# A Discussion of…

## A Unified Theory of Tobin's *q*, Corporate Investment, Financing, and Risk Management

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by

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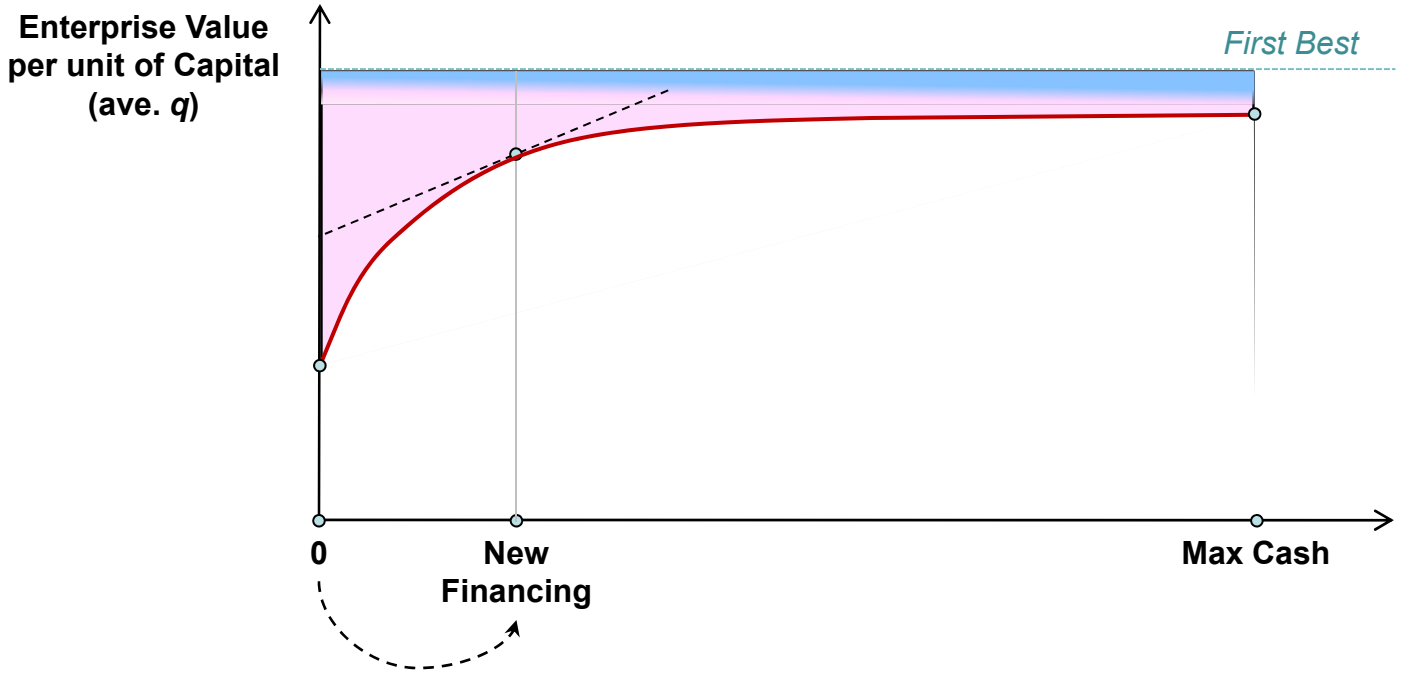
# Basic Inventory Problem

- Firm generates stochastic cash flows
  - $\mu\, dt + \sigma\, dZ$ per unit of capital
- Firm needs cash to cover any operating losses
- Raising cash is costly
  - Proportional cost: $\gamma$ = 6% of amount raised
  - "Fixed" cost: $\phi$ = 1% of firm *size* *(so not really fixed)*
- Holding cash is costly
  - Return on cash: $r - \lambda = r - 1\%$
- What is the optimal cash inventory policy?

# Optimal Solution




- Optimal Investment increases with cash balance:

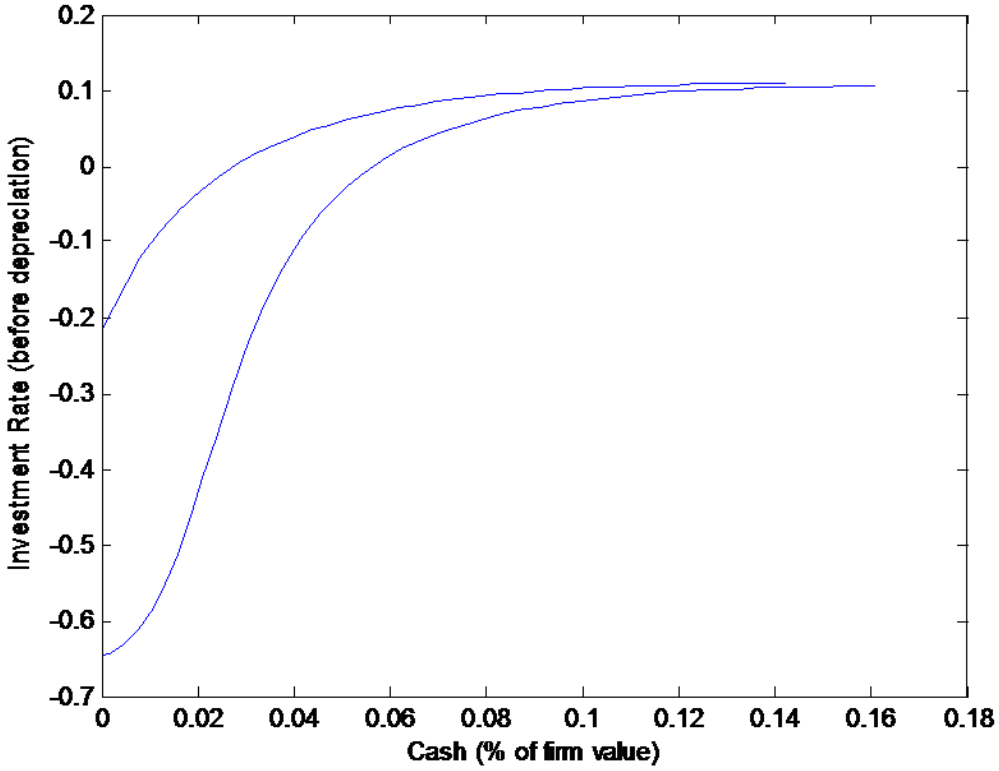
$$\text{marginal cost} = \text{marginal q}$$

$$c'(i)\,[\,1 + v'(w)\,] = v(w) - w\,v'(w)$$

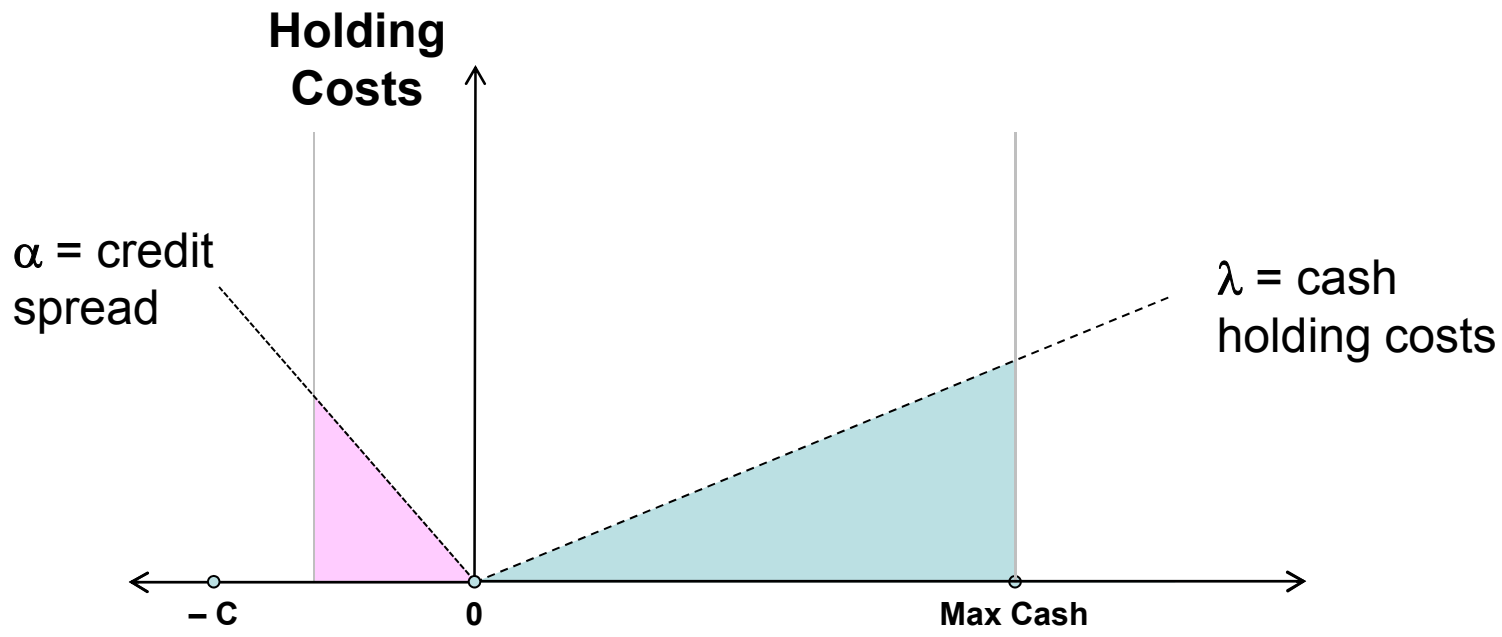
| Installation cost | Financing cost | Ave q | Loss due to reduced cash per unit of capital |
|---|---|---|---|

# Investment / Growth vs. Cash

- For the calibration in the paper:



# Debt Capacity / Credit Line




- Model provides a new benefit for credit:
  - Reduces average holding costs (move the "0" cost point to save costs)
  - Increases investment prior to refinancing (capital increases debt capacity, raising marginal q)

# Endogenizing the Costs (DeMarzo-Fishman-He-Wang)

- Assume zero transactions costs, but introduce an agency problem:
  - Manager can reduce effort, or divert cash flows
    $\Rightarrow$ Manager receives a minimum share of cash flows
  - Limited Liability
    $\Rightarrow$ Delayed compensation with clawback
- Implementation of optimal contract
  - Manager holds share of equity
  - Dividends are paid only after cash balances exceed a threshold
  - If cash is exhausted, new capital is raised and manager is replaced

# Mapping the Models

| "Inventory" Model | Agency Model |
| --- | --- |
| • Cost of holding cash | • Manager impatience |
| • Fixed cost of financing | • Cost of replacing manager |
| • Proportional cost of financing | • Manager's equity share |

- Realized FCF contributes to cash balances

- ***Unexpected*** FCF contributes to cash balances --

  Expected FCF optimally paid out

⇒ ***Different dynamics and comparative statics***

# Comparing the Models

- Using the same calibrated parameters, with an agency problem
  - The firm has lower value (fb – 7% vs. fb – 5%)
  - The firm has higher cash balances
    - At financing: 11% vs. 5% of firm value
    - At payout: 20% vs. 14% of firm value
  - Investment is less sensitive, especially when constrained
    - Minimum investment = 8% vs. -20%

$$c'(i) \cancel{[1 + v'(w)]} = v(w) - w\, v'(w)$$

  - Differing comparative statics