Insider and Outsider Careers in Executive Management

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Introduction

Work in progress

- This work seeks to answer three questions:
  1. How does compensation, promotion, and turnover differ between women, those groups that might be regarded as insiders, and other executives?
  2. How did changes in regulations affect compensation, promotion and turnover affect each of these three groups?
  3. How would individual and firm behavior adjust to further changes in regulations on gender quotas, interlock and executive directorships?
- The data for this project comes from:
  1. executive rank, promotion, job turnover.
  2. membership of the board and financial compensation committees.
  3. compensation from salary, grants and firm-asset based wealth adjustments.
  4. individual firm, stock market index and bond returns.
- We estimate a dynamic model of moral hazard and optimal contracting that:

1. rationalizes insider/outsider behavior.
2. predicts the effects of policy innovations to governance (to come).

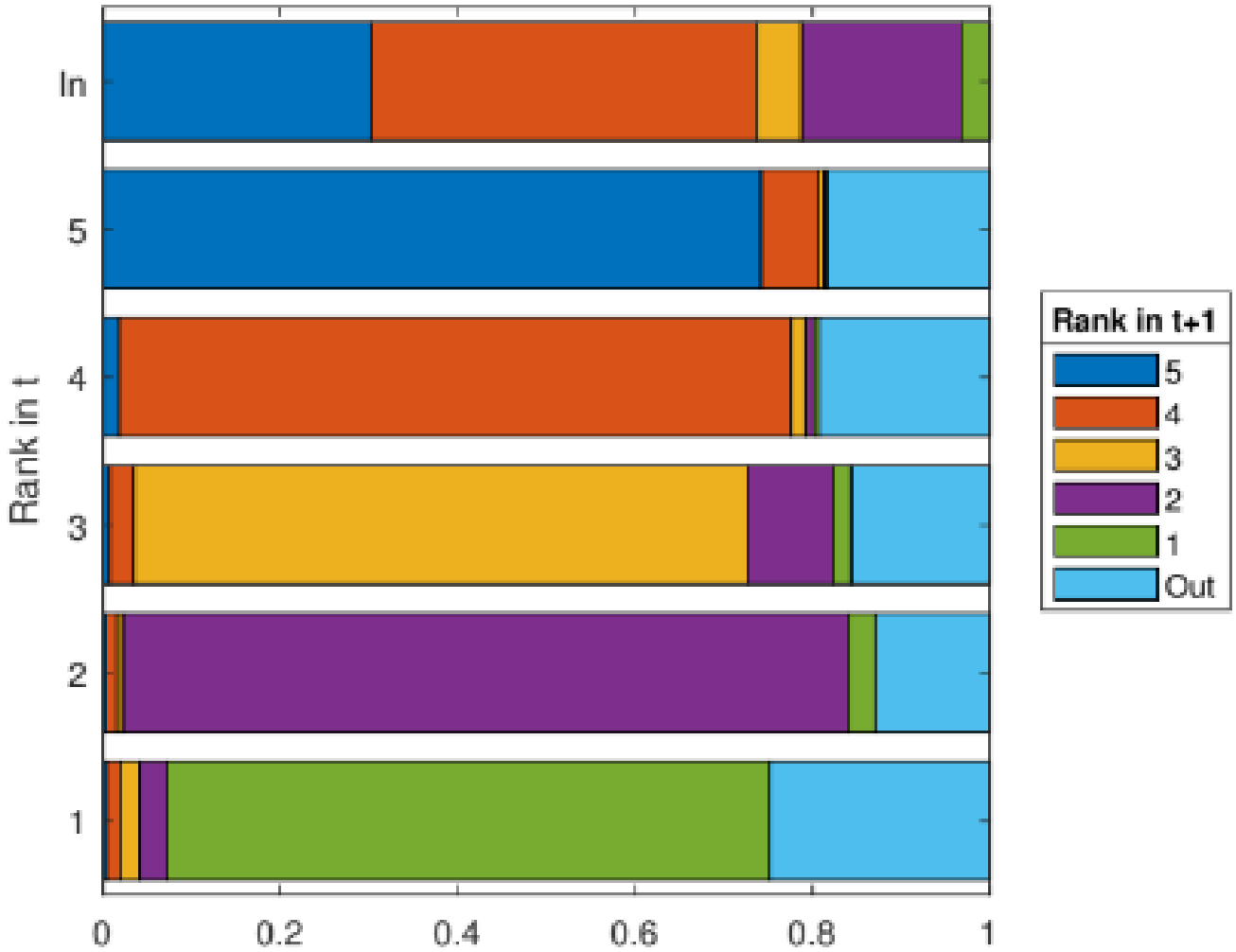
Data

Classifying executive positions within the firm

- We (will) extend panel on S&P 1500 firms for 1992-2006 (taken from Gayle, Golan and Miller, 2012) to construct a hierarchy of lifecycle transitions:
  1. Chairman of the board but no other executive position (*Rank 1*)
  2. CEO (*Rank 2*)
  3. CFO and COO (*Rank 3*)
  4. Other high level rank executives (*Rank 4*)
  5. Other low level ranked executives (*Rank 5*)
- We flag individual executives when they are:
  1. on the board of directors (*insider)*
  2. interlocked, that is on the compensation committee, on another firm's board with a director serving on employee firm's compensation committee, or vice versa (*insider*)
  3. females *(outsider)*
- We categorize company by a *large/small insider board* if the number of board directors who are employed by the firm as executives is greater/less than the median for firms in that sector and size.

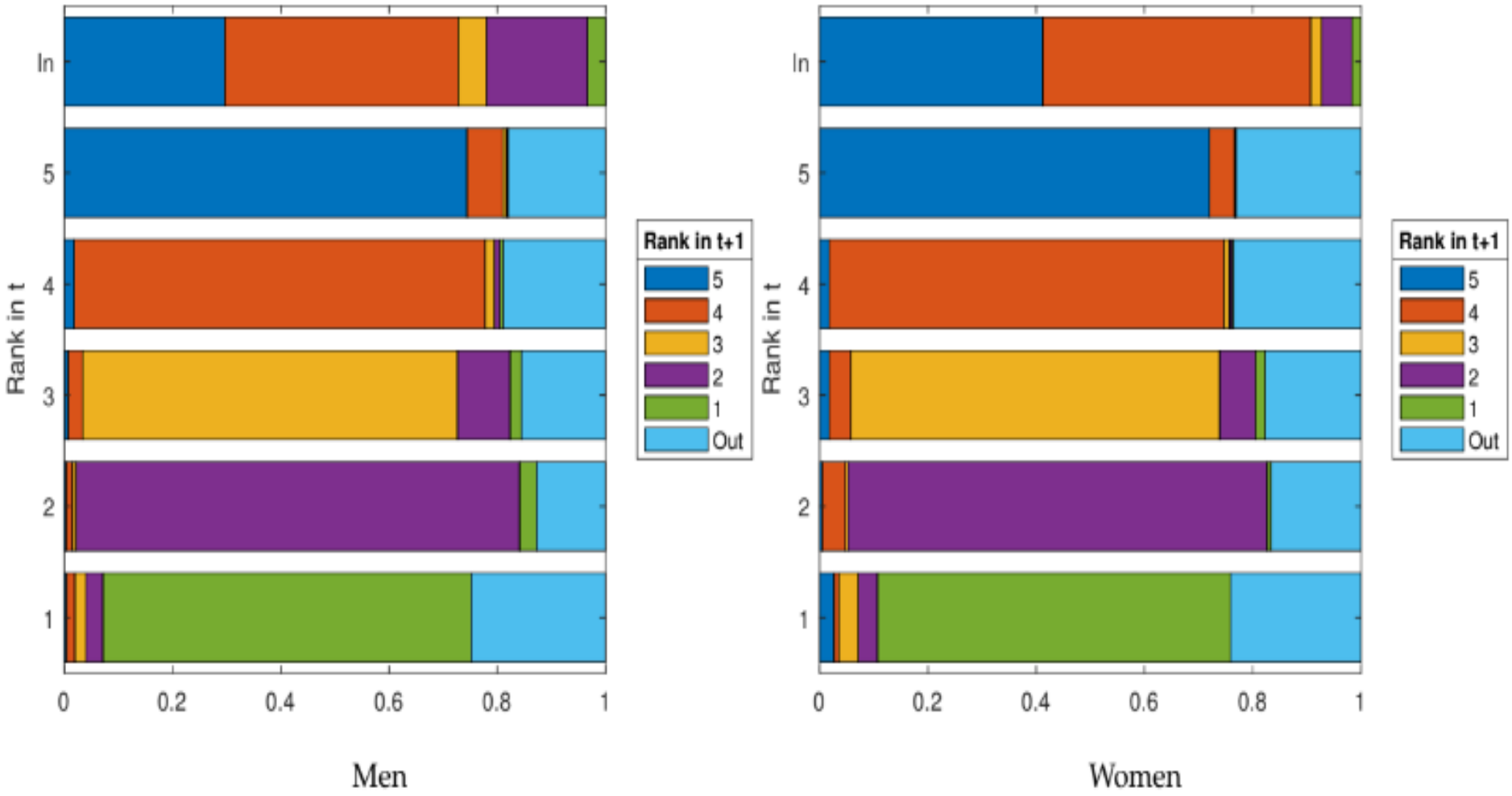
Data

Annual transitions through the ranks as well as entry and exit



Data

Transitions by gender



Data

Components in executive compensation

- Total compensation is the sum of:
  - salary and bonus
  - the value of restricted stocks and options granted
  - the value of retirement and long-term compensation schemes
  - changes in wealth from executives holding firm options and changes in wealth from holding firm stock relative to a well-diversified market portfolio.
- The change in wealth from holding their firms' stock is the value of the stock at the beginning of the period multiplied by the abnormal return, defined as the residual component of returns that cannot be priced by aggregate factors the manager does not control.

Data

Compensation by insider/outside status

	Rank	All Executives	Female Executives	Executive Directors	Interlocked Executives	Boards with Large Num. of Insiders
Total Compensation	1	2,693.290	1,277.075	2,631.546	2,106.416	2,596.101
		(25,324.522)	(17,815.828)	(28,312.065)	(31,256.383)	(26,622.346)
	2	4,294.473	3,876.041	4,586.168	3,516.549	4,190.512
		(25,520.374)	(24,062.739)	(26,158.905)	(29,869.046)	(27,042.537)
	3	3,246.694	-179.155	3,744.392	618.435	3,296.189
		(17,707.640)	(19,978.288)	(19,349.835)	(23,586.838)	(18,784.870)
	4	1,662.167	1,757.116	2,392.181	1,961.974	1,659.536
		(10,978.978)	(11,471.969)	(13,202.687)	(12,217.770)	(11,511.421)
	5	1,153.157	935.827	2,155.380	1,468.979	1,027.438
		(9,091.021)	(9,035.530)	(12,153.325)	(4,793.074)	(9,157.236)
Negative Compensation	1	0.266	0.252	0.296	0.328	0.277
	2	0.253	0.305	0.258	0.295	0.269
	3	0.206	0.238	0.199	0.293	0.216
	4	0.193	0.200	0.197	0.249	0.201
	5	0.190	0.184	0.206	0.237	0.200
Number of Observations	1	6,581	119	4,535	516	4,740
	2	28,526	439	26,188	1,933	14,186
	3	8,858	239	5,344	222	5,522
	4	61,131	3,535	7,961	442	29,742
	5	37,594	2,544	1,899	114	15,934

Data

Heterogeneity amongst executives

- In the data individuals differ by fixed and time-varying characteristics.
- The fixed characteristics are:
  - birth year (mean age of most categories between 50 and 60 years) ;
  - gender (less than 2% female in R1 and R2 rising to 7% in R5);
  - educational background (with indicators for college degree, MBA, MSc, PhD,professional certification);
  - number of firms executive worked for prior to becoming an executive (means about 1.8).
- The variable characteristics consist of several dimensions of labor market experience:
  - years of tenure with the firm (means between 13 and 18);
  - years worked as top executive (means between 15 and 25);
  - number of firms executive worked for after becoming an executive (about 1.8).

Data

Heterogeneity across insiders and outsiders

	All Executives	Female Executives	Executive Directors	Interlocked Executives	Boards with Large Num. of Insiders
Rank 1	0.046	0.017	0.099	0.160	0.068
Rank 2	0.199	0.064	0.569	0.596	0.201
Rank 3	0.062	0.035	0.116	0.068	0.078
Rank 4	0.425	0.511	0.172	0.136	0.420
Rank 5	0.261	0.368	0.041	0.035	0.225
Age	53.013	50.296	55.058	57.680	53.366
	(9.595)	(10.447)	(8.291)	(9.983)	(9.512)
Years of Tenure in Firm	13.508	11.989	14.739	16.388	14.144
	(10.658)	(10.186)	(11.011)	(11.650)	(10.851)
Years of Executive Experience	16.621	14.552	18.513	21.430	17.024
	(10.800)	(11.100)	(10.291)	(11.014)	(10.799)
Number of Firms	0.859	0.923	0.707	0.711	0.817
	(1.289)	(1.345)	(1.136)	(1.231)	(1.258)
College Graduate	0.791	0.781	0.779	0.779	0.781
Masters of Business Admin.	0.224	0.223	0.243	0.230	0.218
Masters of Science	0.191	0.173	0.174	0.174	0.184
PhD	0.179	0.212	0.152	0.170	0.175
Professional Certification	0.224	0.255	0.158	0.121	0.219
Number of Observations	142,690	6,876	45,927	3,227	70,124

Notes Standard deviations are presented in parentheses.

Model Structure

Overview

- Firm governance is modeled as a multilateral contract between:
  1. a value maximizing principal, the board of directors representing shareholders;
  2. risk averse agents, executives at in different positions that determine their span of control over the firm's outcomes, who maximize lifetime expected utility best responding to incentives and outside opportunities.
- Following the literature on managerial compensation markets are incomplete because executive action is noncontractable:
  1. In a static model this creates a standard moral hazard problem . . . solved with a second best incentive contract (Holmstrom, 1979).
  2. In a dynamic model hidden actions affect both the current performance of the firm and also the executive's human capital . . . and the latter factor ameliorates the moral hazard problem (Fama, 1980).
- Formally:
  1. the model is closed with a sequential equilibrium.
  2. the DGP is the probability distribution of observed equilibrium outcomes.
  3. the structural parameters are estimated from panel taken off the DGP.
  4. the effects of policy innovations are found by perturbing the structural parameters and solving the model.

Model Structure

Choices

- Each period while employed the executive chooses
  - consumption $c_t \in \mathcal{R}$
  - a job $d_{jkt} \in \{0, 1\}$
  - and (if s/he does not retire) effort $l_t \in \{0, 1\}$
- where:
  - $k \in \{0, \ldots, K\}$ denotes job rank.
  - $j \equiv j_1 \otimes j_2$
  - $j_1 \in \{0, 1\}$ where $d_t^* = 1$ denotes remaining with the firm.
  - $j_2 \in \{1, 2..., J_2\}$ denotes firm size and industrial sector.
  - s/he retires or exits market by setting $d_{0t} = 1$.
- subject to the restrictions that for all $d_t \equiv (d_{0t}, d_{11t}, \ldots, d_{JKt})$:

$$d_{0t} + \sum_{j=1}^{J} \sum_{k=1}^{K} d_{jkt} = 1$$

Model Structure

Human capital

- $h_t \equiv (t, d_{t-1}, h_0, h_{1t}, h_{2t}, h_{3t})$ denotes human capital vector where:
  - h_0 is a fixed set of individual characteristics including gender and education
  - h_{1t} is total number of years working for firm as an executive (internal capital)
  - h_{2t} is total number of years working as an executive (general capital)
  - h_{3t} is number of firms worked in as an executive (external capital).
- We assume the executive:
  1. loses all his/her internal capital unless s/he remains with the firm and works:
  $$h_{1,t+1} = l_t d_t^* (1 + h_{1t})$$
  2. adds to his/her general capital by working:
  $$h_{2,t+1} \equiv h_{2t} + l_t$$
  3. adds to his/her external capital only by working and switching firms:
  $$h_{3,t+1} = h_{3t} + l_t (1 - d_t^*)$$
- Define $\underline{H}(h_t) \equiv (t+1, h_0, 0, h_{2t}, h_{3t})$ as human capital in $t+1$ from shirking in t, and $\overline{H}_j(h_t)$ as human capital from working as:
$$\overline{H}(h_t, d_t) \equiv (t+1, h_0, l_t d_t^* (1 + h_{1t}), h_{2t} + l_t, h_{3t} + l_t (1 - d_t^*))$$

Model Structure

Preferences and budget constraint

- Lifetime utility of an executive is parameterized as:

$$-\sum_{t=1}^{\infty}\sum_{j=0}^{J}\sum_{k=1}^{K}\delta^{t}e^{-\rho c_{t}-\varepsilon_{jkt}}d_{jkt}\left[\alpha_{jk}\left(h_{t}\right)l_{t}+\beta_{jk}\left(h_{t}\right)\left(1-l_{t}\right)\right]$$

  where:

  - we abbreviate by setting $d_{0kt} \equiv d_{0t}$ for all k.
  - c_t is consumption at time t.
  - δ is the subjective discount factor.
  - ρ denotes the coefficient of absolute risk aversion.
  - $\alpha_{jk}\left(h_t\right)$ is a preference parameter for working.
  - $\beta_{jk}\left(h_t\right)$ is a preference parameter for shirking.
  - Utility depends on h_t and:

$$\alpha_{jk}\left(h_{t}\right) > \beta_{jk}\left(h_{t}\right) > 0$$

- An *iid* firm-job privately observed T1EV taste shock ε_{jkt} also affects utility.
- There are complete markets for all publicly disclosed events, but no borrowing against future executive compensation.

Model Structure

Technology

- Firm production is defined as:

$$\sum_{k=1}^{K} F_{jkt(\tau)}\left(h_{t(\tau)}\right) + e_{j\tau}\left(\pi_{\tau+1} - 1\right) + e_{j\tau}\pi_{j,\tau+1}$$

  where for expositional ease, each executive holds a distinct position and:
  - $t(\tau)$ is the age of executive at calendar time τ
  - $h_t^{(k)}$ denotes the human capital of the executive in position k
  - $F_{jk,t(\tau)}\left(h_{t(\tau)}\right)$ denote the individual contribution of k to the firm
  - $e_{j\tau}$ denotes the value of firm j at the beginning of calendar time τ
  - $\pi_{\tau+1}$ denotes the gross returns to the market portfolio
  - $\pi_{j,\tau+1}$, denotes abnormal return to the firm before executive compensation.
- We assume the probability density for $\pi_{j,\tau+1}$ is:
  - $f_j(\pi_{j,\tau+1})$ when all K executives work
  - $f_j(\pi_{j,\tau+1})g_{jk}(\pi_{j,\tau+1}|h_t)$ when all executives but k work.
- The gross expected return to a firms are higher if everybody works:

$$\int \pi f_j(\pi)\, d\pi > \int \pi f_j(\pi)\, g_{jk}(\pi|h_t)\, d\pi$$

Model Structure

Timing, information, and overview of perfect equilibrium

1. Each executive knows his/her h_t and privately chooses consumption c_t.
2. Then s/he privately observes ε_{jkt} and selects a firm and position.
3. Executives in each firm simultaneously submit compensation proposals, w_{jkt+1}, to the shareholder board.
4. If proposal is off the equilibrium path, shareholders believe the worst and reject all the submissions.
5. This rejection is observed by all firms.
6. If their demands are not approved, the executives in the firm retire.
7. If approved, the executives privately choose l_t.
8. h_t is updated with $\underline{H}(h_t)$ or $\overline{H}(h_t, d_t)$.
9. The equilibrium optimal contract always induces executives to work.
10. Note shareholders never observe evidence of shirking from returns if an executive strays from the equilibrium path.
11. Denoting the board's beliefs about the executive's human capital by h'_t, the board updates with $\overline{H}(h'_t, d_t)$.

Theoretical Implications

Given compensation, this is a dynamic discrete choice problem (Gayle, Golan and Miller, 2015)

Theorem

Job matches $d_t \equiv \left\{d_{jkt}\right\}_{j,k}$ *and effort levels* l_t *are picked to maximize:*

$$\varepsilon_{0t} d_{0t} + \sum_{j=1}^{J} \sum_{k=1}^{K} d_{jkt} \left[\varepsilon_{jkt} - \ln V_{jkt}(h, h', b_t)\right] \tag{1}$$

where b_t *is the bond price,* $p_{0t}(h, h')$ *is the probability of retirement,* $V_{jkt}(h, h', b_t) \equiv$

$$\min \left\{ \begin{array}{l} \alpha_{jk}(h)^{\frac{1}{b_t}} \left\{ p_{0,t+1} \left[\overline{H}(h, d_t), \overline{H}(h', d_t)\right]^{\frac{1}{b_{t+1}}} E_t \left[v'_{jk,t+1}\right] \right\}^{1-\frac{1}{b_t}} \\ \beta_{jk}(h)^{\frac{1}{b_t}} \left\{ \begin{array}{c} p_{0,t+1} \left[\underline{H}(h), \overline{H}(h', d_t)\right]^{\frac{1}{b_{t+1}}} \\ \times E_t \left[v'_{jk,t+1} g_{jk}(\pi | h)\right] \end{array} \right\}^{1-\frac{1}{b_t}} \end{array} \right\}$$

and $v'_{jk,t+1} \equiv \exp\left(-\rho w_{jk,t+1}(h'_t, \pi_t) / b_{t+1}\right)$.

Theoretical Implications

Incentive compatibility constraint to ensure work

- In equilibrium executives propose contracts incentivizing themselves.
- The *incentive compatibility* constraint is:

$$\left[\frac{\alpha_{jk}(h)}{\beta_{jk}(h)}\right]^{\frac{1}{b_t-1}} \leq \left\{\frac{p_{0,t+1}\left[\underline{H}(h), \overline{H}(h', d_t)\right]}{p_{0,t+1}\left[\overline{H}(h, d_t), \overline{H}(h', d_t)\right]}\right\}^{\frac{1}{b_{t+1}}} \frac{E_t\left[v'_{jk,t+1} g_{jk}(\pi|h)\right]}{E_t\left[v'_{jk,t+1}\right]} \tag{2}$$

- Whenever $p_{0,t+1}\left[\underline{H}(h), \overline{H}(h', d_t)\right] > p_{0,t+1}\left[\overline{H}(h, d_t), \overline{H}(h', d_t)\right]$, *career concerns* ameliorate the agency problem.
- For example, the future benefits of human capital fully offset the current gains from shirking, implying the executive would work for a fixed wage satisfying the participation constraint, if:

$$\frac{\alpha_{jk}(h)}{\beta_{jk}(h)} \leq \left\{\frac{p_{0,t+1}\left[\underline{H}(h), \overline{H}(h', d_t)\right]}{p_{0,t+1}\left[\overline{H}(h, d_t), \overline{H}(h', d_t)\right]}\right\}^{\frac{b_t-1}{b_{t+1}}} \tag{3}$$

Theoretical Implications

The optimal contract minimizes the cost of incentivizing the executive

- Given the T1EV assumption, the equilibrium probabilities sorting the job/firm combinations specialize to:

$$\ln\left(\frac{p_{jkt}(h,h)}{p_{0t}(h,h)}\right) = -\ln\alpha_{jk}(h) - (b_t - 1)\left(\begin{array}{c}\frac{1}{b_{t+1}}\ln p_{0,t+1}\left(\overline{H}_{jk}(h), \overline{H}_{jk}(h)\right) \\ +\ln\left\{\Gamma\left(\frac{b_{t+1}+1}{b_{t+1}}\right)E_t\left[v_{jk,t+1}\right]\right\}\end{array}\right) \tag{4}$$

where $\Gamma(\cdot)$ denotes the gamma function.

- Make $E_t[v_{jk,t+1}]$ and hence $w_{jk,t+1}(h,\pi)$ the subject of (4) to obtain the *cost minimizing contract*:

$$w_{jk,t+1}(h,\pi) \equiv \Delta^{\alpha}_{jkt}(h) + \Delta^{p}_{jkt}(h) + \Delta^{q}_{jkt}(h) + r_{jk,t+1}(h,\pi) \tag{5}$$

where:

1. $\Delta^{\alpha}_{jkt}(h)$ is the systematic component of non-pecuniary utility of (j,k)
2. $\Delta^{p}_{jkt}(h)$ is the investment value of (j,k).
3. $\Delta^{q}_{jkt}(h)$ are the idiosyncratic values making executive in fractal $p_{jkt}(h)$ indifferent between (j,k) and retirement.
4. $\Delta^{r}_{jkt}(h) \equiv E\left[r_{jk,t+1}(h,\pi)\right]$ is nonnegative the risk premium.

Theoretical Implications

Cost Minimization (Theorem 5.2 in Gayle, Golan and Miller 2015)

- Under the assumptions of our model:

$$\Delta^{\alpha}_{jkt}(h) \equiv \rho^{-1}\left(b_t-1\right)^{-1} b_{t+1} \ln \alpha_{jk}\left(h\right)$$

$$\Delta^{p}_{jkt}(h) \equiv \rho^{-1} \ln p_{0,t+1}\left[\overline{H}\left(h,d_t\right),\overline{H}\left(h,d_t\right)\right] + \rho^{-1} b_{t+1} \ln \Gamma\left(\frac{b_{t+1}+1}{b_{t+1}}\right)$$

$$\Delta^{q}_{jkt}(h) \equiv \rho^{-1}\left(b_t-1\right)^{-1} b_{t+1} \ln\left[\frac{p_{jkt}\left(h,h\right)}{p_{0t}\left(h,h\right)}\right]$$

and $r_{jk,t+1}(h,\pi) \equiv 0$ if (3) holds, and otherwise defined as:

$$\frac{b_{t+1}}{\rho} \ln\left\{1-\eta g_{jk}\left(\pi\left|h\right.\right)+\eta\left[\frac{p_{0,t+1}\left[\overline{H}\left(h,d_t\right),\overline{H}\left(h,d_t\right)\right]}{p_{0,t+1}\left[\underline{H}\left(h,d_t\right),\overline{H}\left(h,d_t\right)\right]}\right]^{\frac{1}{b_\tau}}\left[\frac{\alpha_{jkt}(h)}{\beta_{jkt}(h)}\right]^{\frac{1}{b_t-1}}\right\}$$

where η the unique positive root to:

$$\int \frac{f_j\left(\pi\right)}{\eta^{-1}+\left[\frac{p_{0,t+1}\left[\overline{H}(h,d_t),\overline{H}(h,d_t)\right]}{p_{0,t+1}\left[\underline{H}(h,d_t),\overline{H}(h,d_t)\right]}\right]^{\frac{1}{b_\tau}}\left[\frac{\alpha_{jk}(h)}{\beta_{jk}(h)}\right]^{\frac{1}{b_\tau-1}}-g_{jk}\left(\pi\left|h\right.\right)} d\pi = 1$$

Theoretical Implications

Equilibrium conditions

- Free entry by firms implies the marginal product of each executive is equated with his expected compensation:

$$F_{jkt}(h) = E\left[w_{jk,t+1}(h)\right]$$

- Note:
  - there is only one subgame, the whole game.
  - we assume executives who shirk become tainted, lowering their productivity to levels that are unacceptable to shareholders.
  - a perfect equilibrium exists where all executives work on the equilibrium path, and it is not optimal for executives to declare any past shirking.

Identification

Compensating differentials for positions and the risk aversion parameter

- Note that (1) is a dynamic discrete choice problem.
- Thus $\alpha_{jk}(h)$ and ρ are identified up the distribution of ε_t and a normalization (Magnac and Thesmar, 2002; Arcidiacono and Miller, 2020),
- Intuitively jobs are like lottery tickets. Distinct jobs differ in their:
  - probability distributions over their pecuniary payoffs.
  - nonpecuniary benefits.
- Hence the different characteristics of their job choices induce executives to reveal
  - their attitude towards risk,
  - the value they place on nonpecuniary features of the job,
  - and their investment value in terms of future employment.

Identification

The slope of compensation identifies the likelihood ratio for shirking versus working

- When career concerns fully offset the agency problem and $r_{jk,t+1}(h,\pi) \neq 0$, neither $g_{jk}(\pi|h)$ nor $\beta_{jk}(h)$ are identified.
- The optimal compensation equation (5) implies:

$$\frac{\partial w_{jk,t+1}(h,\pi)}{\partial \pi} = \frac{\partial r_{jk,t+1}(h,\pi)}{\partial \pi}$$

- Using (5) we rewrite this as:

$$\frac{\partial g_{jk}(\pi|h)}{\partial \pi} = \eta^{-1}\frac{\partial}{\partial \pi}\left[\exp\frac{-\rho r_{jk,t+1}(h,\pi)}{b_{t+1}}\right]$$

- Therefore $g_{jk}(\pi|h)$ is identified when $r_{jk,t+1}(h,\pi) \neq 0$ by appealing to two further conditions:

$$\begin{aligned} \int g_{jk}(\pi|h) f_j(\pi|h) &= 1 \ldots \text{likelihood ratio property} \qquad (6) \\ \lim_{\pi\to\infty}\left[g_{jkt}(\pi|h)\right] &= 0 \ldots \text{shirking cannot produce exceptional returns.} \end{aligned}$$

Identification

Identifying the shirking parameter from the incentive compatibility constraint

- The only remaining parameter, $\beta_{jk}(h)$, is point identified (for each h) when the incentive compatibility constraint binds.
- Rewriting (2) yields:

$$\frac{\beta_{jk}(h)}{\alpha_{jk}(h)} \geq \left\{ \frac{p_{0,t+1}\left[\underline{H}(h), \overline{H}(h', d_t)\right]}{p_{0,t+1}\left[\overline{H}(h, d_t), \overline{H}(h', d_t)\right]} \right\}^{\frac{b_{t+1}}{b_t - 1}} \left\{ \frac{E_t\left[v'_{jk,t+1} g_{jk}(\pi \mid h)\right]}{E_t\left[v'_{jk,t+1}\right]} \right\}^{\frac{1}{b_t - 1}}$$

- Note that realizations from $p_{0,t+1}(h, h)$ are on the equilibrium path but realizations from $p_{0,t+1}(h, h')$ are never observed when $h \neq h'$.
- However successively solving for the model using backwards recursion point identifies both $p_{0,t+1}(h, h')$ and $\beta_{jk}(h)$ when (2).
- Recall that if (2) does not bind compensation is constant (so we know when point identification holds).

Estimation

Four step procedure directly follows identification strategy

1. Nonparametrically (flexibly) estimate:

$$w_{jkt}(\pi, h) \ldots \text{compensation equation}$$
$$f_j(\pi) \ldots \text{density of excess returns given firm type}$$
$$p_{jkt}(h) \ldots \text{conditional choice probabilities}$$

2. Estimate ρ and $\alpha_{jk}(h)$ from sample moments formed from sorting equation (4) with plug-ins obtained from Step 1 (Hotz and Miller, 1993).
3. Exploiting (6), the regularity conditions for $g_{jkt}(\pi|h)$, estimate:

$$\overline{w}_{jkt}(h) \equiv \lim_{\pi \to \infty} \left[w_{jkt}(\pi|h) \right]$$

as a nonparametric monotone regression (Brunk, 1958). Then estimate $g_{jk}(\pi|h)$ (Gayle and Miller 2015) using:

$$g_{jk}(\pi|h_t) = \frac{e^{\rho \overline{w}_{jk,t+1}(h_t)/b_{t+1}} - e^{\rho w_{jk,t+1}(h_t,\pi)/b_{t+1}}}{e^{\rho \overline{w}_{jk,t+1}(h_t)/b_{t+1}} - E\left[e^{\rho w_{jk,t+1}(h,\pi)/b_{t+1}}|h_t, j\right]}$$

4. Recursively calculate $p_{0,t+1}\left[\underline{H}(h), \overline{H}(h', d_t)\right]$ and hence estimate $\beta_{jk}(h)$ using plug-ins for ρ, $\alpha_{jk}(h)$ and $g_{jk}(\pi|h)$.

Estimates from the Structural Model

Insiders and entrenchment

- A **large numbers of insiders on the board** reduces:
  - *expected pay* (marginal product) by \$60K on average (\$2.96M - \$2.9M).
  - *certainty equivalent pay* by \$340K lower on average (\$730K - \$390K), where

$$(\text{certainty equivalent pay} = \text{expected pay} - \text{risk premium}).$$

- The **differences in certainty equivalent pay**

$$(= \text{nonpecuniary loss} - \text{idiosyncratic demand} - \text{investment value})$$

  are mainly explained by:
  - *more agreeable work routines* (by \$250K = \$1.52M - \$1.27M).
  - *idiosyncratic demand considerations* (by \$110K = \$640K - \$530K).
- Focusing on the **sources of the agency problem**:
  - the *annual percentage gross loss* is lower (22% versus 25%).
  - *shirking* is less valuable (\$7.8M versus 10M).
  - *career concerns* ameliorating the problem are the same (\$1.9M).

Estimates from the Structural Model

Interlock

- Compared to the others, **interlocked executives** earn:
  - \$430K lower *expected pay* on average (\$2.43M versus \$2.86M).
  - \$150K lower *certainty equivalent pay* on average (\$560K versus \$710K).
- The **differences in certainty equivalent pay** are mainly explained by:
  - *more agreeable work routines* (\$1.4M versus \$1.51M).
  - *idiosyncratic demand considerations* (by \$40K = \$590K - \$550K).
- Focusing on the **sources of the agency problem**:
  - the *annual percentage gross loss* is lower (22% versus 25%).
  - *shirking* is less valuable (\$9.1M versus 10M).
  - although *career concerns* are less important (\$1.7M versus \$1.9M).

Estimates from the Structural Model

Executive directors

- Compared to the others, **executive directors** earn:
  - \$280K lower *expected pay* on average (\$2.58M versus \$2.86M).
  - \$75K lower *certainty equivalent pay* on average (\$635K versus \$710K).
- The **differences in certainty equivalent pay** are mainly explained by:
  - *more agreeable work routines* (\$1.4M versus \$1.51M).
  - *idiosyncratic demand considerations* (by \$39K = \$588K - \$549K).
  - *lower investment value* (by \$4K = \$251K - \$247K).
- Focusing on the **sources of the agency problem**:
  - the *annual percentage gross loss* is lower (17% versus 25%).
  - *shirking* is more valuable (\$6.2M versus \$6.1M).
  - and *career concerns* are more important (\$2.0M versus \$1.9M).

Estimates from the Structural Model

Gender comparisons

- Compared to males, **females**:
  - receive the same *expected pay* on average ($2.9M).
  - earn $80K higher *certainty equivalent pay* on average ($800K versus $700K).
  - are paid a lower risk premium ($2.1M versus $2.2M).
- The **differences in certainty equivalent pay** are mainly explained by:
  - *less agreeable work routines* ($1.6M versus $1.5M).
  - *idiosyncratic demand considerations* (by $39K = $588K - $549K).
  - *lower investment value* ($200K versus $300K).
- Focusing on the **sources of the agency problem**:
  - the *annual percentage gross loss* would be lower (25.1% versus 25.3%).
  - *shirking* is less valuable ($9.8M versus $10M).
  - *career concerns* are less important ($1.8M versus $1.9M).\