# Discussion of "Feedback Effects and the Limits to Arbitrage" by A. Edmans, I. Goldstein and W. Jiang

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# Synopsis

- Limits to Arbritrage (LTA) literature has focused to either *frictions* like short-selling constraints, transactions costs, liquidity or *timing* issues (short horizon of arbitrageurs vs slow convergence to fundamentals).
  $\longrightarrow$ these issues may be less relevant as markets become more advanced and market participants more sophisticated.
  $\longrightarrow$ furthermore, most models treat the fundamental value as exogenous.
- This paper offers another channel that may limit an arbitrage strategy: trading to profit from private information, signals to firm management that private information and subsequently leads the firm to take actions that may mitigate the profitability of the strategy.
  $\longrightarrow$ "the fundamental value is endogenous to the act of arbitrage."

Arbitrage is defined as trading on private information.

# Model

## Setup

- Three dates $t \in \{0, 1, 2\}$.
- A speculator with perfect information about the state $\theta \in \{H, L\}$ may appear at $t = 1$ with probability $\lambda$.
- Trade on the firm's stock happens at $t = 1$, intermediated by a market-maker à la Kyle (Econometrica, 1985). Aggregate flow $X = s + z$, where $s$ is the trade of the speculator if present, and $z$ is flow from typical noise traders.
- Manager, who is absent of any agency problems, observes order flow and makes a decision $d \in \{i, n\}$ to invest or not invest on a single project.
- All uncertainty about $\theta$ is resolved at $t = 2$.

# Model

## Ingredients

(I1) *Conditional on high (low) value investment is good (bad)*: $R_H^i > R_H^n$, $R_L^n > R_L^i$.

(I2) *Conditional on investment (no investment) high (low) value is preferable*: $R_H^i > R_L^i$, $R_L^n > R_L^i$
$\longrightarrow$ no action dominates the other, it depends on the underlying state, more like "corrective" than "amplifying" action.
$\longrightarrow$ so speculation activity that increases price informativeness is helpful.

$\gamma$ is the probability that makes the manager indifferent between investing or not.

(I3) *Investing is the status quo*: $\gamma < 1/2$
$\longrightarrow$ so that a speculator who sees $H$ ($L$) is positively (negatively) informed.

# Model

## Ingredients

(I4) (a) *Absent speculator with positive probability*: $\lambda < 1$
$\longrightarrow$ implies that observing $X = -1$ the market-maker is not sure about what the state $\theta$ is and so there is an asymmetry of information between the market-maker and the speculator. However, when also

(b) *Speculator sufficiently likely to be present:* $\lambda > \frac{1-2\gamma}{1-\gamma}$
$\longrightarrow$ implies that upon observing aggregate flow $X = -1$ the manager chooses to abandon the project, i.e., becomes *sufficiently* pessimistic, and that gives rise to the feedback effect.

$\longrightarrow$ both taken together imply that speculator makes a negative return when $X = -1$.

# Model

## Ingredients

(I5) *Trading cost $\kappa$ is sufficiently high but not too much*:

$$\frac{1}{3}\left(R_H^i - R_L^i\right) > \kappa > \frac{1}{3}\left[\frac{1}{2}\left(R_H^i - R_L^i\right) + \frac{1-\lambda}{2-\lambda}\left(R_H^n - R_L^n\right)\right]$$

$\longrightarrow$ so that negatively informed speculator does not wish to sell but a positively informed speculator does wish to buy.

(I6) *Positively informed speculator does not try to pretend to be negatively informed and manipulate the price*:

$$\frac{3}{2}\left(R_H^i - R_L^i\right) > \frac{3-\lambda}{2-\lambda}\left(R_L^n - R_H^n\right).$$

$\longrightarrow$ scope for manipulation here exists because a corrective action under $H$ is undesirable and makes a short position profitable.

# Model

## Results

### Asymmetric limits to arbitrage

Under (I1)-(I6) there exists an equilibrium in which the speculator always buys under positive information and does not trade under negative information. [Under any parameter value the reverse can never happen.]

Intuition: Buying the stock on good information signals a good state to the manager who invests, further reinforcing profitability of long position. However, by shorting stock on negative information speculator signals a low state to the manager who then takes the corrective action which makes the initial shorting unprofitable. Hence the speculator does not short-sell in equilibrium. This is true even though all market participants are fully rational.

# Model

## Results

- Without (I4) (b), i.e., for $\lambda > \frac{1-2\gamma}{1-\gamma}$

  $\longrightarrow$ We may have equilibrium with no limits to arbitrage, i.e., the speculator always trades on her information.

  $\longrightarrow$ We may have limits to arbitrage but not due to the feedback effect.

- Without (I4) (a), i.e., for $\lambda = 1$ there is no limit to arbitrage

  $\longrightarrow$ The speculator is always there, there is no asymmetry of information between her and the market-maker, and so the speculator does not make a loss (or a gain) when $X = -1$.

# Model

## Results

### Asymmetric Price Impact

Conditional on the presence of the speculator, her price impact is larger when she has positive news relative to when she has negative news. The expected payoff conditional on the speculator being present is positive.

Intuition: Market-maker and speculator agree on the action the manager will take but disagree on the state for $X = -1$. This asymmetry of information (for $\lambda < 1$) makes bad news have a lesser effect than good news on prices.

# Suggestions

- In the model, assumptions are made on project returns under different actions and states, and the variables $\lambda$ and $\kappa$, which are the only needed frictions. In general it would be interesting to explain more about when the various assumptions on the parameters are relevant or not.
- Interesting to identify (under potentially weaker assumptions) an equilibrium with $\mu_H > \mu_L$, so that a positively informed speculator trades with a higher probability than a negatively informed one.
- Does the result on price impact imply that the speculator would always be willing to pay a cost to acquire firm specific information? Then can do comparative statics of that cost with respect to $\lambda$ and $\kappa$.

# Suggestions

- How about considering a speculator à la Kyle (Review of Economic Studies, 1989) where the speculator also recognizes her impact on prices and spreads her demand/supply over time to profit from her information.
- How would things change if speculator was always present but $\lambda$ was the probability that she had any information. What is the role of a "pseudo"-speculator (similar to Goldstein & Guembel (Review of Economic Studies, 2008))?
- The model predicts that "short-sellers" will be absent from the equity markets.
  $\longrightarrow$ So is short-selling in the example of Coca Cola driven by irrationality or by existing shareholders who ignore the free-riding issue?
  $\longrightarrow$ How about derivatives markets, which are more opaque and may not signal enough to manager. Is there empirical support that most speculators with negative information trade through derivatives?

# General Remarks

- Well motivated and interesting research question.
- Authors make an important point with a simple, very clean model.
- Thorough explanations of the main assumptions and their role.
- Nice empirical predictions & applications.
- At many parts of the paper authors take the time to explain results intuitively.