The economics of deferral and clawback requirements: An indirect tax approach to compensation regulation

by

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Contributions

Three types of contributions:

- methodological: regulatory activity modifies the constraint set of private sector contracting problems
  $\longrightarrow$ this is akin to levying a tax on the rents from contracting.
- technical: how to regulate managerial compensation if managerial actions have long-term consequences
  $\longrightarrow$ compensation as a function of the evolution of informativeness of corporate performance
  $\longrightarrow$ extend Grossman-Hart (1983) to continuous time
- economical: regulating compensation because of regulatory frictions not internalized by the contracting parties
  $\longrightarrow$ the regulation of compensation as one element of regulation that must be considered jointly with other elements
  $\longrightarrow$ "holistic" view of regulation

Hidden Actions - The Base Model

Agent performs a task $a \in \mathcal{A}$,
a influences an outcome $T \in \mathcal{T}$.
Relationship between a and T is stochastic: $\Phi(T, a)$ distribution of T given a.
T is observable and verifiable, a is unobservable to the Principal.

Contracts: $(a, P(\cdot))$, where $P(\cdot) : \mathcal{T} \rightarrow (\underline{p}, \infty)$ denotes payments from the Principal to the Agent.

Preferences (ex-post) over outcomes T, actions a, and payments $p = P(T)$:

- Principal: $u_P(T, a, p) = \pi(T) - p$,
- Agent: $u_A(T, a, p) = U(p) - c(a)$, with $c : \mathcal{A} \rightarrow \mathbb{R}$.

Hidden Actions - The Base Model

Second best problem

$$\max_{a,P(\cdot)} E^a \left[\pi(T) - P(T)\right]$$

subject to

$$a \in \arg\max_{\widehat{a}\in\mathcal{A}} E^{\widehat{a}}[U(P(T))] - c(\widehat{a}) \qquad \text{(IC)}$$

$$E^a \left[U(P(T))\right] - c(a) \geq \underline{u}_A \qquad \text{(PC)}$$

$$P(T) \geq 0 \text{ all } T \qquad \text{(LL)}$$

Hidden Actions - The Basel Model

Grossman-Hart's Two-Step Procedure

1. For each $a \in \mathcal{A}$, find the payment function P^a that minimizes the total cost of implementing a:

$$\min_P E^a[P(T)] \tag{GH1}$$
$$\text{subject to (IC), (PC), (LL)}$$

2. Let $W(a)$ denote the value of problem (GH1). Then choose

$$a^* \in \arg\max_{a \in \mathcal{A}} E^a \pi(T) - W(a). \tag{GH2}$$

If outcome set $\mathcal{T}$ and action set $\mathcal{A}$ are continua, the problem typically

- is non-convex
- is non-compact
- is non-differentiable
- has a continuum of incentive constraints

Hidden Actions - The Base Model

Solution

If outcome set $\mathcal{T}$ and action set $\mathcal{A}$ are continua, the problem typically

- is non-convex
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Solution requires tricks and assumptions and has hardly any structure.

$\mathcal{T} = \mathcal{A} = [0, \infty)$
Action $a =$ effort to keep the bank operating
Outcome $T_B =$ time of (first) "bank failure", c.d.f. $F(\cdot, a)$, density $f(\cdot, a)$.

Let $S(t, a) = 1 - F(t, a)$ be the survival function
and $\lambda(t, a)$ the hazard function (instantaneous failure rate).
Assumption: $\frac{\partial}{\partial a}\lambda(t, a) < 0$.

Then $\lambda(t, a) = \frac{f(t,a)}{S(t,a)}$,
and $\lambda(t, a) = \frac{-S'}{S} = -\frac{d}{dt} \ln S(t, a)$, hence, $S(t, a) = \exp(-\int_0^t \lambda(s, a) ds)$.
This yields

$$f(t, a) = \lambda(t, a) \exp(-\int_0^t \lambda(s, a) ds)$$

This Paper - The Base Model

Technology and value

Market: safe (instantaneous) interest rate r

Bank: Investment technology requiring €1 of input at date 0, yielding flow return

$$Y_t = \begin{cases} y & \text{if } t < T_B \\ 0 & \text{if } t > T_B \end{cases}$$

For fixed T_B, net expected value of returns

$$\pi_0(T_B) = \int_0^{T_B} y e^{-rt} dt - 1 = \frac{y}{r}\left(1 - e^{-rT_B}\right) - 1$$

For uncertain T_B, net expected return under action a

$$\begin{aligned} E^a \pi_0(T_B) &= \int_0^{\infty} \frac{y}{r}\left(1 - e^{-rt}\right) f(t,a) dt - 1 \\ &= y \int e^{-rt} S(t,a) dt - 1 \end{aligned}$$

This Paper - The Base Model

Preferences Principal

Bankers finance balance sheet of size 1, raise (perpetual) debt D, use own funds $K = 1 - D$.
For now: D exogenous.

Assumption: Debt is subsidized by deposit insurance, hence market cost of debt = safe interest rate r.

For any level D and fixed T_B, net expected return

$$\begin{aligned} \pi_D(T_B) &= \int_0^{T_B} (y - rD)e^{-rt} dt - (1 - D) \\ &= \frac{y - rD}{r}(1 - e^{-rT_B}) - (1 - D) \end{aligned}$$

For uncertain T_B, action a

$$E^a \pi_D(T_B) = \int_0^\infty \frac{y - rD}{r} \left(1 - e^{-rt}\right) f(t,a) dt - K$$
$$= (y - rD) \int_0^\infty e^{-rt} S(t,a) dt - (1 - D)$$

Note:

$$E^a \pi_D(T_B) = E^a \pi_0(T_B) + \left(1 - r \int_0^\infty e^{-rt} S(t,a) dt\right) D$$

Debt subsized $\rightarrow$ maximum leverage
($\rightarrow$ Section 5: Bank capital structure)

Manager is risk-neutral: $U(p) = p$,
but impatient.
If T_B is fixed:

$$U(P(T_B)) = e^{-(r+\Delta r)T_B} P(T_B),$$

and if T_B is uncertain, under action a:

$$E^a\left[U(P(T_B))\right] = \int_0^\infty e^{-(r+\Delta r)t} P(t) f(t,a) dt$$

For each $a \in \mathcal{A}$, find the payment function P^a that minimizes the total cost of implementing a:

$$W(a) = \min_P E^a[P(T_B)] \quad \text{(W)}$$

subject to

$$a \in \arg\max_{\widehat{a} \in \mathcal{A}} E^{\widehat{a}}[U(P(T_B))] - c(\widehat{a}) \quad \text{(IC)}$$

$$E^a[U(P(T_B))] - c(a) \geq \underline{u}_A \quad \text{(PC)}$$

$$P(T) \geq 0 \text{ all } T \quad \text{(LL)}$$

This is an interesting and difficult problem ...

... but interestingly, not the one the authors analyze.

Two reasons:

1. Include two additional constraints on the contracting problem (W) - (LL):
   - deferral of compensation: $P(T) = 0$ for $T < T_{\min}$
   - clawback of compensation (compensation after T_B?)

   This new problem Γ_R has higher optimal compensation costs $W(a|\Gamma_R) > W(a)$: regulation acts like taxation.
2. Compensation as a process: instantaneous bonus $db_t \geq 0$ for all $t \geq 0$ instead of a single payment at $t = T_B$.

But attention, Lemma 1 (Theorem B.1, HIO 2018): at the optimum, in the unrestricted problem, the optimal bonus process has a single point mass at a $T^*(a)$: the manager receives a bonus if and only $T_B > T^*(a)$. The same is true for the restricted problem Γ_R (Proposition 1).

So why is $T^*(a) \neq T_B$? Answer: Managerial impatience.
If $\Delta r = 0$, then Lemma 1 implies $T^*(a) = T_B$ (independently of a).

This Paper - Analysis

1. Derive time $T^*(a)$ and size of optimal bonus and characterize optimal action a^{SB} for unrestricted problem (W)-(LL)
2. Introduce regulatory constraints (DEF) and (CLAW) and do the same $\longrightarrow a^{TB}$
3. Compare: Depending on the size of $T_{\min}$ (and other characteristics) the (DEF) constraint increases or decreases a^{TB} relative to a^{SB}.
4. Section 5: Assume that bank chooses D before the contracting and that a minimum capital requirement $k_{\min}$ is in place. Then the government leverage subsidy implies $K = 1 - D = k_{\min}$.
   Now a^{SB} depends on $k_{\min}$ and a^{TB} depends on $k_{\min}$ and $T_{\min}$.
   Regulatory optimization: Determine $k_{\min}$ and $T_{\min}$
   Structure: $k_{\min}$ addresses the discrepancy between private profit and welfare by affecting bank profits.
   $T_{\min}$ affects implementation costs ("tax") and thus corrects actions directly.
   Simple case: If $k_{\min} = 1$, there is no role for compensation regulation.

Comments

Overall praise

- Excellent paper, with technical and structural contribution
- “holistic view" of financial regulation
- Still somewhat preliminary
- Relies heavily on the background paper HIO (2018)
- Modelling of bank capital structure still quite rudimentary

Comments

Managerial performance

- Paper is about bonuses, not general managerial compensation: there is an (unmodeled) flow of compensation w_t in the background (base salary, annual incentive pay, ...).
- The bonus is paid as a reward for the bank still being in business: shouldn't this be part of w_t?
- Usually, we associate bonuses with the performance of the firm: the paper abstracts from many dimensions of managerial behavior
- Most importantly (and most relevant for the regulatory discussion): risk-taking
- The manager's real canondrum: effort provision vs. risk taking (Jensen-Meckling)

Comments

Debt

- A somewhat paradoxical role of debt: debt is riskless, the firm goes bankrupt regardless of its debt
- Debt's main role: be mispriced because of government intervention (deposit insurance, TBTF)
- Mirror image: no role for equity (except for being minimized): equity as a buffer or risk absorption instrument, M-M?
- A holistic theory of financial regulation should address excessive debt as the original evil.
- Bank equity issuance (ΔK): why would the bank want to issue equity, what stands in the way?

Comments

Managerial impatience

- What if $\Delta r = 0$? The theory would change significantly (no more role for the timing or its restriction of bonus payments to incentivize effort), but the problem of bank failures or mispriced debt would still be there.
- Optimal (second or third best) bonus timing and size depends on Δr. Wouldn't that be private information of the manager?

Comments

Predictive power

- The positive theory suffers from the Grossman-Hart curse: in full generality it can make almost no predictions.
- Despite impressive effort and skill in pushing for general statements, the paper must make several strong assumptions (first-order approach, increasing marginal sensitivity of informativeness, ...).
- Private characteristics in the contracting problem likely to distort the impact of regulation.

The authors acknowledge these difficulties and emphasize the grain of salt. Should we read statements such as (p. 10):

> *"the success of deferral regulation hinges on the regulator's ability to correctly gauge comparative statics of unconstrained optimal contracts"*

as meaning: