Risk Management by Gold-Mining Firms

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Why Risk Management?

• Is it for Shareholder Profit Maximization,
  – Financial Distress
  – Investment Policy
  – Taxes

• Or is it an Agency Cost?
  – Managerial Risk Aversion
  – Managerial Signaling (disentangle luck/talent).
Tuf Dataset

- 50 publicly US/Canadian publicly trading gold-mining firms
- Frequent disclosure of hedging data
- All have same exposure
Risk Management Mechanisms

- Hedging
- Diversification
- Insurance

- To control for alternatives, introduce firm leverage and cash balances.
  - Endogeneity problems…
A Proxy \( f \)

- Summary Measure “Delta”, proxy for “short sales”: Percentage of future production sold forward.

- Table 1

- \( \Delta = \text{Change in Firm Value after a 1US\$ Drop in the Price of Gold} \)
A Proxy f

- Other studies use dummy endogenous variables:
  
  - Firm Hedges=1, O otherwise
    (Nance, Smith and Smithson, 1993)
  
  - $\Delta$ is much more precise
A Proxy f

• But $\Delta$ is a limited dependent variable (see table 2): cluster at 0.

• One-sided Tobit analysis

• (Why not two-sided?)
1-sided Tobit MLE

\[
\ln L = \sum_{y_i,0} \left[ -\frac{1}{2} \left( \ln 2\pi - \ln \theta^2 + (\theta y_i - \gamma' x_i)^2 \right) \right] + \sum_{y_i=0} \left[ \ln(1 - \Phi(\gamma' x_i)) \right]
\]
Conclusions

- Table 5: Shareholder Maximization does not seem to be the reason to hedge (convex tax schedule, investment opportunity, etc).

- Table 5: Firms with greater managerial stock ownership hedge more, with greater outside ownership blocks hedge less.
Need to convert estimates

- Slopes not directly obtained
- Intuitively: a change in x has an effect on the mean of y, given it is >0, and an effect on the probability of y=0

- OLS yields inconsistent results, if censored data are observed. But otherwise…
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