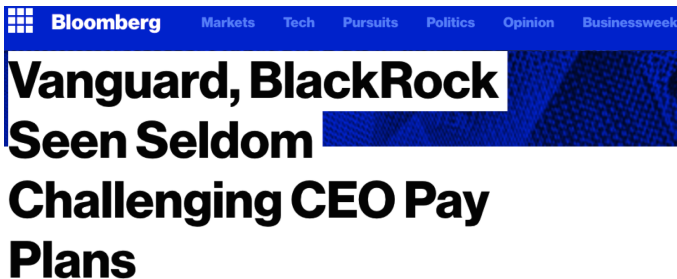
Is there anecdotal evidence that “common” shareholders engage on managerial incentive structure? With the objective of affecting firm interactions?

Anecdotally, investors engage on pay



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Anecdotally, investors engage on pay



Bloomberg Markets Tech Pursuits Politics Opinion Businessweek

Vanguard, BlackRock Seen Seldom Challenging CEO Pay Plans

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Anecdotally, investors indeed engage on pay to affect production decisions

BUSINESS

Wall Street Tells Frackers to Stop Counting Barrels, Start Making Profits

The shale-oil revolution produces lots of oil but not enough upside for investors

By Bradley Olson and Lynn Cook

Updated Dec. 13, 2017 6:09 p.m. ET

Twelve major shareholders in U.S. shale-oil-and-gas producers met this September in a Midtown Manhattan high-rise with a view of Times Square to discuss a common goal, getting those frackers to make money for a change.

The September Manhattan meeting homed in on one factor in particular: the role executive pay plays in driving a growth-at-all-costs mentality.

Interpretation and conclusions

Interpretation of results

- Fact: common ownership associated with “flatter” management incentives
 - Association likely has a “causal” interpretation (in the sense used in reduced-form CF)
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⇒ (Optimally) “lazy” ownership can cause higher industry profits

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 - Does not propose this is the correct model (it's just better than ignoring variation in ownership & firm interactions at organizing the data). Instead, invitation to reject & develop better alternatives!
- Huge research potential in defining and testing alternative objective functions of the firm & re-examining many questions in corporate finance & governance

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- Those are great questions future research is encouraged to address – we merely intend to start a debate by showing such research is likely fruitful!

Thank you!