# Inside debt, bonus caps, and risk taking in banks

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# Motivation

- Post 2008-financial crisis, there was concern that the structure of bankers' compensation contracts contributed to the buildup of the crisis.
- Consequently, financial authorities felt compelled to regulate bank managers' compensation structure.
- Principles for Sound Compensation Practices (2009) suggest including unsecured debt in managers' compensation (inside debt) to align their interests with those of debtholders.
- I analyse how mandatory inside debt impacts bank risk taking.

# Key result

- Main friction: shareholders want to maximize bank risk, due to limited liability and insured deposits.
- I show that risk taking and inside debt create a dual effect on shareholders' expected payoff
  - $\rightarrow$ inside debt makes risk taking more expensive ($\downarrow$)
  - $\rightarrow$ risk taking reduces expected cost of inside debt ($\uparrow$)
- Shareholders optimally adjust the manager's incentive pay (e.g., a bonus) to counteract the risk reduction from inside debt.
- I also discuss the implications of bonus caps and uninsured deposits in the model.

# Outline

1. **Model assumptions**
2. Analysis
3. Discussion of bonus caps and conclusion

# Bank assets and risk taking

- The bank's assets yield at $t = 2$ risky cash flows $R_H > R_M > R_L$ with probabilities $p_H, p_M$, and $p_L$ absent risk taking.
- A manager runs the bank and can increase the bank's risk taking by choosing $\Delta p \geq 0$ at $t = 1$.
- Factor $l$ determines how much the expected cash flow decreases with risk taking.
- The manager bears a cost $\frac{\Delta p^2 \epsilon}{2}$ for increasing asset risk by $\Delta p$.
- The risk-free rate is normalized to zero and all participants are risk neutral.

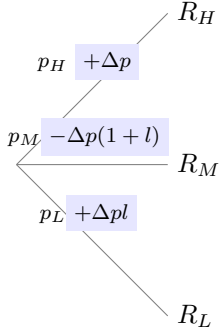


**Figure 1:** Risk taking $\Delta p$

# Bank deposits and shareholders' incentives

- Bank capital structure consists of equity and risk-insensitive insured deposits with payment obligation $R_M > \delta > R_L$.
- Shareholders benefit from increasing risk.
- They cannot observe implemented risk but set at $t = 0$ manager's state-contingent wages $\{w_H, w_M, w_L\}$ based on observable future cash flow realizations.
- I assume that the wages are junior to insured deposits (thus, $w_L = 0$).

# Inside debt $f$

- The regulator can require shareholders to include inside debt in the manager's compensation contract.
- Mandatory inside debt $f > 0$ is exogenously set by the regulator.
- Being an unsecured debt claim, inside debt is junior to insured deposits.
- I assume $R_M - \delta > f$.
- Inside debt is included in wages and can thus be interpreted as a minimum wage that needs to be paid in non-default states, that is, $w_H, w_M \geq f$.

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# Expected payoffs

– The manager's expected utility is

$$\pi_M = \underbrace{(p_H + \Delta p)w_H + (p_M - \Delta p(1+l))w_M}_{\text{expected wage}} - \underbrace{\frac{\Delta p^2 \epsilon}{2}}_{\text{cost of risk taking}}. \tag{1}$$

– The expected value of equity is

$$\pi_S = V + \Delta p B - \underbrace{(p_H + \Delta p)w_H - (p_M - \Delta p(1+l))w_M}_{\text{expected wage}}. \tag{2}$$

$V \equiv p_H(R_H - \delta) + p_M(R_M - \delta) > 0$ is the value of equity without risk taking.
$B \equiv R_H - R_M - l(R_M - \delta) > 0$ is the marginal benefit of risk taking.

# Shareholders' optimization problem

– Shareholders' objective function is

$$\max_{w_H, w_M, \Delta p} \pi_S$$

subject to constraints

$$\pi_M \geq 0 \qquad (PC)$$

$$w_H, w_M \geq f \qquad (R)$$

$$\Delta p \in \arg\max \pi_M \qquad (IC)$$

where $\pi_S$ is the expected value of equity and $\pi_M$ is the manager's expected utility.

# The manager's incentive constraint

- The incentive constraint of the manager is

$$w_H - (1+l)w_M = \Delta p \epsilon.$$

- Both $\pi_S$ and the manager's incentives for risk-taking decrease with $w_M \to w_M^* = f$.
- Then, $w_H = \Delta p \epsilon + (1+l)w_M$.

# Irrelevance of inside debt

– Substituting incentive constraint in the expected value of equity yields

$$\pi_S = V + \Delta pB - (p_H + \underbrace{\Delta p}_{\text{increase in } w_H\ (\downarrow)})(\Delta p\epsilon + \underbrace{(1+l)f}) - (p_M - \underbrace{(1+l)\Delta p}_{\text{decrease in expected inside debt } (\uparrow)})\, f$$

– The two effects cancel out and optimal risk taking $\Delta p^* = \frac{B}{2\epsilon} - \frac{p_H}{2}$ does not depend on inside debt.

# The optimal compensation

- Shareholders set $w_H$ to mitigate the risk-reducing effect of inside debt.
- The wage $w_H^*$ can be interpreted as a combination of inside debt $f$ and a bonus $\Delta p\epsilon + lf$, which is increasing with inside debt.

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# Discussion and Conclusion

- Mandatory inside debt in isolation is ineffective in reducing bank risk.
- An absolute bonus cap
  - prohibits shareholders from adjusting the bonus
  - can be combined with inside debt to eliminate risk taking without forbidding bonuses
- A bonus cap defined as a multiple of base salary (e.g., in EU)
  - increases the minimum wage constraint making risk taking more expensive
  - but does not disable shareholders from increasing the bonus
- I show that if existing debt is not fully insured, risk taking increases in inside debt ($\uparrow > \downarrow$).

# References

– Financial Stability Board (FSB). 2009. *FSB Principles for Sound Compensation Practices*, 25 September. Available at: www.fsb.org, accessed 17 November 2023.