1 Optimal debt policy with incomplete contracts

- Hart and Moore (1998)

- Debt as a discipline device

- Use debt (hard claim) to induce entrepreneur to pay back rather than divert funds

- If you refuse to pay, control goes to creditors

- 3 periods, two agents, $D$ (debtor) and $C$ (creditor)
• $D$ can invest $I$ (fixed amount) in period 0, which yields

\begin{align*}
  & R_1 \text{ in period 1} \\
  & R_2 \text{ in period 2 (if no liquidation)}
\end{align*}

• if liquidation occurs in period 1 then liquidation value is

\[ L \]

• if no-liquidation occurs additional investment can be done at a rate of return

\[ s \]

• $R_1, R_2, L, s$ all random variables that are realized in period 1
• Assume

\[ \frac{R_2}{L} \geq s \geq 1 \] always
• $D$ has wealth $w$ so he needs

$$I - w$$

• He can borrow more than that and hold the receipts in an account protected from creditors collection ($T$) so

$$B = I - w + T$$

• He promises to repay $P$

• Crucial: $R_1, R_2, L, s$ cannot be verified in court $\implies P$ is non state contingent
• No asymmetry of information and perfect renegotiation at date 1

• The maximum the creditors can seize is the liquidation value \( L \)

• In period 2 liquidation value is 0, so \( D \) cannot promise to repay anything at date 2
1.1 Optimal renegotiation

- If $D$ fails to pay $P$ all bargaining power to $D$ (see paper for intermediate cases), so he repays

$$L$$

- Then he will repay iff

$$P \leq L$$

(he can always repay if $P \leq L$ because he can liquidate part of the assets)

- Effective repayment is then

$$\tilde{P} = \min \{P, L\}$$
- Liquidation 1: if

\[ R_1 + T - \tilde{P} \geq 0 \]

no liquidation occurs and \( D \) gets

\[ R_2 + s \left( R_1 + T - \tilde{P} \right) \]

in period 2

- Liquidation 2: if

\[ R_1 + T - \tilde{P} < 0 \]

liquidation occurs, fraction

\[ f = \frac{\tilde{P} - R_1 - T}{L} \]
is liquidated and $1 - f$ continues so $D$ gets payoff

$$(1 - f)R_2 = R_2 - \frac{R_2}{L} (\tilde{P} - R_1 - T)$$

in period 2

- Summarizing total expected payoff of $D$ is

$$R_2 + s \left( R_1 + T - \tilde{P} \right) \quad \text{if} \quad R_1 + T - \tilde{P} \geq 0$$
$$R_2 + \frac{R_2}{L} \left( R_1 + T - \tilde{P} \right) \quad \text{if} \quad R_1 + T - \tilde{P} < 0$$

- Assume for simplicity

$$s = \frac{R_2}{L}$$

(same return on non-liquidated capital and on newly invested capital)
• Then expected return is just

$$E \left[ R_2 + s \left( R_1 + T - \tilde{P} \right) \right]$$

• Participation constraint of $C$ at date 0 is

$$E \left[ \tilde{P} \right] = I - \omega + T$$
1.2 Optimal contract

\[ \max_{T,P} \quad E \left[ R_2 + s \left( R_1 + T - \tilde{P} \right) \right] \]

\[ E \left[ \tilde{P} \right] = I - w + T \]

Marginal effect of changing \( P \) on \( T \)

\[ \frac{dT}{dP} = 1 - F(L) \]

(where \( F \) is CDF of \( L \))

So effect on payoff

\[ E \left[ s \right] (1 - F(L)) - E \left[ s | L \geq P \right] (1 - F(L)) \]
If $L$ is “good news” for $s$ then we have

$$E[s] < E[s|L \geq P]$$

for all $P > L$ (where $L$ is lower bound of $L$ support).

**Proposition** If $L$ is good news for $s$ then it is optimal not too leave any “reserves” $T$ to the entrepreneur (i.e. it is optimal $T = 0$) and to set $P$ to its minimal value (which ensures $E[\tilde{P}] = I - w$)

More general result in paper: debt contract with $T = 0$ is optimal in a broad class of message games.

Idea: value of resources in entrepreneur’s hand is low when $L$ is low, so debt contract works well because it makes the entrepreneur pays maximum when $L$ is low and caps how much creditors can get when $L$ is high
In macro crisis however opposite is true: bad realization of payoff today means scarcity of entrepreneurial net worth → high prospective return! So in anticipation of macro crisis, debt contract is bad