Tournament Culture and Corporate Misconduct : Evidence using Machine Learning

Jitendra Aswani
Fordham University

Franco Fiordelisi
University of Rome III

CMI Field Workshop

September 9, 2020

Outline

- Introduction
- Corporate Culture and Competing Value Framework (CVF)
- Hypotheses Development
- Data and Methodology
  - Measuring Firm-risk, Corporate Culture, and Misconduct Activities
  - External Validity of Corporate Culture Measures
  - Endogeneity Test - Self-Selection Bias
- Empirical Specification
- Results and Discussions
- Conclusion

Introduction

Why Economists ignore Culture for so long ?

- Culture does not fit well with the rational-agent methodology of neoclassical economics (Hermalin, 2000).
- Difficult to define or measure, making it hard to use or control for in econometric analyses.
- Implicit rules rooted in the impossibility of writing complete contracts (Kreps, 1990).

Intro (Contd.)

What has changed then ?

- Recent research has provided the evidence that culture can influence behavior of individuals and groups through its influence on expectations and preferences (Benabou and Tirole, 2006 ; Tabellini, 2008; Guiso et al. (2006).
- Effect of [national] culture on economic and political outcomes (Guiso, Sapeienza, and Zingales (2004, 2006, 2009); Tabellini (2008,2010)).

What about culture at organizational level ?

Intro (Contd.)

- 90% of executives believe that culture is important or very important in their firms and 92% believe that improving culture would improve firm value (Graham et al. 2020).
- Corporate culture is an important channel through which shareholder governance affects a firms value (Popadak, 2015).
- Corporate culture may affect a banks performance and growth strategy, and but suggests that there is no uniquely best culture for a firm. (Thakor, 2016).

Culture and Competing Value Framework (CVF)

Defining Culture:

*"Widely held set of **informal values, beliefs and norms** that are taken for granted by the employees of a firm and that are **necessary for coordination and action**"*
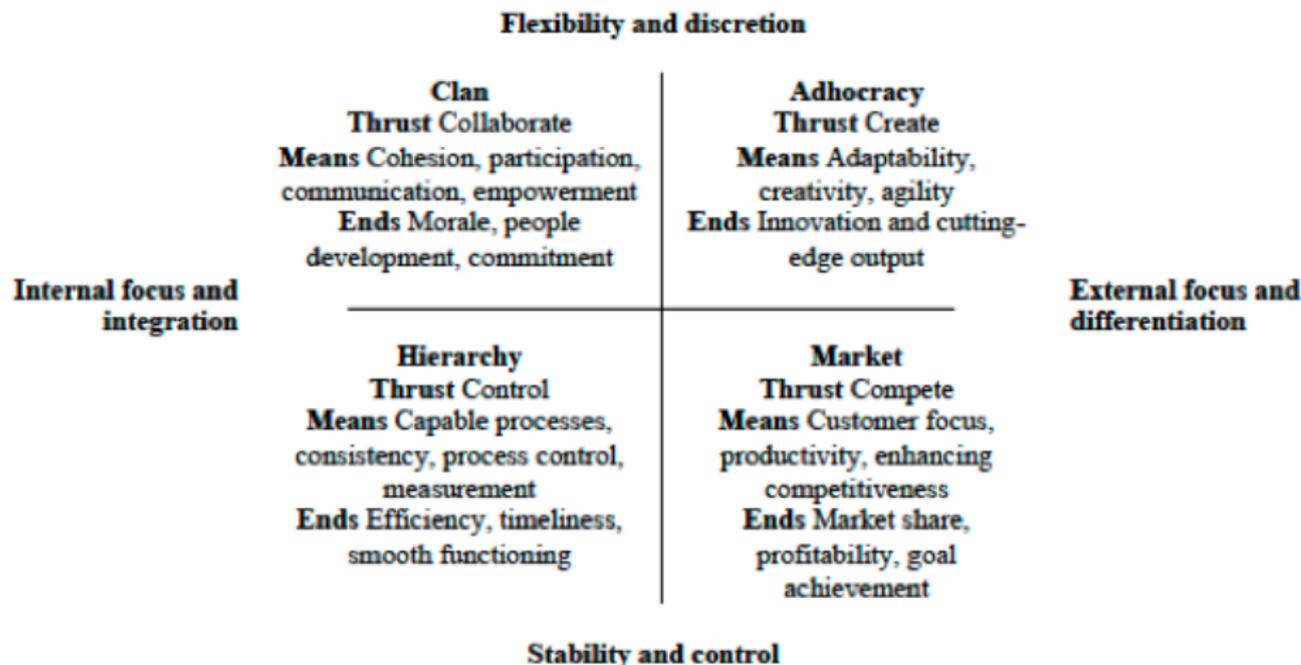
(Becker, 1982 and Smircich, 1983)

Data and Methodology
Corporate Culture in Existing Papers

- Great Places to Work survey (Edmans, 2012)
- Culture ratings on career intelligence websites such as Glassdoor.com, Careerbliss.com, and Vault.com (Popadak, 2015)
- Word trust in the MD&A section of a firms 10-K filing (Audi, Loughran and McDonald, 2015)
- Firms corporate social responsibility (CSR) behavior, from the KLD database (Hoi, Wu and Zhang, 2013)
- Executives cultural heritage and their attitude towards risk and uncertainty (Pan et al. 2017)
- Compliance records with regulators of worker, product and environmental safety (Kedia, Luo and Rajgopal, 2015).
- **Still there is a scope...**Textual analysis, which covers a variety of techniques, has achieved some successful external validation. (Graham et al., 2019).

Culture and CVF (Contd.)

Flexibility and discretion

Internal focus and integration

Clan
Thrust Collaborate
Means Cohesion, participation, communication, empowerment
Ends Morale, people development, commitment

Adhocracy
Thrust Create
Means Adaptability, creativity, agility
Ends Innovation and cutting-edge output

External focus and differentiation

Hierarchy
Thrust Control
Means Capable processes, consistency, process control, measurement
Ends Efficiency, timeliness, smooth functioning

Market
Thrust Compete
Means Customer focus, productivity, enhancing competitiveness
Ends Market share, profitability, goal achievement

Stability and control

Culture and CVF (Contd.)

Cultural dimensions	Assumptions	Beliefs	Values	Artefacts (behaviours)	Effectiveness criteria
Adhocracy	Change	People behave appropriately when they understand the importance and impact of the task.	Growth, stimulation, variety, autonomy, and attention to detail	Risk-taking, creativity, and adaptability	Innovation
Market	Achievement	People behave appropriately when they have clear objectives and are rewarded based on their achievements	Communication, competition, competence, and achievement	Gathering customer and competitor information, goal-setting, planning, task focus, competitiveness, and aggressiveness	Increased market share, profit, product quality and productivit
Hierarchy	Stability	People behave appropriately when they have clear roles and procedures are formally defined by rules and regulation	Communication, routinisation, formalisation, and consistency	Conformity and predictability	Efficiency, timeliness and smooth functioning
Clan	Human affiliation	People behave appropriately when they have trust in, loyalty to, and membership in the organisation	Attachment, affiliation, collaboration, trust, and support	Teamwork, participation, employee involvement, and open communication	Employee satisfaction and commitment

Hypotheses Development

- All firms have some elements of each type of culture dimension but one dimension can dominate over the others.
- Firm with 'compete' culture would excessively be focused on gaining market share, increasing profits, to have a higher bonus-to-base-pay ratio, and to carry out more acquisitions (Thakor, 2016).
- Internal compete culture can also be relate to the seminal work of tournament theory by Lazear and Rosen (1981).
- In a tournament model, workers of a given rank in a organization compete for promotion to the next level of the job hierarchy, higher bonuses, or any other form of award. In such tournaments (or higher competitive environment), employees or executives would take any risk to win the award.

Hypothesis 1: Internal compete culture (aka tournament culture) increases firm-specific risk more as compared to other culture types

Hypotheses Development (Contd.)

- Liu (2016) find that firms with a culture of high opportunistic behavior are more likely to engage in earnings management, accounting fraud, option backdating, and opportunistic insider trading.

- Extending that argument, we are proposing that it is internal competitive environment which enhances the risk-taking behavior (or opportunistic behavior) of the employees and in such environment, there is high probability of misconducts.

- In tournament culture, the employees or executives are incentivized to take the risk to win promotion, bonus, or any other award.

Hypothesis 2: The compete type of firm culture increases corporate misconduct activities as compared to other culture types.

Hypotheses Development (Contd.)

- Culture types may affect firm behavior during a financial crisis (Fang et. al., 2019).
- Rajan (2011) suggests that the risk-taking behavior of the senior executive officers contributed to the crisis of 2008-09.
- In post-crisis era, the US firms have to work under strict internal and external regulations. Thus, firms have to compete in this controlled environment for higher profitability.

Hypothesis 3: The explanatory power of the compete type of culture for firm-specific risk is higher in post-crisis period than the pre-crisis period.

Data and Methodology
Measuring Corporate Culture

- 10-K reports from 1994-2014 downloaded from SEC server through API. (Disclosure documents are available from 1994 onwards)
- Include only one filing per firm in each calendar year.
- Classic machine learning method i.e. textual analysis is used to quantify the tone of the management in financial statements and that is used as a proxy of the culture.
- In textual analysis, a bag of words method (or dictionary method) is used that requires us to parse the 10-K documents into vectors of words and word counts (excluding tables and exhibits).
- The raw score for each cultural dimension is the frequency of its synonyms normalized by the total number of words in the 10-K section.

Data and Methodology
Measuring Corporate Culture

- Formation of dictionary - Two step procedure (Carretta et al. (2011))
  - Synonyms of each culture dimension from CVF framework.
  - Synonyms of each word from first step in reliable dictionaries like Oxford, Cambridge and others.
- Dropping words that occur in more than one bag of words for each cultural dimension in order to identify only unique words that capture a particular cultural dimension.
- Culture tags and related words.
  - Adhocracy : Begin, Change, Envision and similar others.
  - Market: Achieve, Drive, Expand and similar others.
  - Hierarchy: Caution, Conservation, Efficiency and similar others.
  - Clan: Capability, Collective, Cooperation and others.

Create	Compete	Control	Collaborate
ABBOTT LABORATORIES	AZZ INC	BROWN SHOE CO INC	CHILDRENS PLACE INC
ANCHOR GAMING	COLGATE-PALMOLIVE CO	COSTCO WHOLESALE CORP	MACY'S INC
AVON PRODUCTS	EQUINIX INC	FEDEX CORP	MARRIOTT INTL INC
STARBUCKS CORP	KENT ELECTRONICS CORP	QUESTAR CORP	SAKS INC
VITAL SIGNS INC	VISA INC	SKYLINE CORP	SOUTHWEST AIRLINES

Data and Methodology

Firm-specific risk is measured based on Gul et al. (2011).

Expanded market model:

$$r_{j,t} = \alpha_j + \beta_{1,j} r_{m,t-1} + \beta_{2,j} r_{m,t} + \beta_{3,j} r_{m,t+1} + \beta_{4,j} r_{i,t-1} + \beta_{5,j} r_{i,t} + \beta_{6,j} r_{i,t+1} + \epsilon_{j,t}$$

$1 - R^2$ (estimated from above equation) captures the proportion of return variation that is unexplained by the market and industry.

Firm-Specific Risk$_{j,t} = ln[1 - R^2_{j,t}/(R^2_{j,t})]$

Data and Methodology
Measuring Corporate Misconduct

- Absolute value of abnormal discretionary accruals - Dechow and Dichev (2002).
- Earnings restatements - Audit Analytics
- Litigation risk (Text analysis measure) - Campbell et al. (2014)
- Fraud - Liu et al. (2016)
  - Dummy variable which takes value 1 (zero otherwise) if the firm has experienced one of following three events in a year - class action lawsuit, misstated earnings as per SECs Accounting and Auditing Enforcement Releases (AAER) or earnings restatement which classified as irregularity according to General Accounting Office (GAO) database.

Data and Methodology

H1: Internal compete culture (aka tournament culture) increases firm-specific risk more as compared to other culture types.

$FIRM - RISK_{j,t} = \alpha + \beta_1 Collaborate_{j,t-1} + \beta_2 Control_{j,t-1} + \beta_3 Compete_{j,t-1} + \beta_4 Create_{j,t-1} + \gamma X_{j,t-1} + \delta_1 BINDEP_{j,t-1} + \delta_2 BSIZE_{j,t-1} + \delta_3 GDIV_{j,t-1} + \delta_4 EINDEX_{j,t-1} + Industry_j + Year_t + \epsilon_{j,t}$

H2:The compete type of firm culture increases corporate misconduct activities as compared to other culture types.

$MISCONDUCT_{j,t} = \alpha + \beta_1 High\_Risk_{j,t-1} + \beta_2 Culture\_Type_{j,t-1} + \beta_3 High\_RiskXCulture\_Type_{j,t-1} + \gamma X_{j,t-1} + Industry_j + Year_t + \epsilon_{j,t}$

H3: Hypothesis 3: The explanatory power of the compete type of culture for firm-specific risk is higher in post-crisis period than the pre-crisis period.

$FIRM - RISK_{j,t} = \alpha + \beta_1 Post\_CrisisXCollaborate_{j,t-1} + \beta_2 (1 - Post\_Crisis)XCollaborate_{j,t-1} + \beta_3 Post\_CrisisXControl_{j,t-1} + \beta_4 (1 - Post\_Crisis)XControl_{j,t-1} + \beta_5 Post\_CrisisXCompete_{j,t-1} + \beta_6 (1 - Post\_Crisis)XCompete_{j,t-1} + \beta_7 Post\_CrisisXCreate_{j,t-1} + \beta_8 (1 - Post\_Crisis)XCreate_{j,t-1} + \gamma X_{j,t-1} + Industry_j + Year_t + \epsilon_{j,t}$

Results and Discussion

Firm-risk and Tournament Culture

	FIRM -RISK	FIRM -RISK
COLLABORATE	0.037	-0.004
	(0.043)	(0.033)
CONTROL	-0.087***	-0.051**
	(0.031)	(0.023)
COMPETE	0.139***	0.057***
	(0.018)	(0.013)
CREATE	-0.001	-0.026
	(0.040)	(0.031)
Intercept	0.665***	3.268***
	(0.104)	(0.133)
Industry effects	Yes	Yes
Year effects	Yes	Yes
Controls	No	Yes
Obs.	12,323	12,323
R-squared	0.184	0.375

Results and Discussion

Misconduct Activities and Tournament Culture

VARIABLES	EM	RES	LITIGATION_RISK	FRAUD
High_Risk	0.003***	0.017**	-0.016	2.389***
	(0.001)	(0.007)	(0.022)	(0.080)
COMPETE	0.003***	0.008	-0.125***	0.796***
	(0.001)	(0.006)	(0.019)	(0.067)
High_Risk x COMPETE	0.010***	0.015**	0.050*	0.598***
	(0.001)	(0.006)	(0.028)	(0.105)
Constant	0.049***	0.039*	-0.235	-3.022***
	(0.005)	(0.024)	(0.194)	(0.277)
Observations	10,899	12,323	6,258	11,134
R-squared / Psuedo R-squared	0.133	0.025	0.089	0.243
Controls	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes

Results and Discussion

Financial Crisis and Corporate Culture

	FIRM-SPECIFIC RISK	
COLLABORATION_(Post Crisis)	-0.033	
	(0.048)	
COLLABORATION _(1 - Post-Crisis)	0.011	[0.394]
	(0.037)	
CONTROL_(Post Crisis)	-0.103***	
	(0.034)	
CONTROL_(1 - Post-Crisis)	-0.03	[0.037]
	(0.025)	
COMPETE_(Post Crisis)	0.048***	
	(0.018)	
COMPETE _(1 - Post-Crisis)	0.061***	[0.455]
	(0.015)	
CREATE_(Post Crisis)	0.06	
	(0.046)	
CREATE_(1 - Post-Crisis)	-0.054*	[0.009]
	(0.032)	
Intercept	3.224***	
	(0.135)	
Industry	Yes	
Year	Yes	
Controls	Yes	
Observations	12,323	
R-squared	0.375	

Endogenity Test and External Validity of Constructs

- Firm can choose a culture as per its requirement - Self-selection bias
  - 2 SLS regression
  - Instruments - PRODUCT STRENGTH (COMPETE), COMMUNITY (COLLABORATE), PATENT PER EMP (CREATE) and WORK-LIFE BENEFITS (CONTROL).
- External validity of constructs
  - Dependent variable - Firm-risk from Campbell et al. (2014)
  - Culture variables - association with Net CSR score and culture constructs from Li et al. (2020).

Results and Discussion

2SLS Regression - Second Stage

			FIRM-SPECIFIC RISK		
	(1)	(2)	(3)	(4)	(5)
$\overline{COMPETE}$	0.493*				0.657**
	(0.258)				(0.271)
$\overline{CONTROL}$		-0.337			-0.18
		(0.503)			(0.512)
$\overline{CREATE}$			-0.623***		-0.580***
			(0.145)		(0.185)
$\overline{COLLABORATE}$				2.689*	2.790*
				(1.415)	(1.602)
Intercept	5.550***	3.973***	3.921***	0.051	3.932
	(1.210)	(1.033)	(0.167)	(1.683)	(2.683)
Industry	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Observations	7,546	5,619	9,946	7,546	5,619
R-squared	0.306	0.326	0.371	0.306	0.332

Results and Discussion

External Validity Test

VARIABLES	(1) COMPETE	(2) COLLABORATE	(3) CONTROL	(4) CREATE
Innovation	0.160***	0.026**	0.067***	0.103***
	(0.026)	(0.010)	(0.016)	(0.012)
Respect	0.018	0.055***	-0.013	0.036***
	(0.024)	(0.010)	(0.014)	(0.010)
Integrity	-0.018	0.016***	0.034***	0.004
	(0.014)	(0.006)	(0.009)	(0.006)
Team Work	-0.006	0.130***	-0.035	0.076***
	(0.057)	(0.027)	(0.027)	(0.020)
Quality	0.106***	0.007	0.003	-0.019
	(0.024)	(0.013)	(0.015)	(0.012)
Constant	3.910***	0.998***	2.516***	1.036***
	(0.032)	(0.015)	(0.020)	(0.014)
Observations	11,717	11,717	11,717	11,717
Adjusted R-squared	0.844	0.767	0.777	0.829
Firm	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes

Robustness Checks

- Systematic Risk - Controlling for Beta
- External competition - Product market competition
- CEO Effects
- Non-linear specification
- R2 as dependent variable
- Excluding the crisis period data

Conclusion

- Compete culture (Tournament culture) is positively associated with firm-specific risk.

- High compete culture increases misconduct activities such as earnings management, restatements, litigation risk, and accounting fraud, by increasing the firm risk.

- Association of compete culture with firm risk has decreased after the crisis but not significantly.

Thank You

Summary Statistics

Variables	Mean	Stdev	Min	25%	Median	75%	Max
FIRM-SPECIFIC RISK	0.315	0.914	-1.808	-0.322	0.301	0.926	2.61
EM	0.029	0.034	0	0.008	0.018	0.037	0.192
RESTATEMENTS	0.058	0.246	0	0	0	1	2
LITIGATION RISK	0.925	0.559	0	0.565	0.892	1.263	4.762
Corporate culture variables:							
COLLABORATE	1.094	0.342	0.07	0.87	1.03	1.23	4.2
CONTROL	2.555	0.52	1.07	2.22	2.52	2.84	6.61
COMPETE	4.069	0.957	0.56	3.39	3.97	4.66	9.41
CREATE	1.141	0.43	0.17	0.84	1.08	1.37	4.281