FINM3407 – Behavioral Finance

Topic 4:

Chapters 6 & 9: Overconfidence & Investors

Reference: Ackert and Deaves, Chapters 6 & 9

Shirina Lin

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What we do this week

[Part One – Overconfidence]

- Overview about Overconfidence

- Miscalibration / Other Strains of Overconfidence

- Factors Impeding Correction

[Part Two – The Impact of Overconfidence on Financial Decision-making]

- Overview: The Impact of Overconfidence on Financial Decision-making

- Overconfidence and Excessive Trading – A simple Model

- Under diversification and excessive risk taking

- Analysts and excessive optimism

Information, probability and cognitive biases

❑ People tend not to use probabilities correctly:

- People are **overconfident** about themselves.

- People **overstate** the probability that they are **right.**

❑ People tend not to process information correctly:

- If information is boring, mundane, or commonplace, people tend to **under-react** to it.

- If information is exciting or dramatic, people tend to **overreact** to it.

- People also tend to **look for** information that is **consistent** with their view and **ignore** information that is **inconsistent.**

Does this matter in financial markets?

Overconfidence Overview

Overconfidence: ***unwarranted faith*** in one's intuitive reasoning, judgments, and cognitive abilities.

- *Subjects overestimate both their own **predictive abilities and precision of information** they have been given.*

- *People think that they are **smarter** and have **better information** than they actually do.*

- Overconfidence: regardless of primary knowledge, secondary knowledge is overestimated.

  (People tend to overestimate the probability that they are right. Thus, they are surprised more often than they think.)

Two types of overconfidence:

Prediction overconfidence:
The **confidence intervals** that investors assign to their investment predictions are **too narrow**

Certainty overconfidence:
Investors are often ***too certain of their judgment***

4

Confidence vs. overconfidence

- Confidence is all about having a _positive feeling_ about your skills, knowledge, etc.

- But overconfidence is when you have **an inflated sense** of your abilities.

Various manifestations:

- **Miscalibration**

Other Strains of Overconfidence

- Better-than-average effect

- Illusion of control

- Excessive optimism

Calibration-based overconfidence

Miscalibration is the tendency for people to overestimate the precision of their knowledge.

- It normally implies thinking that your knowledge is more _accurate_ than it really is.

- Two ways to measure

1. **Calibration tests**

<u>**e.g. You get 20 multiple choice questions in your mid-exam**</u>

- Then ask how many you answer correctly. And compare the two numbers

- If you think you got **_____** right (   )...but you **only got _____** right (   ).

- You appear to be **overconfident**

Calibration-based overconfidence cont.

2. Confidence interval approach

Confidence interval: an interval that is expected to contain the parameter being estimated.

(e.g. 95% confidence interval → 5% chance of being wrong)

Suppose individuals are asked to construct 90% confidence intervals
(e.g., height of Mount Everest, the level of the Dow in a month, etc.).

If an individual is asked **a large number of questions** (sampling error is reduced by asking a sufficiently large number of questions), **then proper calibration implies that about 90% of their confidence intervals** should contain correct answers to the questions.

*Or, focusing on a particular question that is **asked of a large number of respondents**, if the group as a whole is properly calibrated, **90% of these individuals should have confidence intervals bracketing the correct answer.***

Calibration-based overconfidence cont.

The reality turns out to be quite different.

A percentage of individuals usually markedly below x% produces intervals that bracket the true answer. The same holds at the level of the individual.

In sum, calibration studies find that the _confidence intervals that individuals provide are **too narrow**,_ resulting in correct answers lying within the confidence ranges less often than an accurate sense of one's limitations would imply.

Other Strains of Overconfidence

Better-than-average effect

Refers to the tendency for a person to rate themselves as above average.

- Many of us feel we are smarter or more skilled than average, but only 50% of us can really be better than average.
- Evidence suggests that people pick a definition of a task that suits their purpose.
- On the cognitive side, the performance criteria that most easily come to mind are often those that you are best at.

Illusion of control

The tendency to think that there is more control over events than can objectively be true

- For example, gamblers may think that they can control the outcome of the dice or the cards, or people actually believe that the risk of infection is partly a function of the character of the person that they are coming into contact with.

9

Other Strains of Overconfidence

Excessive optimism

- Reflects the feeling that things will be rosier than objective analysis suggests.

- When people's predictions about the future are **unrealistically optimistic**.

- In essence, people assign probabilities to favourable/unfavourable outcomes that are too high/low given historical experience or reasoned analysis.

Excessive optimism and miscalibration can go hand in hand.

Suppose you purchase a stock:

- True distribution for the return on this stock over the next year entails an expected return of 10%, with a 90% confidence range of -10% to 30%

- Your (optimistic) distribution, has an expectation of 20%, with a 90% confidence range of 10% to 30%

Other Strains of Overconfidence

Excessive optimism

Evidence on excessive optimism:

- Students expect to receive higher marks than they actually receive.
- Overestimates the number of job offers that they will receive.
- People think they can accomplish more than they actually end up accomplishing.
- Individuals assume that costs will align with initial estimates.

Subject to the planning fallacy

In reality, many of us fall short of our work goals on a regular basis, and budget overruns are a common feature of large public projects

- The Sydney Opera House, for instance, was supposed to be completed in 1963 at $7 million. Instead, it was finished 10 years later at $102 million.

Costs of excessive optimism:

- Inability to meet one's goals can lead to disappointment, loss of self-esteem and reduced social regard.
- And time and money can be wasted pursuing goals that are unrealistic.

Problems with measuring overconfidence

Most people most of the time appear to be ***overconfident.***

But overconfidence does not seem to be universal.

- Under confidence is common on easy tasks

- Also, depending on the metric, it is possible for people to be judged overconfident using one metric but not using another.

- And there is no universally accepted way to measure overconfidence

Overconfidence and demographics

We are **not all equally overconfident**.

- Male vs Female
  - *On a survey men and women were asked what they expected the market return and their own portfolio return to be in the following 12 months.*
  - *Both men and women expected their portfolios to outperform the market – but the gap was greater for men*

- Education Level & Income Level

Factors Impeding Correction

Why don't we learn?

- ***Self-attribution bias*** retards the learning process by allowing us to embellish our triumphs while forgetting our defeats.

- ***Hindsight bias:*** says we knew what was going to happen when we really didn't.

- ***Confirmation bias:*** the tendency to search out evidence consistent with one's prior beliefs and to ignore conflicting data.

These effects suggest that overconfidence can evolve over time.

Overconfidence may not be all bad

Research has shown that predictions about the future tend to be **more optimistic when:**

- Goals are far off
- A course of action has been committed to

When these conditions are met, excessive optimism may be useful in enhancing performance.

Part Two

The Impact of Overconfidence on Financial Decision-making

Overconfidence: (Negative) Implications for (retail) investors

1. Unfounded belief in own ability to identify companies as potential investments: *blind to any negative information*

> ➜ *suggestion: review trading records of past two years and then calculate the performance of your trades.*

2. Excessive trading: *lower returns*

> ➜ *suggestion: keep track of each and every investment trade and then calculate the returns.*

3. Underestimating their downside risks: *surprise on underperformance*

> ➜ *suggestions: (1) review investment holdings for potential poor performance; (2) realized how volatile the markets are*

4. Portfolio under diversification: *taking on more risk*

> ➜ *suggestion: recall that numerous, once-great companies have fallen; what is the optimal portfolio without current holdings?*

Overconfidence and excessive trading

Theoretical models indicate a relationship between overconfidence (OC) and extent of trading.

To get a flavor, consider 3 investors:

- High-OC investor: HOC
- Low-OC investor: LOC
- No-OC investor (accepts whatever the market tells him): **PC** (**P**roper **C**alibration).

- At the level of the individual, demand will be a function of the investor's estimate of the security's (intrinsic) value.
  - If the investor believes that the value (v_i) exceeds the market price **(p)**, he/she will wish to hold more of the security than if the security was perceived to be fairly priced.
- Let q_n equal the (neutral) number of shares that an investor would hold if price and value were equivalent ($v_i = p$).
  - If the value exceeds the price, the investor will want to hold <u>more</u> than q_n shares.
  - If value falls short of the price, the investor will want to hold <u>less</u> than q_n shares.

Overconfident Traders: A Simple Model

1) **First assume that since there are many investors, all are price-takers.**

Further, we will assume that when estimating value, an investor uses two items of information, his own opinion (prior value) and the market price (which is the weighted average of all investors' opinions), as follows:

$$v_i = \alpha_i v_i^* + (1 - \alpha_i)\, p, \quad 0 \leq \alpha_i \leq 1 \ (\textbf{Equation 9.1})$$

Where:

v_i is the (posterior) estimate of value of investor i;

v_i^* is the same investor's prior estimate of value;

p is the market price; and a_i is the weight (i.e., level of overconfidence) investor i puts on his prior relative to the market price.

The higher α_i is, the higher is the weight an investor puts on his own opinion.

Since there is **a very large number of investor views determining p**, any value of α_i *more than slightly above zero suggests some overconfidence*, with **higher** values suggesting **more overconfidence** than lower values.

Overconfident Traders: A Simple Model

Consider how Equation 9.1 feeds into demand for the stock. Suppose that the demand curve can be written as:

2) Suppose that the demand curve can be written as:

$$q_i = q_n + \theta \, (v_i - p), \theta > 0 \qquad \textbf{(Equation 9.2)}$$

Where:

q_i is investor i's demand (i.e., quantity)

θ is the sensitivity of demand to a divergence between the posterior value estimate and price.

- Substitute (Equation 9.1) $v_i = \alpha_i v_i^* + (1 - \alpha_i)\text{p}, \quad 0 \le \alpha_i \le 1$ into (Equation 9.2):

$$q_i = q_n + \theta\alpha_i(v_i^* - p), \theta > 0$$

- Next take the partial derivative of q_i with respect to p:

$$\frac{\partial \, q_i}{\partial \, p} = - \, \theta \, \alpha_i$$

1. *The higher the investor's level of overconfidence (α_i) the more responsive demand is to changes in price.*
2. *As α_i approaches one, which means market price has no influence, the closer ∂qi/∂p is to −ϑ*
3. *On the other hand, as α_i moves toward zero, the demand changes little when the price changes.*

Overconfidence, excessive trading and demand curves

Demand Curve for Investor 1 with proper calibration (PC)

Equilibrium price (q_n, v_o)
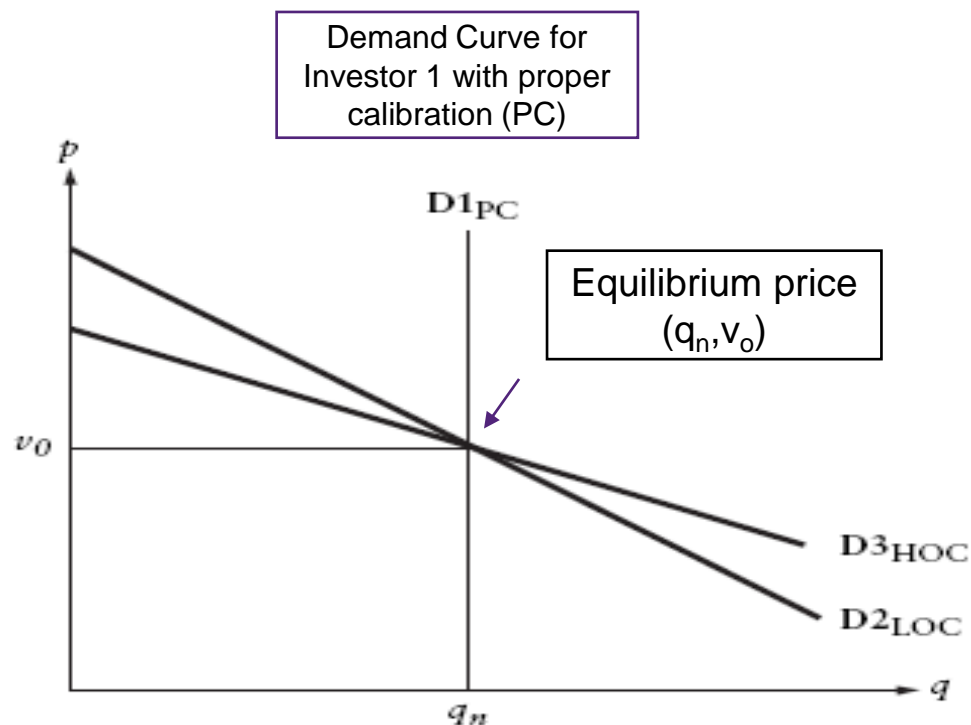
$$D1_{PC}$$

$$D3_{HOC}$$

$$D2_{LOC}$$

On this graph, their **D**emand curves (**D**) for a given security are depicted.

These are labelled **D1PC, D2LOC & D3HOC**, where "PC" refers to "proper calibration," "LOC" refers to "low overconfidence," and "HOC" refers to "high overconfidence".

As has been discussed, a more overconfident investor in this context is one who more strongly believes in his ability to appropriately value the security.

The three investors are similar in some respects. They all analyse the security in question and arrive at the same prior value estimate, which is designated as in the v_0 graph.

Overconfidence, excessive trading and demand curves: Interpretation

Difference between 3 investors:

They respond differently to prices that are different from their value estimates.

- Investor 1 (PC) slavishly maintains his holding regardless of price changes: this investor wishes to hold q_n at any price.
- Other two investors have negatively-sloped demand curves, implying willingness to "march to beat of a different drummer."
- Investor 2/3 pays some/most attention to own opinion.

Consider what happens as the price changes:

- Higher OC leads to **more trading** for a given value vs. price gap

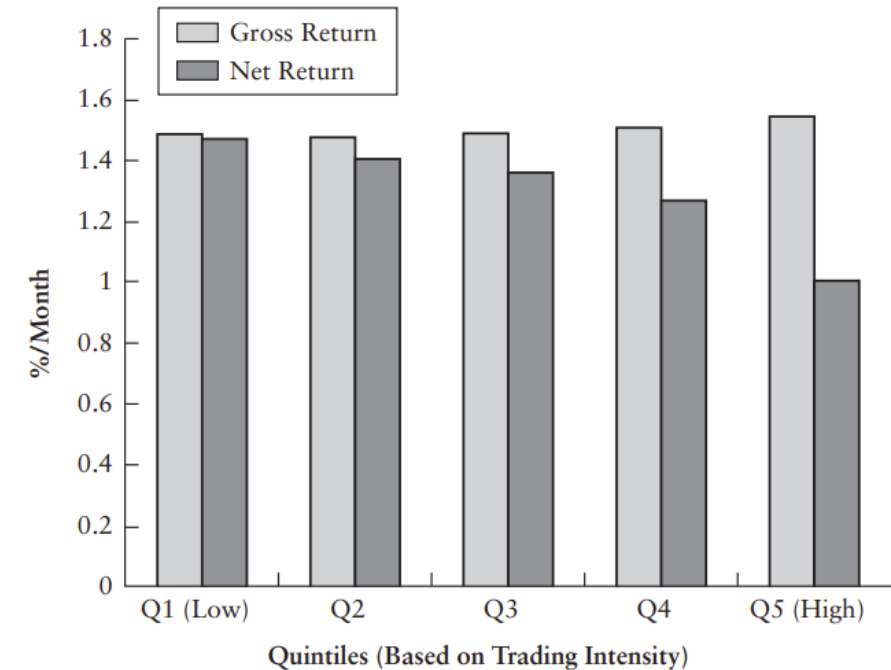*The more overconfident is the market **the greater will be volume** at level of market.*
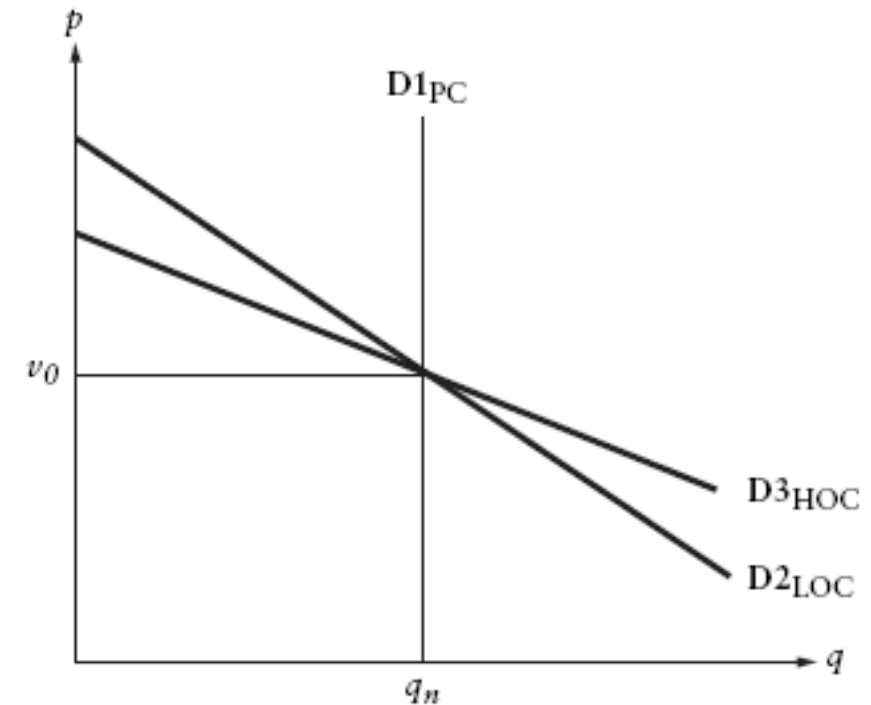
Evidence from the Field
Do people trade because of knowledge or knowledge perception?

Several related studies documented trading losses that were _perhaps_ attributable to overconfidence.

- 60,000 households during 1991-96.

- Look at gross and net transaction cost returns.

- For both raw returns and risk-adjusted returns, they find that the high quintile group have higher gross return.

- However, their net risk-adjusted return was below the market return. Those trading the most frequently earned an average annual return of 11.4% vs. the market return of 17.9% (underperformed the market).

- Greatest offenders were men.

FIGURE 9.6 Gross and Net Returns for Groups with Different Trading Intensities

Legend:
- Gross Return
- Net Return

Y-axis: %/Month (0 to 1.8)
X-axis: Quintiles (Based on Trading Intensity) — Q1 (Low), Q2, Q3, Q4, Q5 (High)

Source: Barber, B., and T. Odean, 2000, "Trading is hazardous to your wealth: The common stock investment performance of individual investors," _Journal of Finance_ 55, 773–806.

Overconfidence and excessive trading?

This evidence only *indirectly* links trading and overconfidence.

- How do we know that it is overconfidence that is driving excessive trading?

Studies from surveys and the lab try to establish a *direct* relationship between overconfidence and trading activity.

Experimental evidence

In an experimental study correlation between various forms of overconfidence and trading activity was also investigated.

- Participants first filled out questionnaires eliciting their level of overconfidence.
- **Then trading sessions were conducted:**
  - *Subjects were endowed with cash plus stocks (with random dividends) that they could trade*
  - *Private signals of true dividends*
  - *Most accurate people were given the least noisy signals*

Point was to see if overconfidence and trading activity were correlated.

Other variables were also investigated.

Evidence From Surveys and the Lab: Trading activity regressions

Independent Variable	Specification 1	Specification 2
Constant	-8.854 (0.509)	43.908 (0.026)
CBO	49.673 (0.008)	40.499 (0.023)
BTA	1.008 (0.027)	0.700 (0.164)
IOC	- 2.611 (0.152)	
AGE		- 1.818 (0.016)
EDUC		-0.794 (0.003)
EXP		16.454 (0.023)
R^2	13.8% (9.5%)	27.5% (18.5%)

Calibrated-based OC

Better-than-average

Illusion of control

Source: Deaves, R., E. Lüders and G. Y. Luo, 2008, "An experimental test of the impact of
overconfidence and gender on trading activity," Forthcoming in *Review of Finance*.
P-values are in the parentheses.

Specification (1), they found that both **miscalibration and the better-than-average effect** led to more trading. No significant effect was found for illusion of control.

Specification (2) explored additional determinants of trading activity beyond overconfidence measures. *Older participants with more financial education traded less.*

On the other hand, those **with real-world trading experience** felt more comfortable "pulling the trigger" and hence **traded more.**

Under-diversification and excessive risk taking

- Rationally speaking, diversification is beneficial, and investors are better off investing in a well-diversified index fund.

- However, a study found that people under-diversify, and this under-diversification was *less severe* among people who were financially sophisticated.

- Diversification increased with income, wealth, and age, and those who traded the most also tended to be the least diversified.

  - *Perhaps overconfidence is the driving force behind both excessive trading and under-diversification*

- In one study, the portfolio composition of more than 3,000 U.S. individuals was examined.
- Most held no stocks at all. Of those households that did hold stocks (more than 600), he found that the median number of stocks in their portfolios was only one.
- And only about 5% of stock-holding households held 10 or more stocks.
- Most evidence says that to achieve a reasonable level of diversification, one has to hold more than 10 different stocks (preferably in different sectors of the economy).
- Thus, it seems clear that many individual investors are quite under-diversified.

Analysts and excessive optimism

- Research has established that analysts tend to be excessively optimistic about the companies that they are following (textbook table 9.2).

- True both in the U.S. and internationally.

- A lot more buy recommendations than sell (e.g. the US: 52%/3%, Germany: 39%/20%)

- *Another interpretation: conflict of interest and desire to keep prospective issuers happy.*

Conclusion

- *Overconfidence:* regardless of how much they know, people overestimate how well they know their limits.

- 4 manifestations: *Miscalibration, better-than-average, Excessive Optimism, and Illusion of Control.*

- Different biases make it hard for us to learn and correct overconfidence.

- However, overconfidence may not be all bad.

- *Overconfident investors* tend to engage in *excessive trading and under-diversification*.

- Analysts tend to show excessive optimism as well.
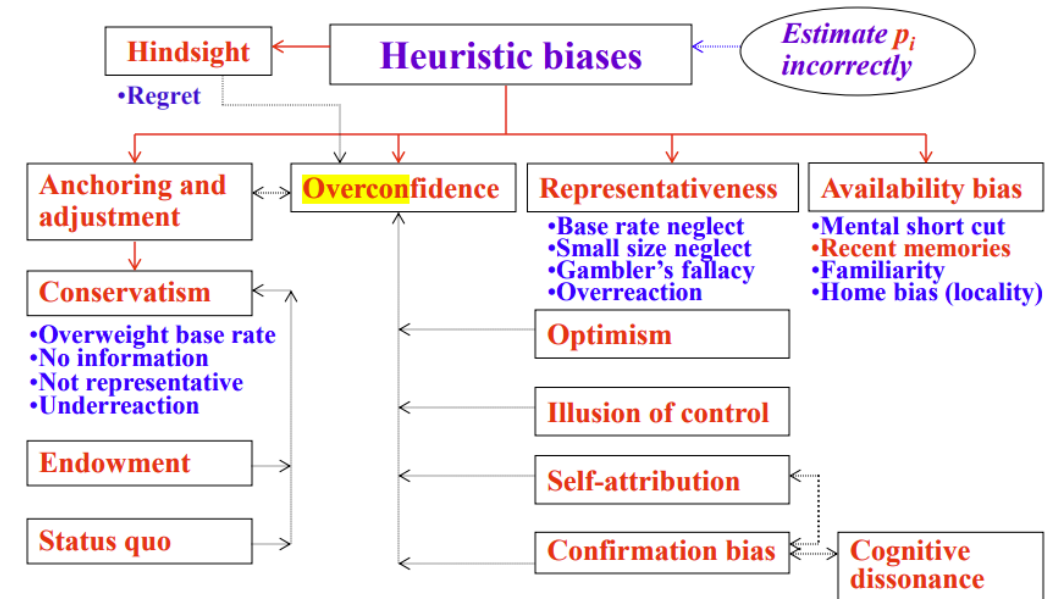
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Topic 4:

Thank you very much