

**Information, Beliefs and the
Corporate Objective**
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Definition: Corporation

“a company or group of people authorized to act as a single entity (legally a person) and recognized as such in law.”

Standard Corporate Finance Model

Single Manager, Entrepreneur, Equity holder, Or

Several agents with single prior, possibly asymmetric information

Conflicts due to different claims

- > Manager/Shareholder
- > Debt/equity
- > Existing Shareholders, new shareholders

Observation:

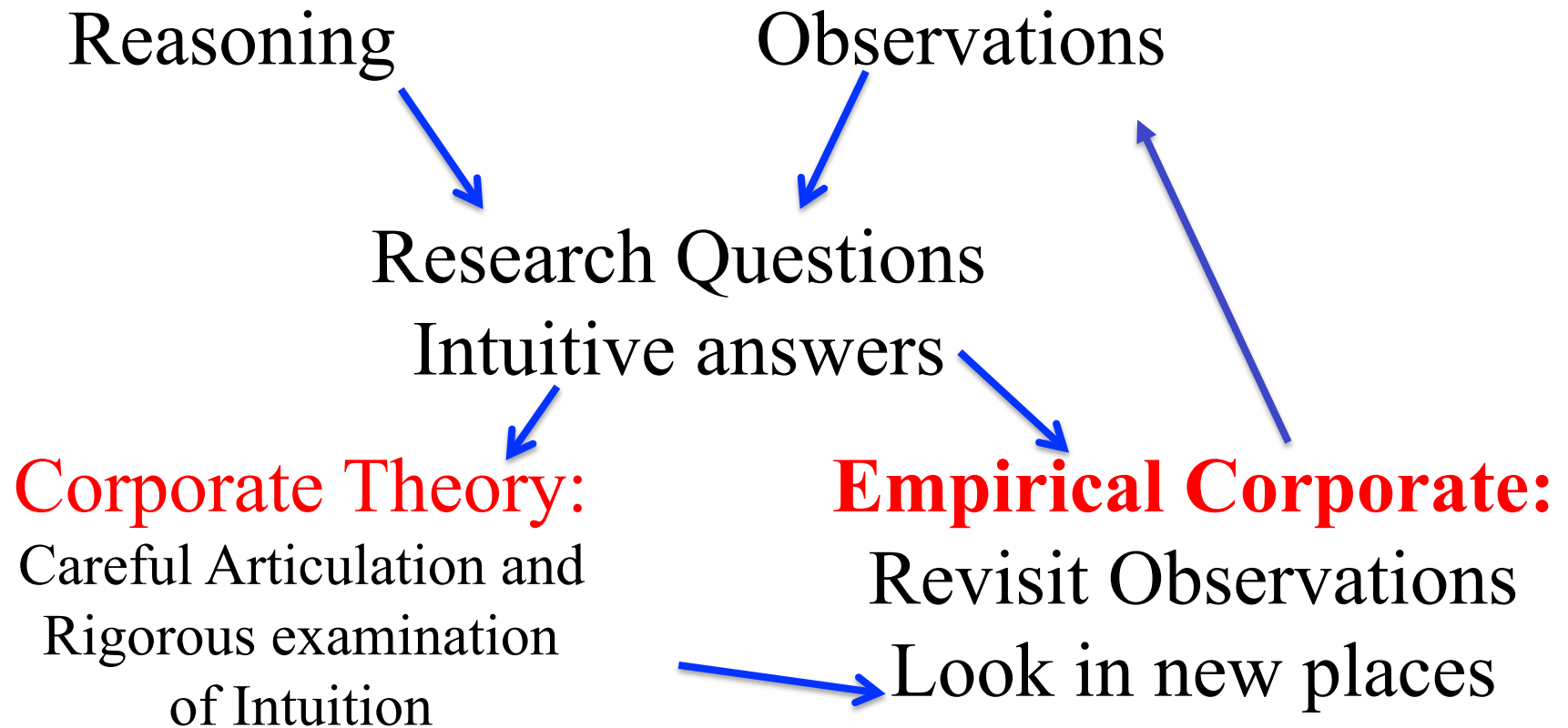
most corporate decisions are made by groups (boards, syndicates, committees).

Conflicts may be due to different beliefs

Differences resolved through political process

What is the Corporation's Objective?

Research Process



Some Important Milestones

- **Irving Fisher, The Theory of Interest, 1930**
 - Fisher Separation
 - Managers should pick investment to maximize market value
 - Investors will determine **savings/investment**.
 - Objective: maximize market value of the firm/investor utility
 - Financial and Real Decisions are Separable
- **Modiglianni and Miller**
 - Capital Structure Irrelevance
 - Managers should pick investment to maximize market value
 - Investors will determine the **optimal debt equity mix**
 - Objective: maximize market value of the firm/investor utility
 - Financial and Real Decisions are Separable

Personally motivating puzzle

**In mid 80's AT&T Issued \$1billion of new shares
Market value of existing shares fell by \$2 billion**

- **Typical Seasoned Equity Offering (SEO)**
 - 100% price increase year prior to announcement
 - 2-3% price drop on day of announcement
 - Returns for the next 5 years are lower than a matched sample
- **Typical debt issue**
 - Little market reaction

How is this consistent with

- Value Max (Fisher Separation)?
- Capital Structure Irrelevance

If managers are able to hurt shareholders, are they entrenched?



**FINANCIAL AND REAL DECISION
ARE NOT SEPARABLE!**

Some Important Milestones

- **Myers/Myers and Majluf**
 - Debt Overhang/real options/A NEW OBJECTIVE
 - Financial and Real Transactions **ARE NOT SEPARABLE**
 - Value Maximization **helps some - hurts others**
 - **OBJECTIVE:**
 - **A) Maximize market value**
 - **B) Maximize**
 $\alpha \times (\text{Current Market Value}) + (1-\alpha) \text{ Intrinsic Value}$
 - A) Has little empirical bite**
 - B) Has great empirical bite IF α is small enough**

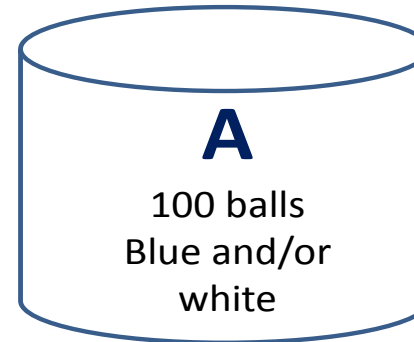
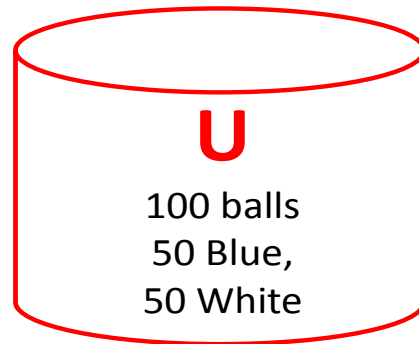
Followed by a large literature that assumed α is small enough and explained many empirical observations

These results are based on subjective expected utility:

- **5 Basic Axioms including completeness and independence**
 - imply a unique probability distribution
- **An agent selects action that has the highest expected utility (market value)**

A Fundamental Challenge

Ellsberg Paradox and Multiple Priors



Gamble 1: 10 if **blue** drawn
Subject selects **U** or **A**

Subject usually selects U \longrightarrow Prob of **BLUE in A** <.5

Gamble 2: 10 if **WHITE** drawn
Subject selects **U** or **A**

Subject usually selects U \longrightarrow Prob of **BLUE in A** >.5

MM and the Evolution of Corporate Finance

Modigliani & Miller
Price taking atomistic
corporations



Prediction:
Corporate Decisions are
Irrelevant

Empirical Evidence
Circa 1982
Corporate Decisions have
Huge Impact!

**MM Explained
This!**

**Motivating
Observations**

**Stock Splits
Security Issues**

- Korwar (WP)
- Asquith and Mulliins (WP)
- Dann and Mikkelson (forthcoming)

Illustration: Beliefs and Objectives

A shoe manufacturer can invest 10 in a technology that saves 20
 Cost saving is risk free, shoe sales are not

	High demand	Low demand
Probability	.2	.8
Shoe Factory	50	5
Savings	20	20
Investment	-10	-10
Equity sold	10	10
Post invest. value	70	25

Symmetric Information set common prior

- **Single prior all agents (.2 high /.8 low), price taking**
- **Firm value if do not invest = $.2 \times 50 + .8 \times 5 = 14$**
- **Firm value if invest = $.2 \times 70 + .8 \times 25 = 34$**



INVEST

- **Finance: sell $10/34$ (29.4%) of the firm to 'new' investors for 10**
- **VALUE of shares purchased for 10**
 $= 10/34 \times 34 = 10$

Asymmetric/common prior Manager receives signal

Alternative: Same prior but Manager receives a signal that demand is high.

Based on this posterior

- **Firm value if invest = 70**
 - New shareholders pay 10, receive $.29 \times 70 = 20.6$
 - Existing shareholders receive $.71 \times 70 = 49.4$
 - **TOTAL MARKET VALUE = 70**
- **Existing Shareholder value**
 - if no investment = 50**
 - if invest = 49.4**

Conflict among shareholders

If demand is high and you issue:

Existing investors lose, new investors gain

If demand is low and you issue

Existing investors gain, new investors lose

Heterogeneous (dogmatic) beliefs

- **Value Maximizing decision involves transfer from existing shareholder to new shareholder**
 - Fisher Separation is destroyed
- **Financing with Debt (promise 10) has higher value than financing with equity**
 - Modiglianni and Miller is destroyed

Predicted decision depends on objective

Investors do not learn, market does not react - beliefs are dogmatic

Asymmetric Information: common prior with learning

Common knowledge that manager knows demand EQUITY ISSUE

- Maximize total market value
 - Invest – no price reaction
- Maximize New Shareholders
 - Invest if demand strong – prices rise
 - Don't invest if demand weak
- Maximize Existing Shareholders
 - Don't invest if demand strong
 - Invest if demand weak- prices fall

**Market Learns,
Price reacts on
announcement**

Key Evidence: Announcement effect, the market learns when the company announces, prices fall

Heterogeneous Information

Non strategic, no learning, ‘dogmatic’

No announcement effect

Asymmetric Information

- **Market updates when firm chooses to issue**
- **BUT only IF MANAGERS CARE ENOUGH ABOUT CURRENT SHAREHOLDERS (remember prices fall)**
- **Management’s objective is critical!**

Is the corporate objective a political process

- **For decades ‘managers’ favoring one group over the other has simply been accepted**
 - It explains the facts
- **How do corporations decide on who they should worry about and who they should not**
 - E.g. current shareholders versus those buying in
- **Can models of a political process help?**

Next Steps

- **Recognition of strategic interactions generated long research journey to study asymmetric information**
- **Heterogeneous Expectations was not well suited to explain event studies**
 - Heterogeneous expectations models have not been explored
- **Revisit Heterogeneous expectations**
 - explain Boards, Loan Syndicates, Contract Design?
- **Political economy of the corporation?**

Canonical corporate finance model

Entrepreneur has ideas – no money

Financier has money – no ideas

Bilateral exchange: entrepreneur and financier bargain under asymmetric information

Based on Subjective Expected Utility (SEU)

Individuals attach a Utility Index to each outcome and a **unique** probability (subjective belief) to the likelihood that the outcome will obtain

Doesn't seem to be universally consistent with behavior

What do we do:

- **View corporation as multi-agent Decision Making Group (DMG) with heterogeneous expectations**
- **DMG is governed by Utilitarian rule**
 - λ should be thought of as political influence
- **Study a simple real option model**

• Results

- **Utilitarian aggregation in groups is time inconsistent.**
 - Learning about irrelevant alternatives changes decisions
- **Time inconsistency causes underinvestment**
 - Decision makers are reluctant knowing they will conflict in the future
- **Allowing trading**
 - With outsiders can pre-empt future conflict
 - With insiders can lead to over investment

Empirical Implications

- Conflicts of interest based on beliefs. Might explain
 - Board diversity decreases performance (Adams et. al. 2015)
 - Boards with more independent directors engage in less radical R&D (Balsmeier, 2017)
 - Gender diversity and caution (Levi et. al., 2014)
 - Conjecture, women are more risk averse
 - Alternative, women have different priors

A corporate investment and abandonment decision

Standard real option in continuous time

Key Modification: Decisions made by a Decision Making Group (DMG)

Several Members, each with different beliefs

No other imperfections (e.g. asymmetric information, different contracts)

Political mechanism

Actions taken only when proposal is made by one member and voted upon

> Focus on Majority

Extend results to other rules

Underinvestment

All agents would invest if they controlled

But, fear of loss of control results in investment being blocked

Driving Conditions:

Change in Pivotal Voter over time

Polarization: sufficiently different beliefs between pivots

Majority voting is key to inefficiency

Prior literature: Contributions

Garlappi et. al. (2017)

Inefficiency due to learning and Utilitarian Aggregation

Donaldson, Malenko, Piacentino (2017)

Dynamic Voting and inefficient Gridlock

Election of CEO shaped by voting

Endogenous status quo is central

Brennan and Schwartz (1985) MacDonald and Segal (1986)

Real Options exercised by the classic 'manager'

Highlights the importance of volatility; we contrast with polarization

Azzimonti (2011)

Macro relationship between polarization (country level) and economic growth and investment.

Key is political uncertainty (importance of public sector)

Strulovici (2010)

Ability of decision maker to react to information is dampened when groups are involved

Technology:

Invest I_0 at t_0

Generates X continuously,

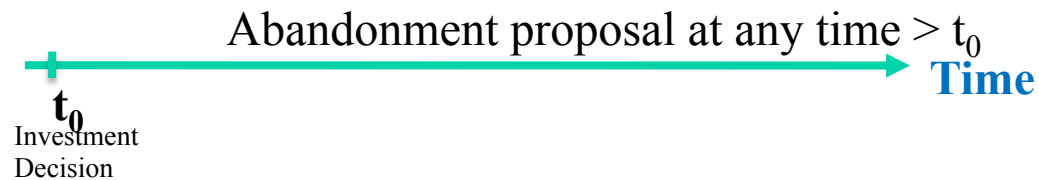
X follows

$$dX_t = \mu_n X_t + \sigma X_t dW_{nt}$$

μ_n is DMG member n 's individual belief

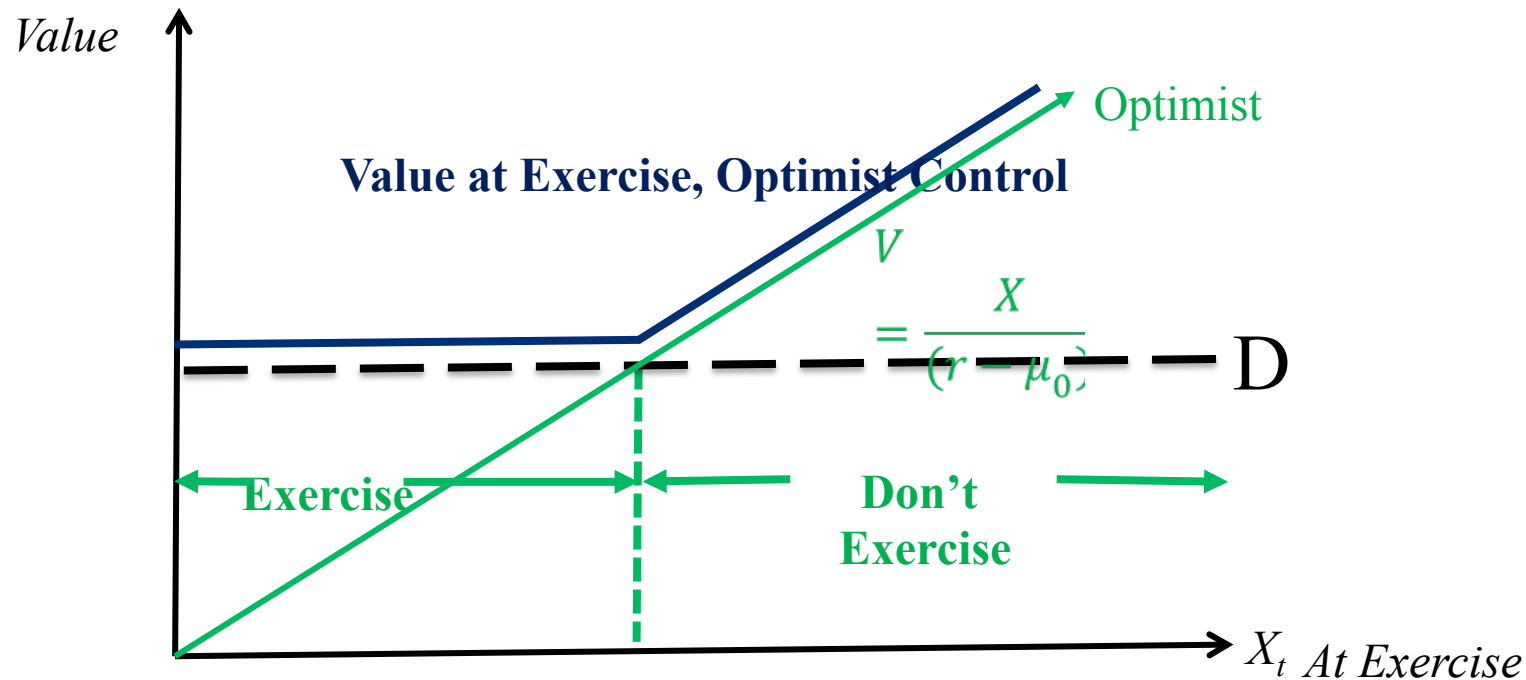
DMG Decisions

Invest at t



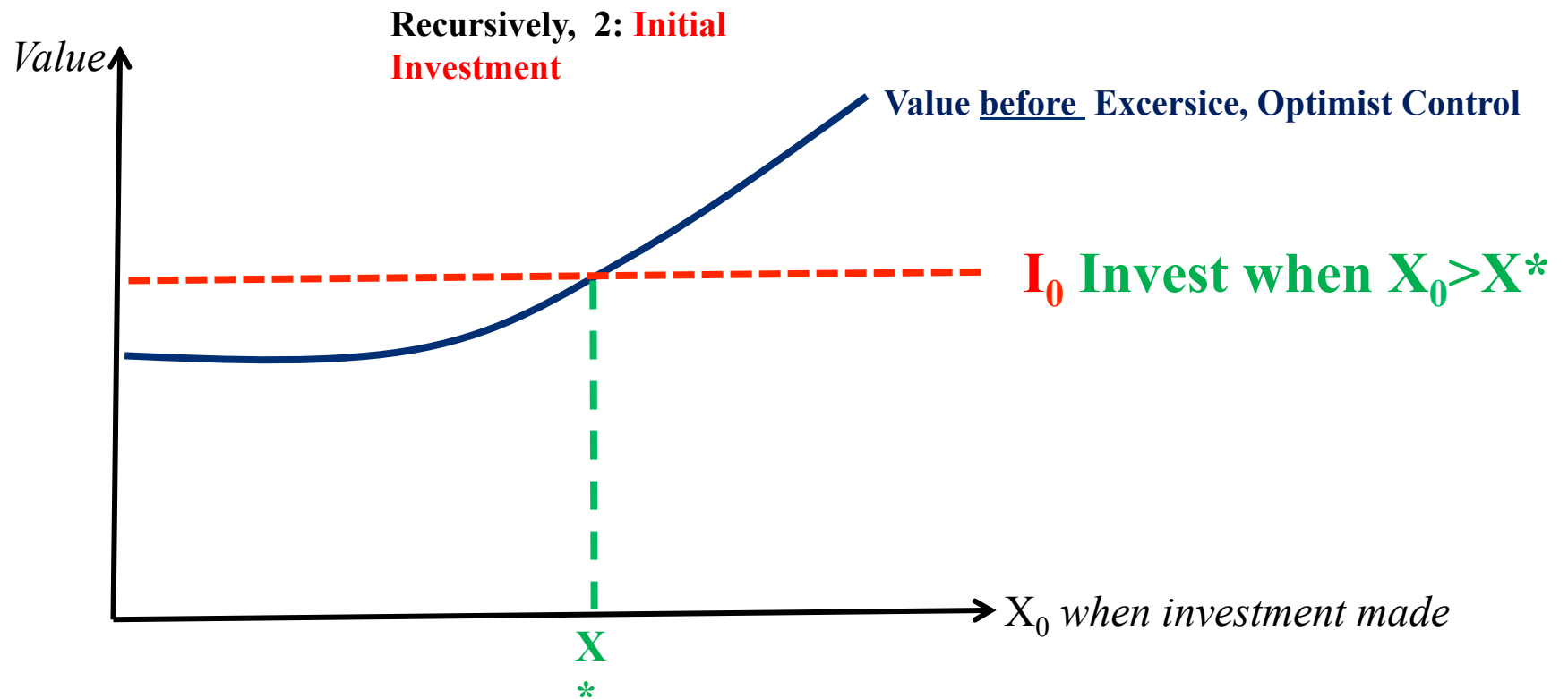
Plus Abandonment/Put Option for D

Recursively, 1. Abandonment Decision at Exercise

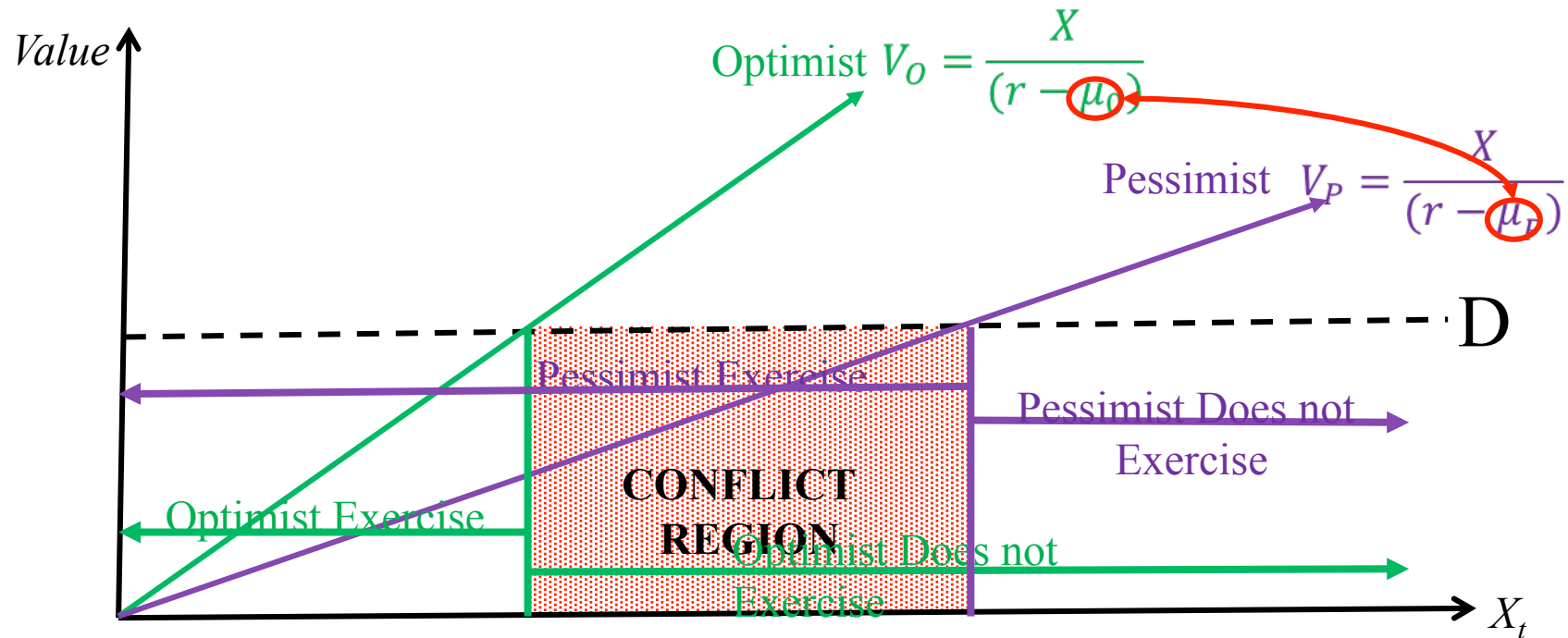


The investment is a perpetual growing cash

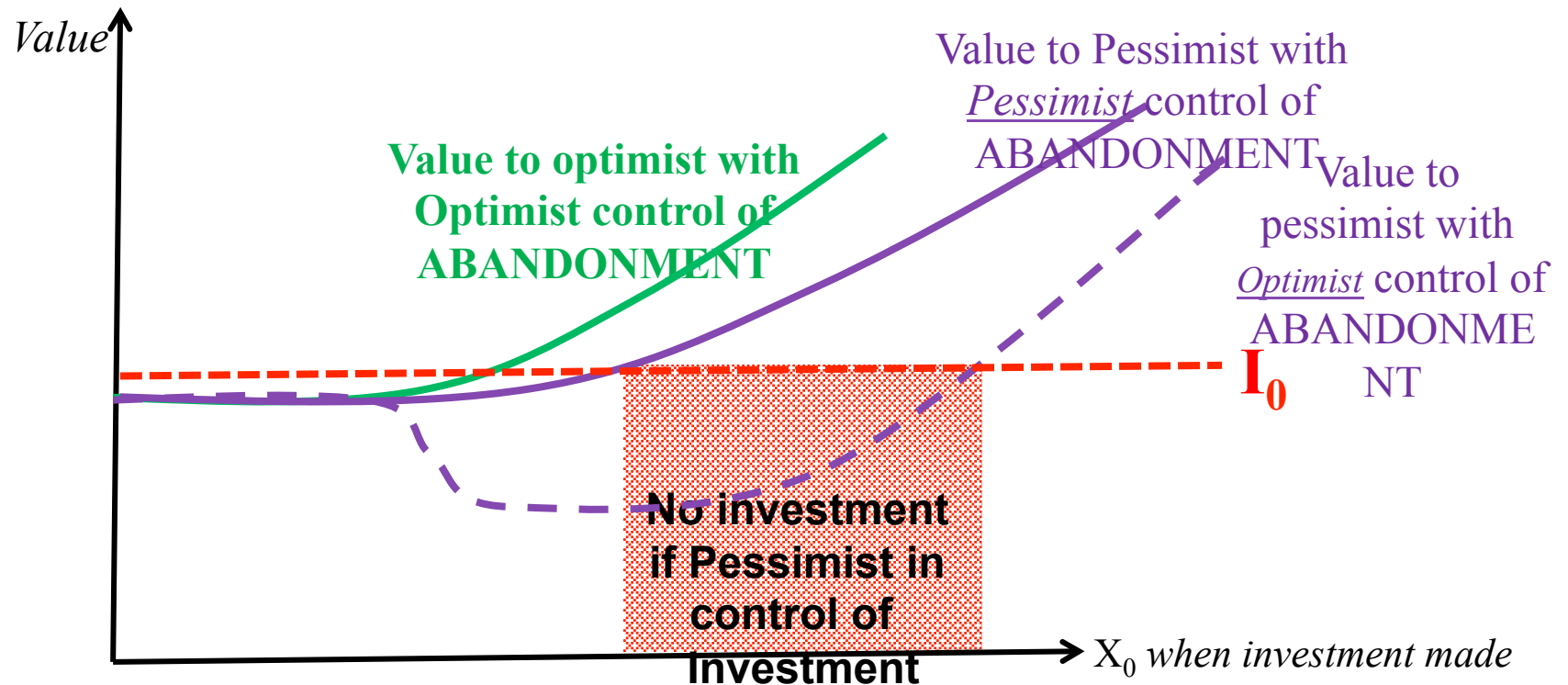
Plus a Put Option for D



Heterogeneous Beliefs – 2 Person DMG



Value of Investment at t_0 depends on who controls abandonment



Dynamic Voting Game: Decisive Coalitions and

Recursively

Abandonment vote any time after t_0

Investment vote at t_0 , anticipates abandonment vote.

Decisive Coalition

A group that

- > Supports the same action – i.e. accept or reject a proposal
- > Is large enough so that their action becomes the corporation's action

Strict Majority to **accept** a proposal, e.g.

2 voters in a 2 person DMG

3 voters in a 4 person DMG

Simple majority to **block** a proposal, e.g.

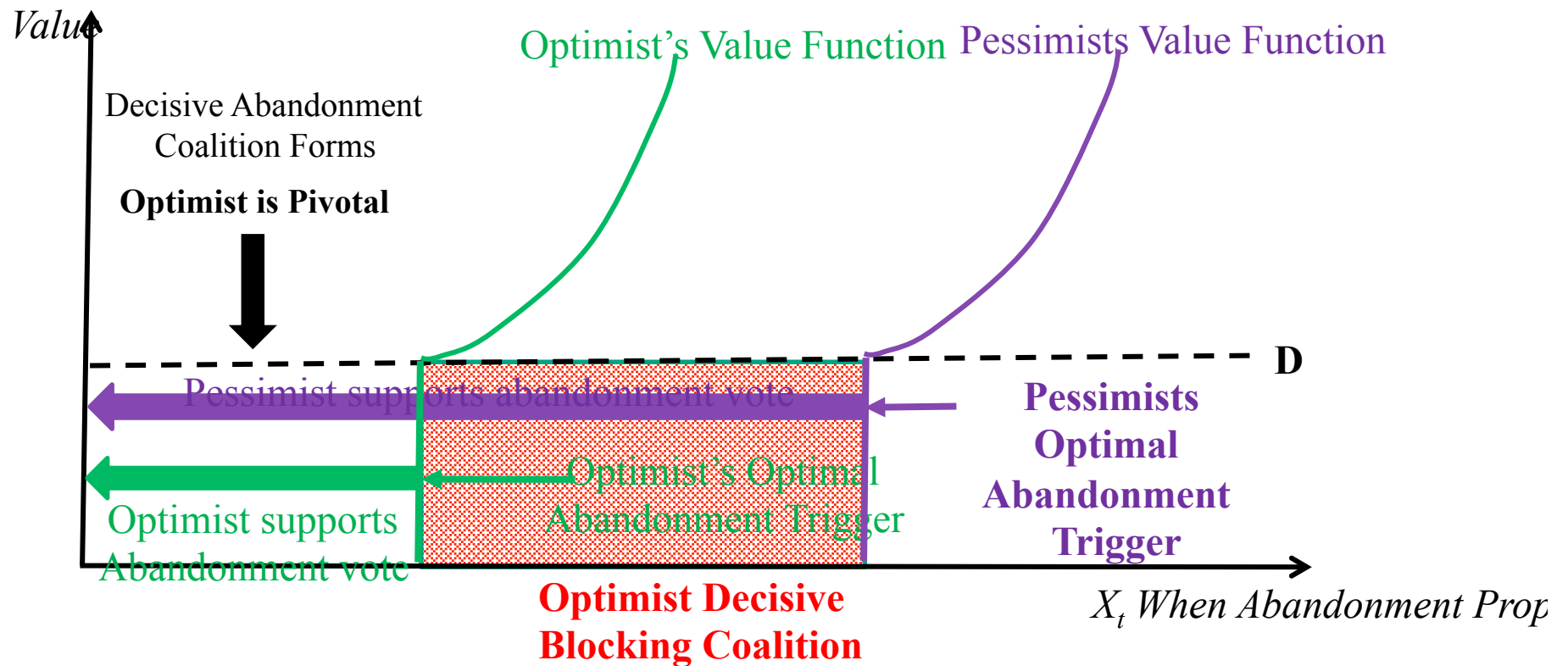
1 voter in a 2 person DMG

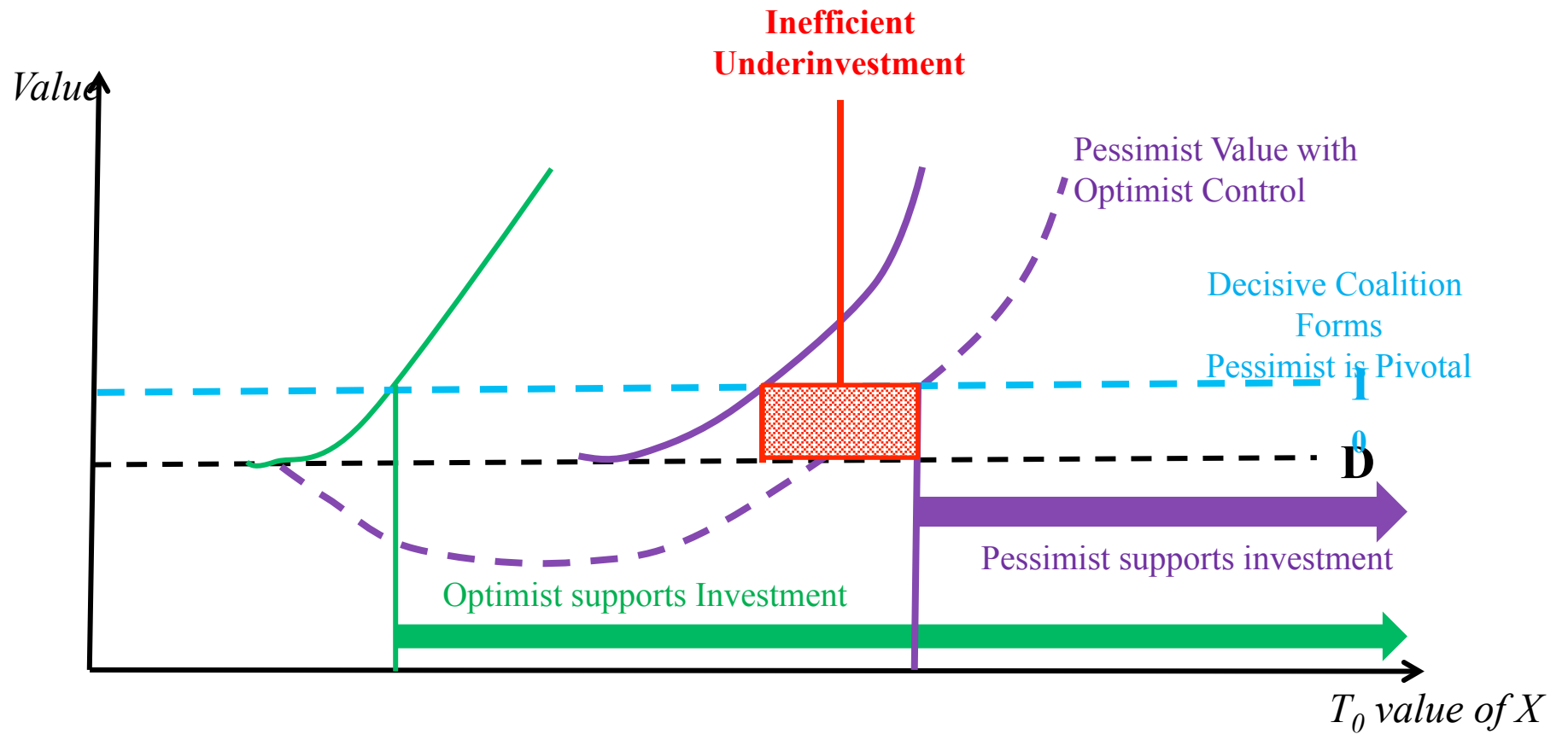
2 voters in a 4 person DMG

Pivotal Voter

- > The marginal voter, the swing voter

Expected Abandonment Vote





Results

Inefficiency requires

A change in the pivotal voter

Polarization

> A sufficient difference in Beliefs

Odd number in group eliminates inefficiencies

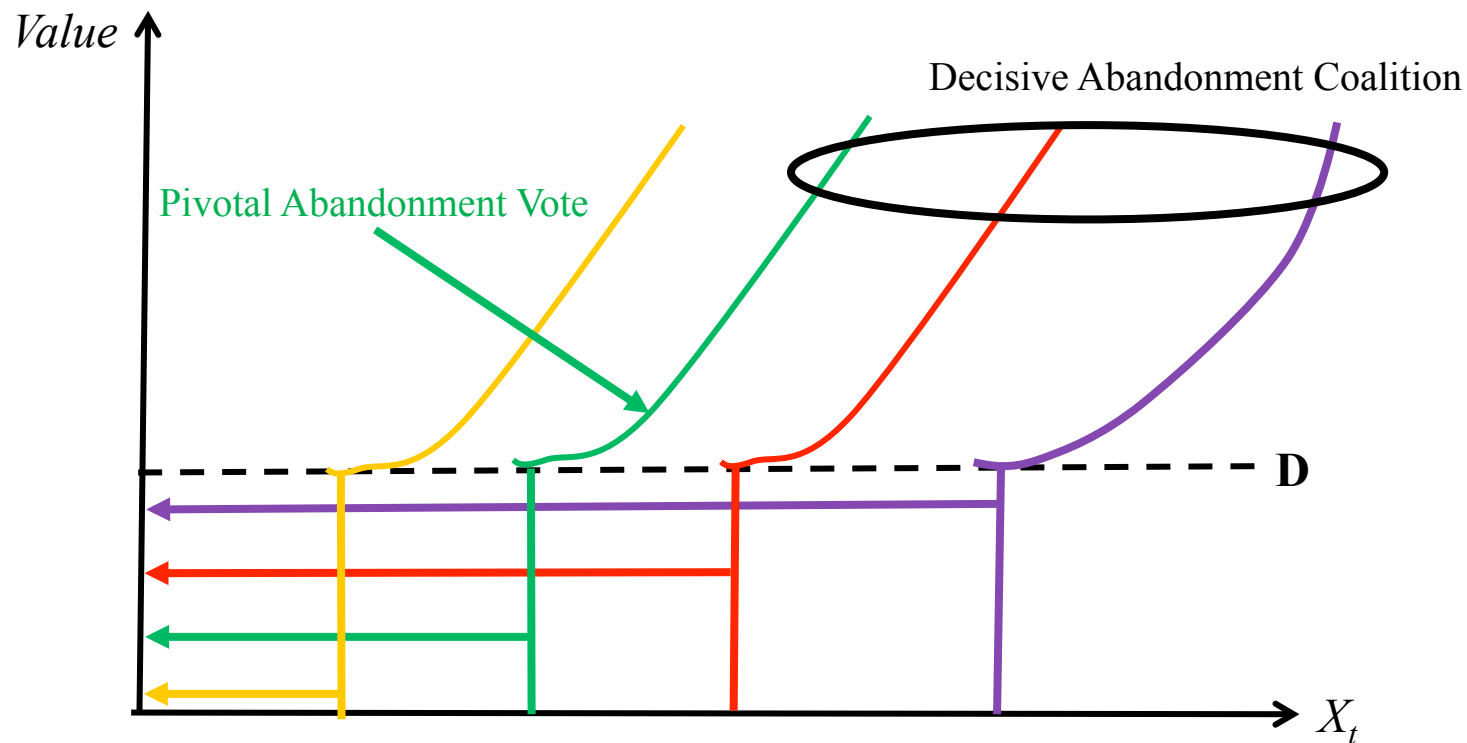
Conventional wisdom in startups

Holds only for single dimensional proposals

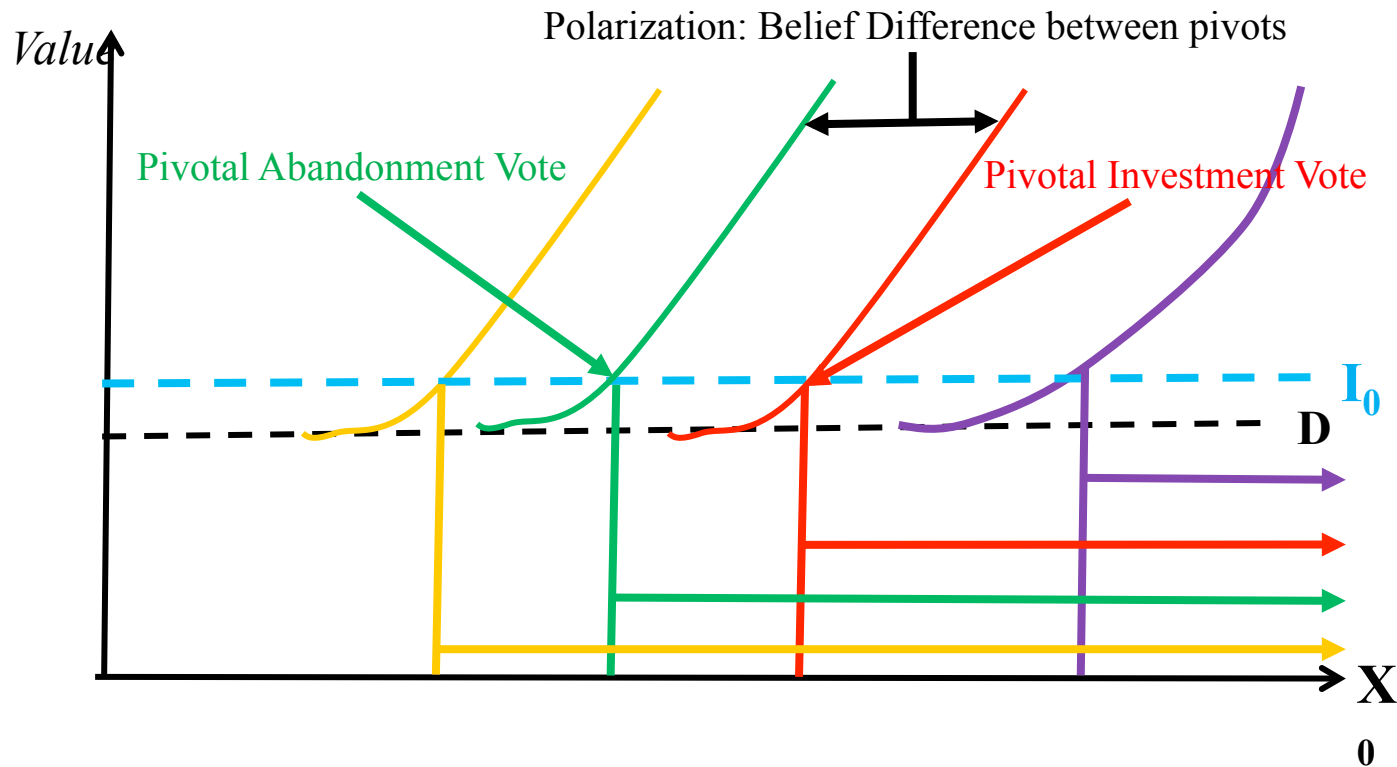
Results hold for other voting rules

Distinctly different than volatility

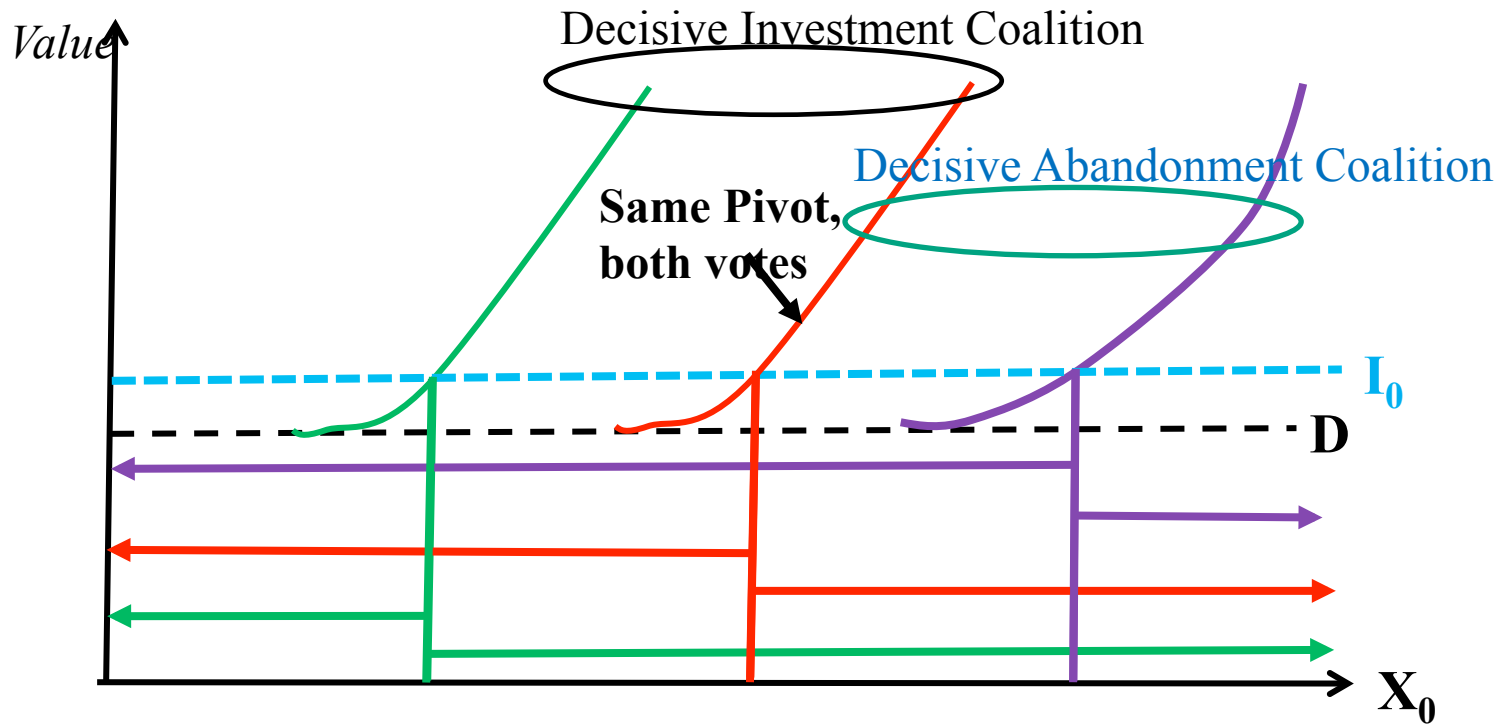
DMG size and Inefficiency: Abandonment 4 person DMG



DMG size and Inefficiency: Investment

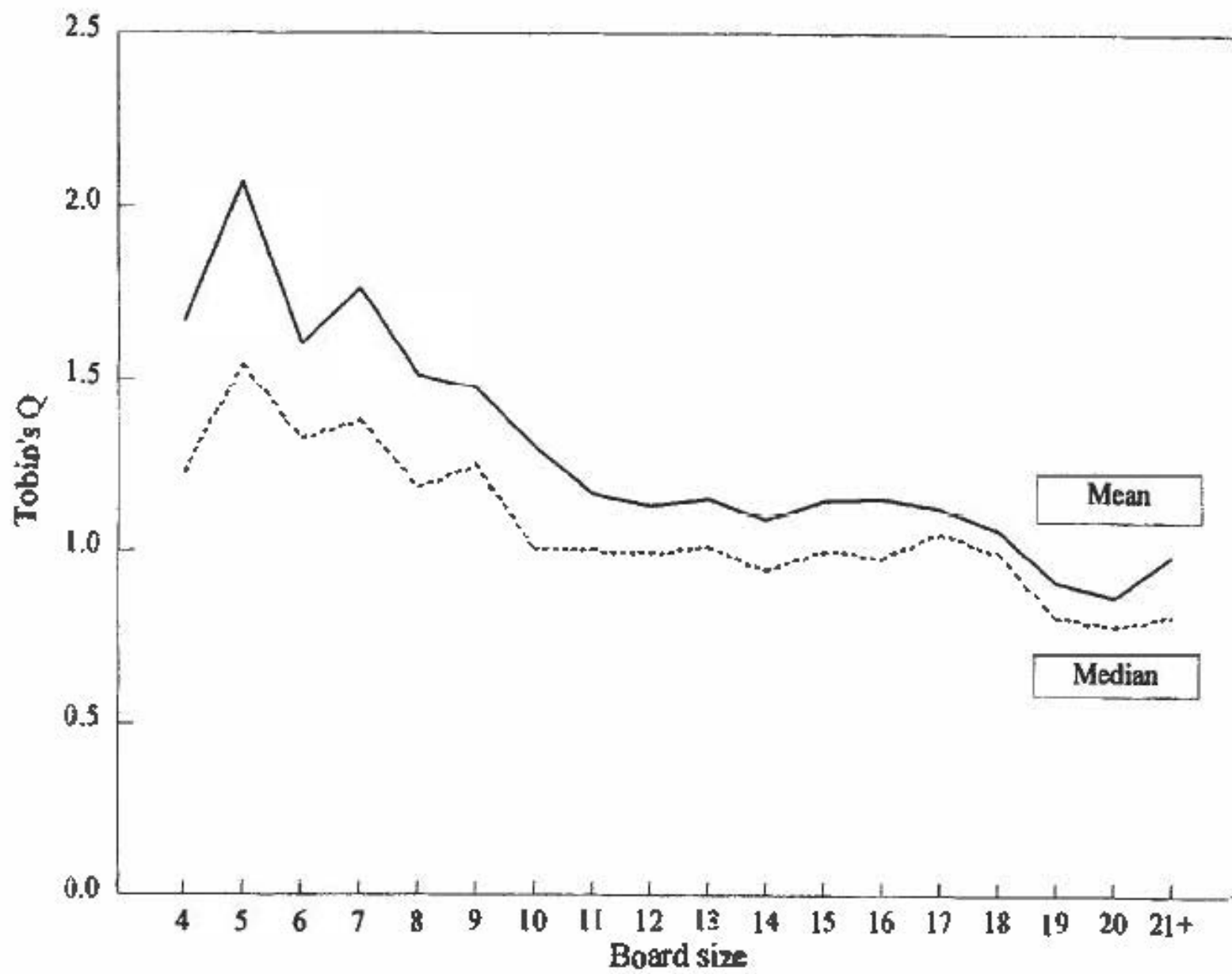


and Inefficiency: Odd



MEDIAN VOTER THEOREM:

With an odd number (and one dimension), Abandonment and Investment Pivots are the same person



Conclusions:

Corporate objectives and corporate theory

- **Objective 1: Value Maximization**
 - SEU single prior
 - Atomistic price taking manager and investors
- **Objective 2: The ‘chosen few’**
 - Manager favors one group (existing shareholders) over another
 - SEU single prior,
 - STRATEGIC, SOPHISTICATED, strategic
- **Objective 3: The Political Corporation**
 - Decisions are made through a political process
 - Unequal influence
 - Voting procedures