INTELLECTUAL PROPERTY RIGHTS AND EMPLOYEE STOCK OPTION COMPENSATION: *EVIDENCE FROM COURT OF APPEALS FEDERAL CIRCUIT RULING IN 2008*

AMERICAN FINANCE ASSOCIATION
PH.D. POSTER SESSION
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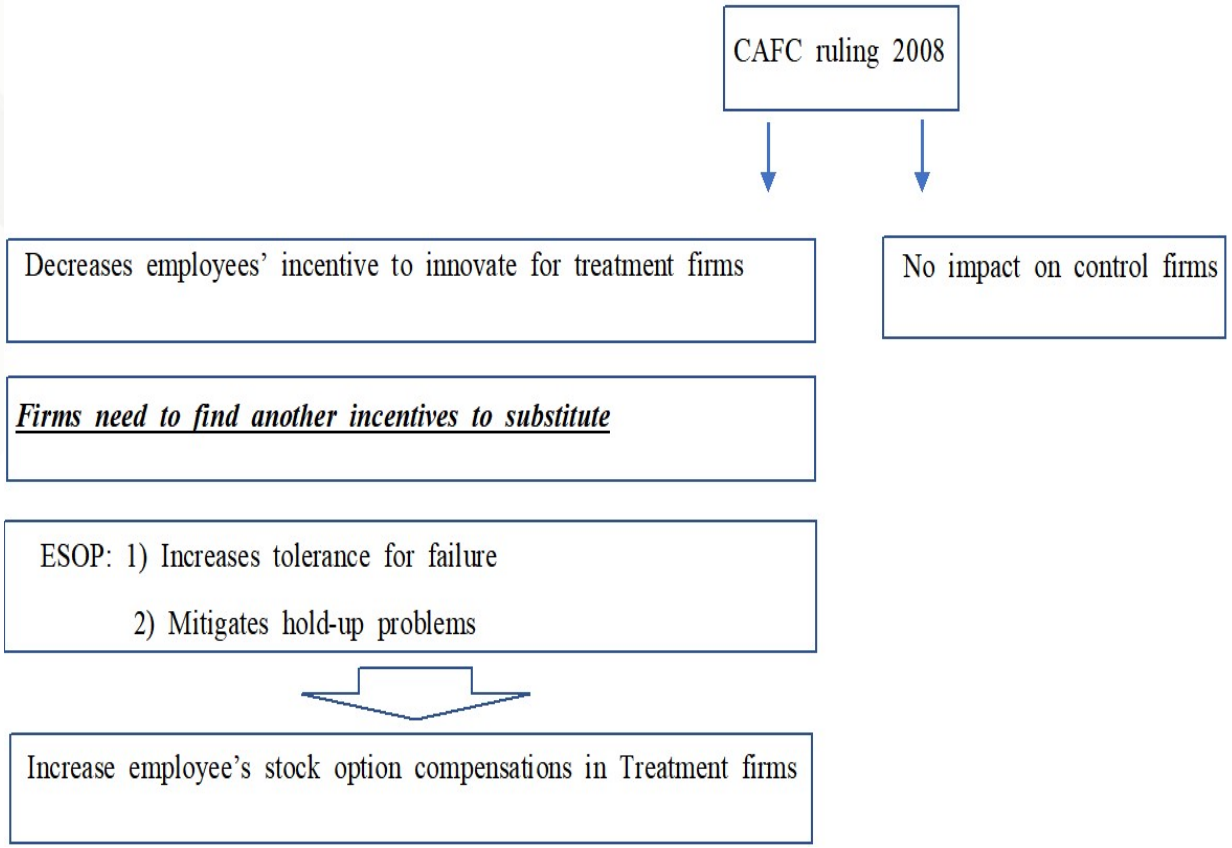
CAFC RULING IN 2008

- MAKES EMPLOYER PATENT OWNERSHIP RIGHTS EXCLUSIVE UNDER ANY CIRCUMSTANCES, ELIMINATES ANY INVENTOR-EMPLOYEE FRIENDLY EXCLUSIONS

- *DDB TECHNOLOGIES, L.L.C., Plaintiff-Appellant, vs. MLB ADVANCED MEDIA, L.P., Defendant-Appellee in 2008*

- *Patent ownership provisions are uniformly regulated under federal law, resulting in more pro-employer rights of intellectual properties for the eight treatment states*

MOTIVATION



- Agency theory
- Positive relation between non-executive stock option compensation and corporate innovation: stock options motivating employees to take risks (Chang et al., 2015)
- Higher levels of intellectual capital firms are more likely to adopt employee stock options (Kroumova and Se

HYPOTHESES

- ***H1: The 2008 CAFC ruling leads to an increase in employee stock option grants for firms headquartered in treatment states***

✓ Firms in states affected by the ruling increase their option awards compared to those unaffected

- ***H2: Granting employee stock options mitigates the negative impact of the CAFC ruling on corporate innovation in treatment states***

✓ Firms awarding more option grants in states affected by the CAFC ruling are granted more patent applications and display more research productivity after the ruling in 2008 comp[illegible] other firms

DATA & DESCRIPTIVE STATS

	COUNT	MEAN	SD	P25	MEDIAN	P75
OPT1	22,138	0.1509	0.9811	0.0001	0.0025	0.2621
OPT2	12,501	0.1226	1.0493	0.0000	0.0008	0.0094
SIZE	22,138	6.1375	1.9982	4.7332	6.1329	7.4608
ROA	22,138	-0.0438	0.3665	-0.0376	0.0350	0.0775
SG	22,138	1.0408	83.8344	-0.0190	0.0812	0.2118
PPE	22,138	0.2291	0.2192	0.0646	0.1512	0.3222
MTB	22,138	2.8950	6.7445	1.3060	2.1212	3.5957
LEV	22,138	0.1988	0.2503	0.0031	0.1419	0.3042
R&D	22,138	0.0643	0.1367	0.0000	0.0066	0.0738
RET	22,138	0.1728	0.6113	-0.1753	0.0798	0.3737
FAS_123R	22,138	0.7264	0.4458	0.0000	1.0000	1.0000

- 2004 ~ 2012
- OPT1: Employees' option grants
  - Ratio of a total number of stock options granted during the year to the common shares outstanding, scaled by the number of employees
- OPT2: Non-executive employees' option grants
  - Ratio of a total number of non-executive emplo
    options during th
    common shares
    scaled by the nu
    employees

TOBIT REGRESSION (FULL)

	Dep.: OPT1		Dep.: OPT2		Dep.: OPT1		Dep.: OPT2	
Indep. Var.	(1)		(2)		(3)		(4)	
POST	-0.08***	(-2.60)	-0.09**	(-2.22)	-0.08***	(-2.68)	-0.09**	(-2.35)
TREAT	0.02	(0.71)	-0.00	(-0.01)				
POST*TREAT	0.10***	(2.73)	0.10**	(2.18)	0.10***	(2.82)	0.10**	(2.28)
SIZE	-0.04***	(-4.90)	-0.03***	(-3.47)	-0.04***	(-4.89)	-0.03***	(-3.42)
ROA	-0.80***	(-4.31)	-0.78***	(-4.65)	-0.80***	(-4.29)	-0.78***	(-4.62)
SG	0.00	(0.86)	0.00	(0.83)	0.00	(0.83)	0.00	(0.78)
PPE	-0.30***	(-3.48)	-0.28**	(-2.18)	-0.30***	(-3.36)	-0.28**	(-2.04)
MTB	0.00*	(1.87)	0.00**	(2.30)	0.00*	(1.78)	0.00**	(2.19)
LEV	-0.19**	(-2.15)	-0.16*	(-1.75)	-0.19**	(-2.08)	-0.16*	(-1.72)
R&D	0.16	(0.63)	0.06	(0.19)	0.14	(0.54)	0.04	(0.13)
RET	0.05***	(2.60)	0.03	(1.10)	0.05***	(2.63)	0.03	(1.13)
FAS_123R	-0.20***	(-3.78)	-0.09**	(-2.00)	-0.12***	(-3.82)	-0.09**	(-2.05)
Year Fixed	Yes		Yes		Yes		Yes	
Industry Fixed	Yes		Yes		Yes		Ye	
State Fixed	No		No		Yes		Ye	
# of obs (N)	22,138		12,501		22,138		12,50	
Pseudo. R-sq	0.0486		0.0418		0.0497		0.043	

R&D EXPENDITURE

	Dep.: OPT1				Dep.: OPT2			
Indep. Var.	*(1)XRD>0*		*(2)XRD=0*		*(3)XRD>0*		*(4)XRD=0*	
POST	-0.04	(-1.37)	-0.10**	(-2.57)	-0.01	(-0.32)	-0.13**	(-2.39)
TREAT	0.01	(0.55)	0.04	(1.15)	0.06***	(2.98)	-0.05	(-1.29)
*POST*TREAT*	0.12***	(2.87)	0.00	(0.09)	0.06*	(1.77)	0.09	(1.58)
SIZE	-0.07***	(-2.82)	-0.03***	(-3.16)	-0.06	(-1.25)	-0.01	(-0.77)
ROA	-0.82***	(-7.11)	-0.69***	(-3.26)	-0.75***	(-75.31)	-0.91***	(-3.24)
SG	0.00***	(2.60)	0.00	(1.19)	0.00***	(3.30)	0.01*	(1.69)
PPE	-0.75***	(-4.01)	-0.04	(-0.45)	-0.58**	(-2.05)	-0.03	(-0.24)
MTB	0.00	(1.12)	0.00	(1.31)	0.00***	(2.59)	0.00	(0.13)
LEV	-0.20***	(-2.88)	-0.13**	(-1.99)	-0.17***	(-3.32)	-0.09	(-1.01)
RET	0.06***	(6.24)	0.02	(1.31)	0.04***	(3.70)	0.01	(0.33)
FAS_123R	-0.11***	(-2.86)	-0.12**	(-2.24)	-0.06	(-0.72)	-0.11	(-1.29)
Year Fixed	Yes		Yes		Yes		Yes	
Industry Fixed	Yes		Yes		Yes		Yes	
# of obs (N)	12,099		10,039		6,655		5,846	
Pseudo. R-sq	0.0505		0.0126		0.0505		0.0319	

EFFECT OF EMPLOYEE STOCK OPTION GRANTS ON CORPORATE INNOVATION

	Dep.: LN#Patent				Dep.: RD_Product			
	(1)		(2)		(3)		(4)	
CH_Opt1	0.01	(1.09)			0.92	(1.59)		
POST	0.12*	(1.77)	0.07	(0.93)	0.01	(0.04)	0.28	(0.86)
CH_Opt1*POST	-0.02	(-0.70)			-1.01	(-1.63)		
TREAT	0.24***	(3.29)	0.17*	(1.86)	0.27*	(1.79)	0.48**	(2.26)
CH_Opt1*TREAT	-0.16	(-1.58)			-1.14*	(-1.80)		
POST*TREAT	0.28***	(3.45)	0.39***	(3.88)	0.03	(0.15)	-0.10	(-0.37)
CH_Opt1*POST*TREAT	0.21*	(1.90)			2.81***	(3.08)		
CH_Opt2			0.03	(0.62)			1.85***	(11.76)
CH_Opt2*POST			-0.05	(-1.01)			-1.72***	(-6.38)
CH_Opt2*TREAT			-0.37***	(-3.56)			-1.81***	(-8.26)
CH_Opt2*POST*TREAT			0.40***	(3.41)			3.11***	(4.40)
Controls	Yes		Yes		Yes		Yes	
Year Fixed	Yes		Yes		Yes		Ye	
Industry Fixed	Yes		Yes		Yes			
# of obs (N)	7,001		4,758		16,596		1	
Pseudo. R-sq	0.1670		0.1705		0.0866		0.	

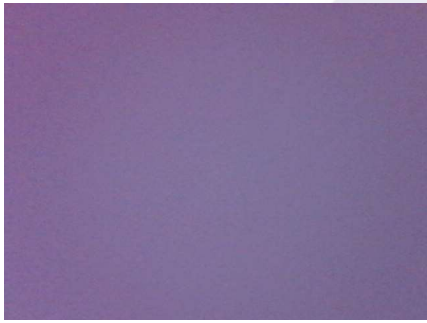
EFFECT OF EMPLOYEE STOCK OPTION GRANTS ON FUTURE PERFORMANCE

	Dep.:ROA_{t+1}	
Indep. Var.	*(1)*	*(2)*
OPT1	*-0.04*** (-3.62)*	
POST	*0.01 (0.65)*	*0.01 (0.65)*
*OPT1*POST*	*-0.04 (-0.95)*	
TREAT	*0.01 (0.91)*	*-0.00 (-0.65)*
*OPT1*TREAT*	*-0.08** (-1.97)*	
*POST*TREAT*	*-0.01 (-0.61)*	*-0.00 (-0.18)*
*OPT1*POST*TREAT*	*0.11** (2.04)*	
OPT2		*-0.03*** (-8.13)*
*OPT2*POST*		*-0.01*** (-2.79)*
*OPT2*TREAT*		*-0.05*** (-8.24)*
*OPT2*POST*TREAT*		*0.06*** (6.32)*
Controls	*Yes*	*Yes*
Year Fixed	*Yes*	*Yes*
Industry Fixed	*Yes*	*Yes*
# of obs (N)	*17,858*	*8,711*
Adjusted. R-sq	*0.2248*	*0.3172*

ADDITIONAL ROBUSTNESS TESTS

- Not supported by alternative exaplantions
  - Financial crisis, Financial constraint
- More pronounces
  - High Ph.D., High Unionization, High litigation risk industry

  High CEO risk incentive firms
- Robust to alternative specifications
  - OLS model and Industry*Year Fixed Effect
  - Alternative measures
  - Matched samples
  - Short-term Window
  - Macro economics variables
  - Dynamic model



CONCLUSIONS

- Use the CAFC ruling in 2008 as a quasi-natural experiment that reduces employees' incentives to innovate
  - Firms from treatment states grant more employee stock options compared to control states after the CAFC ruling in 2008
  - Employee stock option grants have a significant positive impact on corporate innovation