

Learning from Market Prices

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1. Information in Prices

Information in Prices

- A basic premise in financial economics: market prices are very informative about assets fundamentals
- This line of thinking goes back to Hayek (1945)
 - He argued that prices are key sources of information for guiding production and allocation decisions
 - Prices aggregate information from many different traders, providing information that would be hard to generate otherwise
 - While Hayek was referring to prices of all goods and services in the economy, the argument applies to financial-market prices also, as

they gather information from many different participants, who trade on their own money

- There is a lot of empirical work investigating the informational content in market prices, and largely supporting the idea that prices contain useful information
 - A leading example is Roll (1984) who shows that orange-juice futures markets improve weather forecasting relative to traditional meteorological forecasts
 - A large literature on prediction markets argues that markets provide the most efficient mechanism for predicting various realizations, such as outcomes of elections (see Wolfers and Zitzewitz, 2004)

The Feedback Effect

- Given the information content in market prices, it is natural to expect that decision makers in the real side of the economy will make use of this information in their decisions
- What prices may be useful?
 - Stock prices, futures prices, bond prices; depending on the context and purpose
- Who can learn from prices?
 - Managers, Creditors, Regulators, Customers, Employees, etc.
 - As long as there is *some* information in the price they don't know

2. Managerial Learning from Stock Prices

Should Managers Learn from Stock Prices?

An efficient market “has a very desirable feature. In particular, at any point in time market prices of securities provide accurate signals for resource allocation. That is, firms can make production-investment decisions ...”

Fama & Miller (1972)

- If financial markets aggregate information from many different market participants, this information can help managers
- While managers know many aspects of the firm best, there are dimensions on which they can gain from others’ insights:
 - Information about synergies in mergers and acquisitions, product-market demand, strategic interactions between firms in the market

Examples from Mergers and Acquisitions

- Coca-Cola's attempted acquisition of Quaker Oats:
 - On November 20, 2000, the Wall Street Journal reported that Coca-Cola was in talks to acquire Quaker Oats, and shortly thereafter, Coca-Cola confirmed such discussions
 - The market reacted negatively, sending Coca-Cola's shares down 8 percent on November 20 and 2 percent on November 21
 - Coca-Cola's board rejected the acquisition later on November 21, and connections were made to the negative market reaction, leading to Coca-Cola's shares rebounding 8 percent in the following day

- Hewlett Packard's (HP) acquisition of Compaq:
 - HP's stock price fell 19 percent following the announcement of the acquisition on September 4, 2001
 - To everyone's surprise, Walter Hewlett, who earlier voted in favor of the deal as a board member, announced opposition on behalf of the Hewlett Foundation in the wake of the stock price drop, mentioning the market's reaction
 - As chairman of the second-largest shareholder and the son of the company's founder, he posed a credible threat to the deal. Shares of HP rose 17 percent in response

Large-Scale Empirical Evidence

- Empirical Challenge:
 - Correlation between prices and corporate investments are not necessarily indication of active learning
 - They could both be affected by the same underlying fundamental
- Evidence relying on the idea that investment-price sensitivity will be stronger in some cases than others:
 - The evidence suggests that firms rely on prices more when they are expected to do so based on informational theories

- Luo (2005) – Mergers are more likely to be cancelled when prices react more negatively and managers are trying to learn: uncertainty is not about technology and deal is easier to reverse
- Chen, Goldstein, and Jiang (2007) and Bakke and Whited (2010) – Sensitivity of investment to price is higher when prices are more informative, based on microstructure variables, even when controlling for measures of managerial information
- Foucault and Fresard (2012) – Cross-listed firms have stronger investment-price sensitivity

- Foucault and Fresard (2014) – Firms’ investments are sensitive to their peers’ stock prices when they are more informative; their sensitivity to their own stock prices decreases when their peers’ prices are more informative
- Edmans, Jayaraman, and Schneemeier (2017) – Investment sensitivity to price increases following greater enforcement of insider-trading laws
- Evidence relying on the effect of non-fundamental shocks to prices:
 - The evidence suggests that attempting to learn from the price brings noise into investment decisions when managers cannot tell what affects price changes

- Edmans, Goldstein, and Jiang (2012) – Using mutual-fund extreme outflows as a non-fundamental shock to price, it is shown that firms more exposed to the shock are more likely to become takeover targets
- Dessaint, Foucault, Fresard, and Matray (2019) – Using the same non-fundamental shock to prices, it is shown that firms respond to a negative shock for their peers by cutting their own investments
- Overall, the evidence suggests that the financial markets are not just a side show
 - The information in prices affects managerial decisions
 - As a byproduct, noise in prices also affects managerial decisions

- The fact that markets are not just a side show has very important implications (see review by Bond, Edmans, and Goldstein, 2012):

“Up until the crash of 2008, the prevailing view called the efficient market hypothesis was that the prices of financial instruments accurately reflect all the available information (i.e. the underlying reality). But this is not true...

We must understand financial markets through a new paradigm which recognizes that they always provide a biased view of the future, and that the distortion of prices in financial markets may affect the underlying reality that those prices are supposed to reflect. (I call this feedback mechanism reflexivity..)”

Soros (2009)

3. Other Decision Makers or Other Market Prices

On the Central Role Market Prices Play in Policy

Making:

“...policy makers watch financial markets carefully for another reason, which is that asset prices and yields are potentially valuable sources of timely information about economic and financial conditions. Because the future returns on most financial assets depend sensitively on economic conditions, asset prices—if determined in sufficiently liquid markets—should embody a great deal of investors’ collective information and beliefs about the future course of the economy.”

Bernanke (2004)

Using Market Prices for Bank Supervision:

“Market data are generated by a very large number of participants. Market participants have their funds at risk of loss. A monetary incentive provides a perspective on risk taking that is difficult to replicate in a supervisory context. Unlike accounting-based measures, market data are generated on a nearly continuous basis and to a considerable extent anticipates future performance and conditions. Raw market prices are nearly free to supervisors. This characteristic seems particularly important given that supervisory resources are limited and are diminishing in comparison to the complexity of large banking organizations.”

Gary Stern, Former President of Minneapolis Fed

Other Decisions Based on Prices

- Board of directors decides on whether to keep the CEO
 - Large empirical literature discusses the effect of stock prices on the CEO-retention decision, e.g., Jenter and Kanaan (2015)
- Credit rating agencies set ratings
 - Although recent evidence by Gredil, Kapadia, and Lee (2019) suggests they can differentiate fundamental from non-fundamental information
- Lenders, creditors, and depositors determine access to capital
 - See how SEC explained restrictions on short sales for financial institutions

Commodities Futures Markets

“futures prices provide a wealth of valuable information for those who produce, store, and use commodities...The big benefit from futures markets is the side effect: the fact that participants in the futures markets can make production, storage, and processing decisions by looking at the pattern of futures prices, even if they don't take positions in that market.”

Black (1976)

- This issue has become very relevant recently with the wave of commodities financialization, whereby financial traders have entered the commodities futures markets: Cheng and Xiong (2014)

- Economists and regulators are concerned about whether and how financialization has affected the functioning of futures and spot markets and what is potentially the real effect
- Recent theoretical analyses provided by Sockin and Xiong (2015) and Goldstein and Yang (2019)
- Empirical evidence by Brogaard, Ringgenberg, and Sovich (2019) presents some intriguing findings:
 - Financialization decreased the informativeness of commodities futures prices and hurt the profits of firms that depend on them

4. The Feedback Loop: New Paradigm for Financial Markets

Implications for Theory

- A feedback loop emerges between market prices and firms' cash flows and fundamentals. Prices reflect *and* affect cash flows:
- Traditional models on financial markets – Grossman and Stiglitz (1980), Kyle (1985), Glosten and Milgrom (1985) – do not capture this feedback loop
 - They take firm cash flows as given and study price formation as a result
- The “Feedback Effect” papers break this paradigm and consider the feedback loop between prices and cash flows / fundamentals
 - Modelling can be challenging because of feedback loop

Summarizing Theoretical Lessons: Bond, Edmans, and Goldstein (2012)

- Two channels for real effect of (secondary) financial markets (both rely on information):
 - Decision makers on the real side learn new information from markets that guides their decisions
 - Compensation contracts for real decision makers are tied to market prices and affect their incentives
 - Both channels rely on the informativeness of market prices

- Highlight two implications for theoretical research:
 - Incorporating the feedback effect into models of trading in financial markets fundamentally changes predictions on price formation in financial markets (with implications for firm cash flows)
 - Giving rise to phenomena that otherwise look puzzling
 - Different notions of efficiency
 - Forecasting Price Efficiency (FPE)
 - Revelatory Price Efficiency (RPE)
 - Former is often emphasized (Market Efficiency), but latter really matters (Real Efficiency)

5. Examples for New Conceptual Insights

Manipulation: Goldstein and Guembel (2008)

- The fact that prices perform an allocational role creates a scope for price manipulation by uninformed speculators via short sales:
 - Uninformed traders establish short position
 - Price decreases
 - Real investment decreases
 - Value of asset decreases
 - Uninformed traders make a profit on the short position
- The channel is not symmetric:

- Under-investment due to manipulative short sales reduces firm value and allows speculators to make a profit
- Over-investment due to manipulative buying also reduces firm value and does not allow speculators to make a profit
- This is implicitly understood by regulators as a primary reason for short-sales restrictions, which are very common
- There is an inherent limitation in the allocational role of prices
- Such manipulation has negative real effects: The fact that speculators might engage in manipulation reduces the informativeness of the price and the efficiency of investment decisions

Limits to Arbitrage and Asymmetric Trading: Edmans, Goldstein, and Jiang (2015)

- Broad definition of arbitrage: trading on private information
- Limit to Arbitrage (LTA) arises because the value of the asset being arbitrated is endogenous to the act of arbitrage
 - If speculator knows that state is bad, shorting stock may convey this to the manager and induce a corrective action
 - This improves firm value and harms the profitability of a short position

- Our LTA is asymmetric
 - Trading in either direction (buying on good news and selling on bad news) improves price informativeness, increasing firm value
 - This increases the profitability of a long position, but decreases the profitability of a short position
- Price impact ends up being asymmetric too (even though market maker is rational and takes into account the LTA)
 - Bad news has a smaller impact than good news
 - Since bad news is not incorporated in prices, overinvestment arises

Strategic Complementarities and Trading Frenzies: Goldstein, Ozdenoren, and Yuan (2013)

- Trading Frenzies arise when speculators rush to trade in the same direction causing large pressure on price
 - Give rise to bear raids, financial-market runs
- What causes trading frenzies?
 - Markets usually feature strategic substitutes, not complementarities
- Feedback effect turns out to be source of complementarities

- Consider a capital provider deciding how much capital to provide for a new real investment
- Decision of capital provider depends on assessment of investment productivity, based on private information and information in price
- Due to feedback effect, speculators have a tendency to act like each other and use correlated information: trading frenzy
 - A lower price reduces the firm's access to capital, reducing firm value, and increasing incentive to sell
 - Capital provider, as a decision maker, generates different implications than manager: Amplifying vs. Corrective action

Disclosure and Feedback: Goldstein and Yang (2019)

- The paper studies the real-efficiency implications of public disclosure in a model with feedback effect
- The model differentiates between different types of information and shows that implications can be different depending on what is being disclosed, how precise the disclosure is, how efficient the market is
- There is a clear benefit in providing public information about what decision makers already know, as it pushes the market to focus on the information that decision makers care to learn

- Providing public information about something decision makers wish to learn might backfire, because it crowds out useful market information, especially when market is efficient at aggregating
- Implications: Having public disclosure focused on the quality of technology and products is always beneficial. However, providing public disclosure on competition with other firms might not be desirable if market is efficient and public disclosure has low precision
- Result provides rationale for accounting metrics that are based on backward looking information and not forward looking assessments

6. Conclusion

- Feedback effects are a natural consequence of informative markets
- They involve different decision makers and markets
- There is evidence supporting their presence in the data and they generate important implications for theories of financial markets, highlighting complications, limitations, and remedies
- There are many opportunities for future research:
 - Establishing empirical evidence more firmly or directly
 - Exploring other implications of interactions between financial markets and the real economy