Debt, Managers and Cartels

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Work in progress!
CRESSE

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Introduction

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The quality and intensity of antitrust enforcement has increased considerably over the last decades, yet, price fixing conspiracies continue to be formed. Many aspects of optimal cartel design still ignored by the existing theories. Understanding factors that confer stability to cartels seems an important step towards the design of effective enforcement strategies.
This paper

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- **Motivating evidence**: in some concentrated industries, high leverage is correlated with low output and high prices — e.g., Chevalier (1995), Chevalier and Sharfstein (1996), Kovenock and Phillips (1995, 1997), Phillips (1995) ...
We explore link between competitive debt markets, corporate governance (managerial incentives and regulation) and cartel stability.


Surprising for cartel theory: existing theories (except Spagnolo 2004, with collusive lenders) predict that debt should lead firms to compete more aggressively in the product market — e.g., Maksimovic (1988, 1995)
Our point

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- Conservative *managerial incentives* may reinforce this effect
New perspective emerges when combining appropriately \textit{managerial incentives, competitive debt markets} and \textit{product market competition}. Model explains why debt can work as a coordination device for firms allowing to sustain collusion in otherwise competitive industries. If shareholders commit against strategic default hiring managers with \textit{established reputation}, debt may facilitate collusion. Conservative \textit{managerial incentives} may reinforce this effect. \textit{Corporate governance regulation - disclosure rules} and \textit{liability rules} to protect small "outside" shareholders - reinforce these effects generating commitment through transparency.
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- New perspective emerges when combining appropriately *managerial incentives*, *competitive debt markets* and *product market competition*
- Model explains why debt can work as a coordination device for firms allowing to sustain collusion in otherwise competitive industries
- If shareholders commit against strategic default hiring managers with *established reputation*, debt may facilitate collusion
- Conservative *managerial incentives* may reinforce this effect
- *Corporate governance regulation* - *disclosure rules* and *liability rules* to protect small "outside" shareholders - reinforce these effects generating commitment through transparency
- *Credit bureaus* have similar effects, reminding Stigler (1964) on public procurement rules
Implications for competition policy

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- Cartels that are sufficiently stable without debt may have no reason to incur the cost of raising debt
- By contrast, cartels that may not be stable without debt may actually become stable with high debt
- The presence of high debt in an industry cannot be taken as a reassuring information regarding the presence of a cartel
**Dark side** of information sharing systems: firms’ access to information on competitors’ financial structure may facilitate price fixing in the product market.
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This is only the case for “positive” information sharing — i.e., on new or outstanding debt rather that on poor repayment behavior.
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Example: since 2004 companies are required to report to the Security and in the Form 8k (introduced by the Securities and Exchange Act) any material change in their financial situation, including changes in debt, within 4 business days from their occurrence.
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This increased transparency has obvious benefits for corporate governance, but may also facilitate anti-competitive effects of governance structure.
Recent evidence by Muller and Giraud (2010, 2011) confirms Allen and Gale’s (2000) conjecture that product market competition is the strongest force in favor of good governance: corporate governance variables only matter when product market competition is weak.
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*Our results* imply that disclosure and liability rules designed to improve financial transparency and corporate governance, by hindering competition (increasing cartel stability) may end up worsening precisely the governance problems they were supposed to address.
Baseline model
Rest of the talk

- Baseline model
- Revisit Maksimovic’s result
Rest of the talk

- Baseline model
- Revisit Maksimovic’s result
- Basic insights
Rest of the talk

- Baseline model
- Revisit Maksimovic’s result
- Basic insights
- Endogenous debt
Baseline model
Revisit Maksimovic’s result
Basic insights
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Extensions
Baseline model
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Conclusions and way forward
Players and environment

- $N$ identical competing firms play an infinitely repeated game
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- Stage game: Bertrand competition
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Stage game: Bertrand competition

Profit of firm $i$ at $\tau$ is

$$\pi_i^\tau = \begin{cases} 
\pi & \text{in collusion phase} \\
N\pi & \text{if } i \text{ deviates} \\
0 & \text{in punishment phase}
\end{cases}$$
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- Perfect monitoring
Credit market

Before competing on the product market, firms can issue long-term debt: credit market perfectly competitive
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- Bankrupt firms are sold to new owners with short time horizon: if collusion breaks down, the market does not cartelize again.
Shareholders can delegate pricing decisions to self-interested managers.
Organization structure

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- Conflict of interests between property and management
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Fixed component \( C \), and a variable component \( \phi (b_i - \pi^\tau_i) \)

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Managers’ reservation utility \( u \), with \( 0 \leq u < \pi \)
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- Fixed component $C$, and a variable component $\phi (b_i - \tau_i^\tau)$ proportional to the severity of financial problems.
- Managers’ reservation utility $u$, with $0 \leq u < \pi$.
- Limited liability: banks can seize at most the product-market earnings.
Evidence supporting this approach

- Gilson et al. (various years) and more recently Eckbo et al. (various years): after bankruptcy managers not re-hired by large quoted firm, and suffer a 3-fold reduction in expected future income, the larger the worse is bankruptcy

- Ross (1977) and Berk et al. (2010) show that managerial losses from bankruptcy are naturally caused by optimal contractual arrangements in perfectly competitive capital and labor markets.

- Gilson (1989), Nini, Smith and Suai (2014 forthcoming), lenders explicitly ask shareholders to hire top managers with a particularly solid reputation for ‘prudent behavior’, who have much to lose from driving the firm into bankruptcy.

- Valta (2012), cost of debt higher with stronger product market competition.
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Simple managerial contracts: *Net Profit Sharing* contracts
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Managers are paid a fixed wage (normalized to zero) plus a share $\alpha_i \in [0, 1]$ of the period’s net profit

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*NPS* are long-term: managers maximize an objective function equivalent in all aspects to that of shareholders except in the evaluation of bankruptcy
Timing and collusion

- Industry funded at $\tau = 0$: shareholders commit to loan and NPS contracts before competing in the product market.
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Focus on symmetric and stationary collusive strategies that implement the monopoly outcome: financial structure $(L, b)$ and a NPS contract $\alpha$ to be announced by all firms.
For any debt $b \in [0, \pi)$, the collusive agreement is respected if

$$\frac{1}{1 - \delta} (\pi - b) \geq N\pi - b + \frac{\delta}{1 - \delta} \max \{0, -b\}$$
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Self-managed firms

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High debt destabilizes the formation of cartels in the product market
The self-enforceability condition for the monopoly outcome to be sustainable is

\[
\frac{\alpha}{1 - \delta} (\pi - b) \geq \alpha (N\pi - b) - \delta (C + \phi b)
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Self-interested managers

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- \textit{Left-hand side}: managers’ discounted stream of profits on the equilibrium path

\textit{Result 1.} The monopoly outcome is harder to sustain when managers’ compensation is more responsive to profits. The impact of higher debt on collusion is ambiguous: positive only if \( \alpha \) not too large relative to \( \phi \). Other things being equal, collusion can be sustained more easily when firms are led by self-interested managers than when they are self-managed.
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- **Left-hand side**: managers’ discounted stream of profits on the equilibrium path
- **Right-hand side**: spot gain from deviation \(\alpha (N\pi - b)\), and the following cost of bankruptcy \(C + \phi b\)
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- The impact of higher debt on collusion **ambiguous**: positive only if \(\alpha\) not too large relative to \(\phi\)
- Other things being equal, collusion can be sustained **more easily** when firms are led by self-interested managers than when they are self-managed
The cartel’s maximization problem at $\tau = 0$ is

$$\max_{\alpha \in [0,1], b \in [0,\pi]} \frac{(1 - \alpha)(\pi - b)}{1 - \delta}$$

subject to

$$\alpha (\pi - b) \geq u$$

$$\frac{\alpha}{1 - \delta} (\pi - b) \geq \alpha(N\pi - b) - \delta (C + \phi b)$$
Result 2. Suppose $u$ not too large:

- Optimal collusive strategy combines debt and NPS only if $\phi$ larger than $\phi$. There exist two thresholds $\delta_1 < \delta_2 < N$ such that:
  - For every $\delta \in (\delta_1, \delta_2)$ rms do not issue debt to sustain the monopoly outcome: $b = 0$. However, shareholders must hire managers to sustain this outcome: $\alpha = u\pi < 1$.
  - For every $\delta < \delta_1$ only competitive outcome can be sustained.
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For every $\delta > \bar{\delta}$
- Firms issue debt and hire independent and self-interested managers to sustain monopoly outcome: $\alpha = u \pi b_2(0, 1)$ and $b_2(0, \pi)$, with $b_2$ being solution of

\[ \delta + \frac{\phi}{u} b u = \frac{\pi}{N}. \]
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Debt expands firms’ collusive ability only if they are led by self-interested managers.
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Complementarity between debt and delegation is necessary only in the region of parameters where the discount factor is neither too large nor too small.
Interpretation

- Debt expands firms’ collusive ability only if they are led by self-interested managers.
- Complementarity between debt and delegation is necessary only in the region of parameters where the discount factor is neither too large nor too small
- and if managers’ reputational loss from default is sufficiently responsive to the amount of unrepaid debt
Lack of commitment

- So far firms were able to commit to their financial structure as well as to NPS
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⚠️ First, study ‘imperfect commitment’: shareholders can commit to financial structure, but cannot announce credibly managerial contracts
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So far firms were able to commit to their financial structure as well as to NPS.

Yet, the commitment value of contracts with third parties can be reduced by *secretly renegotiation*.

Relax this assumption.

1. First, study *imperfect commitment*: shareholders can commit to financial structure, but cannot announce credibly managerial contracts.

2. Second, consider a regime with *no commitment at all*: every contract can be secretly renegotiated.
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- Yet, the commitment value of contracts with third parties can be reduced by secretly renegotiation.
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  1. First, study ‘imperfect commitment’: shareholders can commit to financial structure, but cannot announce credibly managerial contracts.
  2. Second, consider a regime with ‘no commitment at all’: every contract can be secretly renegotiated.

A1 Contracts announcements are not ‘cheap talk’: any contract that is announced by a firm must be legally valid even if it can be secretly substituted by another (legally valid) contract afterwards.
Imperfect commitment

Let $\tilde{V}(\alpha, b)$ be the maximal utility that a firm shareholder can earn by switching to a different NPS contract, which induces undercutting by the manager.
Imperfect commitment

- Let $\tilde{V}(\alpha, b)$ be the maximal utility that a firm shareholder can earn by switching to a different NPS contract, which induces undercutting by the manager.
- If $(\alpha, b)$ induces collusion in the full commitment game

\[ V(\alpha, b) \equiv \frac{1 - \alpha}{1 - \delta} (\pi - b) \]
Imperfect commitment

Let $\tilde{V}(\alpha, b)$ be the maximal utility that a firm shareholder can earn by switching to a different NPS contract, which induces undercutting by the manager.

If $(\alpha, b)$ induces collusion in the full commitment game

$$V(\alpha, b) \equiv \frac{1 - \alpha}{1 - \delta} (\pi - b)$$

Hence, $(\alpha, b)$ is renegotiation-proof iff $V(\alpha, b) \geq \tilde{V}(\alpha, b) \iff$

$$\frac{1}{1 - \delta} (\pi - b) \geq N\pi - b - \delta (C + \phi b)$$
Imperfect commitment

- Let $\tilde{V}(\alpha, b)$ be the maximal utility that a firm shareholder can earn by switching to a different NPS contract, which induces undercutting by the manager.

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- Essentially, what matters now is the coalition formed by shareholders and managers....
Result 3. Even if managerial contracts can be secretly renegotiated, an optimal symmetric collusive strategy that is robust to renegotiation still combines debt and managerial contracts: when $\delta$ takes intermediate values, $\phi$ is large enough and $u$ is not too large. In this case, firms are more leveraged than with full commitment.
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- This requires firms to take excessive debt relative to the case of full commitment.
**Result 4:** If each firm borrows from an exclusive lender there is no scope for collusion when $\delta < \frac{N-1}{N}$. 
No commitment at all

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- With complete lack of commitment, loan contracts can be reneged at no costs when each firm borrows from an exclusive lender.

- Exclusive lenders do not internalize the impact of debt renegotiation in the product market.
Result 5: Despite lack of commitment, if $\phi$ and $\pi$ are sufficiently high and $u$ is not too large, there exists a non empty subset of discount factors where monopoly can be sustained only by means of a symmetric, renegotiation-proof strategy profile that combines debt and NPS and relies on a common lender.
No commitment at all contd.

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- Assume, the deviating firm tries to cancel the debt contract. The common lender indifferent between accepting and refusing this new deal if

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Renegotiation Premium
No commitment at all contd.

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- *Renegotiation Premium*

- Essentially, this bank internalizes, through loan contracts, the negative externalities between its clients (firms) when they may be tempted to use secret renegotiation to break the cartel.
To do

- Endogenize $\phi$
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- Uncertainty / imperfect monitoring
Conclusion

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- Weaker but positive pro-collusive effects of debt even in very unregulated environments where disclosure or liability rules about firm’s financial situation are lacking or poorly enforced.
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Thank you!