Chapter 9
Implications of Overconfidence for Financial Decision-Making
Introduction

➢ Overconfidence is pandemic in society.
   – address the extent to which this behavioral tendency impacts financial decision-making
   – overconfidence plays a central role in explaining various market anomalies

➢ Various manifestations of overconfidence and excessive trading are related.
   – demographics and dynamics of overconfidence in financial settings
Overconfidence to under-diversification and excessive risk taking

Analysts exhibit excessive optimism.
A simple model

- At the level of individual, demand is a function of the investor’s estimate of the security’s intrinsic value.

- If the investor believes that the value exceeds the market price, he 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.
A simple model (cont.)

- Difference b/w investors: they respond differently to prices that deviate from their value estimates
- A mechanism for value estimation
- Assumptions
  - All investors are price-takers
  - When estimating value, an investor uses two items of information, his own opinion (prior value) and the market price (the weighted average of all investors’ opinions)
Overconfidence and excessive trading

Value estimation:

\[ v_i = a_i v_i^* + (1 - a_i)p, \quad 0 \leq a_i \leq 1 \]

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 investor \( i \) puts on his prior relative to the market price.

Since there is a very large number of investor views determining \( p \), any value of \( a_i \) more than slightly above zero suggests some overconfidence, with higher value suggesting more overconfidence than lower values.
Overconfidence and excessive trading

- Value estimation:
  \[ v_i = a_i v_i^* + (1 - a_i)p, \quad 0 \leq a_i \leq 1 \]

- Overconfidence
  - primarily mean *miscalibration*: an inflated view of the precision of one’s information (or opinion)
  - also mean the better-than-average effect: the feeling that one is better at estimating value than other market participants
Overconfidence and excessive trading

- **Value estimation:**
  \[ v_i = a_i v_i^* + (1 - a_i)p, \quad 0 \leq a_i \leq 1 \]

- **Demand:**
  \[ q_i = q_n + \theta (v_i - p), \quad \theta > 0 \]
  - where \( q_i \) is investor \( i \)'s demand and \( \theta \) is the sensitivity of demand to a divergence b/w posterior value estimate and price

\[ q_i = q_n + \theta a_i (v_i^* - p) \]

\[ \frac{\partial q_i}{\partial p} = -\theta a_i: \]

the higher the investor’s level of overconfidence, the more responsive demand is to changes in price
Theoretical models indicate a relationship between overconfidence and extent of trading.

To get a flavor, consider 3 investors:

- High-OC investor: flatter demand
- Low-OC investor
- No-OC investor (accepts whatever the market tells him): vertical demand
Overconfidence, excessive trading and demand curves

\[ a_3 > a_2, \quad a_1 = 0 \]
Interpretation

- Difference between 3 investors: they respond differently to prices which are different from their value estimates.
- Inv. 1 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.”
- Inv. 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.
Role of overconfidence on trading and volatility

$Q=300$

Demand curve for three investors

- $q_1 = 100$ (Investor 1)
- $p = 20 - 0.1 \times q_2$ (Investor 2)
- $p = 15 - 0.05 \times q_3$ (Investor 3)

- The more overconfident trader has a flatter, more price-responsive demand curve.

- At $20$ or more, $q_1 = 100, q_2 = q_3 = 0$; $20 \sim $15, $q_1 = 100, q_2 > 0, q_3 = 0$; at lower prices, $q_1 = 100, q_2 > 0, q_3 > 0$
Value revision

- Periodically, investors reassess their prior value estimates
  - *When material news arrives*

- Suppose Investor 2 believes that the security has become more valuable: ↑ demand by a $5
  - \( p = 25 - 0.1 \times q_2 \) (Investor 2 – Scenario 1)
  - *aggregate demand has shifted up*
  - New equilibrium price is $11.67
Value revision

- Increasing overconfidence level of Investor 2
  - \( p = 15 - 0.05 \times q_2 \) (Investor 2 – Scenario 2)
  - Both Investor 2 and 2 have the same high level of overconfidence
  - Equilibrium price is still $10

- Both more overconfident and \( \uparrow \) demand by a $5
  - \( p = 20 - 0.05 \times q_2 \) (Investor 2 – Scenario 3)
  - Equilibrium price rises to $12.5 \( \Leftarrow \) weighted average of the three estimates, but the investor with the extreme view exerts a greater influence on it b/c of her willingness to trade more.
Lesson

- Volatility increases with overconfidence
  - the same value revision led to a greater price change when one of the traders was more overconfident
- Overconfidence induces greater trading activity – as well as higher levels of volume at the level of the market.
  - Assuming all investors begin with 100 shares.
  - In Scenario 1, Investor 2 increases her holding to 133.33 shares ← a 33.33 share sale by Investor 3
  - In Scenario 3, Investor 2 increase her holding to 150 shares ← a 50 share sale by Investor 3
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 studied
  - Looked at gross and net of transaction cost returns
  - Found that those trading the most frequently earned an average annual return of 11.4% vs. the market’s 17.9%
  - Greatest offenders were men
Gross vs. net returns

This evidence only *indirectly* relates 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 *direct* relationship between overconfidence and trading activity.
Consider two investors (A and B) with the following demand curves for a stock:

A: \( p = 100 - q \)

B: \( p = 150 - 2q \)

a. At a price of $50, how much will A and B purchase?

b. If the price falls to $30, who will increase their holdings more? Explain.

c. On this basis, which investor seems to be more overconfident?
Another study
- combined naturally-occurring data with information obtained from a survey.

Used trading data and psychometric data
- Used trading data from online brokerage accounts
- and psychometric data obtained from same group of investors who responded to an online questionnaire.
Another study combined naturally-occurring data with information obtained from a survey.

Used trading data from online brokerage accounts and psychometric data obtained from same group of investors who responded to an online questionnaire.

Various measures of trading activity were correlated with a number of metrics of overconfidence.

Solid evidence that those who were most subject to better-than-average effect traded the most.
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 dividend
- Most *accurate* people were given least noisy signals

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

Other variables were also investigated.
### Trading activity regressions

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Specification 1</th>
<th>Specification 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-8.854 (0.509)</td>
<td>43.908 (0.026)</td>
</tr>
<tr>
<td>CBO</td>
<td>49.673 (0.008)</td>
<td>40.499 (0.023)</td>
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<tr>
<td>BTA</td>
<td>1.008 (0.027)</td>
<td>0.700 (0.164)</td>
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<tr>
<td>IOC</td>
<td>-2.611 (0.152)</td>
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<tr>
<td>AGE</td>
<td></td>
<td>-1.818 (0.016)</td>
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<tr>
<td>EDUC</td>
<td></td>
<td>-0.794 (0.003)</td>
</tr>
<tr>
<td>EXP</td>
<td></td>
<td>16.454 (0.023)</td>
</tr>
<tr>
<td>R²</td>
<td>13.8% (9.5%)</td>
<td>27.5% (18.5%)</td>
</tr>
</tbody>
</table>

Conclusions

- Overconfident traders traded the most.
- And performed the worst (not shown in table).
- Miscalibration was predominant.
- And better-than-average effect mattered as well.
- Overconfidence mattered both at individual and market levels (not shown in table).
- Other effects mattered too:
  - Higher education – less trading
  - Experience investing – more trading
In one study underdiversification 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 because it is argued that overconfidence is driving force behind both excessive trading and underdiversification
Research has established that analysts tend to be excessively optimistic about prospects of companies that they are following.

True both in U.S. and internationally.

In U.S., where tendency was most pronounced, buys/sells were observed 52%/3% of the time.

In Germany, where this tendency was least pronounced, buy/sell ratio was still 39%/20%.

Another motivation: *conflict of interest* induced by a perceived need to keep prospective issuers happy.
Table 9.2: Recommendation Distributions (%) in G7 Countries during 1993-2002

<table>
<thead>
<tr>
<th></th>
<th>Strong buy</th>
<th>Buy</th>
<th>Hold</th>
<th>Sell/strong sell</th>
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<tbody>
<tr>
<td>U.S.</td>
<td>28.6</td>
<td>33.6</td>
<td>34.5</td>
<td>3.3</td>
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<tr>
<td>Britain</td>
<td>24.3</td>
<td>22.3</td>
<td>41.7</td>
<td>11.8</td>
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<tr>
<td>Canada</td>
<td>29.4</td>
<td>28.6</td>
<td>29.9</td>
<td>12.1</td>
</tr>
<tr>
<td>France</td>
<td>24.7</td>
<td>28.3</td>
<td>31.1</td>
<td>15.9</td>
</tr>
<tr>
<td>Germany</td>
<td>18.3</td>
<td>20.3</td>
<td>41.5</td>
<td>19.9</td>
</tr>
<tr>
<td>Italy</td>
<td>19.2</td>
<td>20.0</td>
<td>47.1</td>
<td>13.6</td>
</tr>
<tr>
<td>Japan</td>
<td>23.6</td>
<td>22.4</td>
<td>35.7</td>
<td>18.3</td>
</tr>
</tbody>
</table>