Chapter 15.1
Investment in expertise

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Trading expertise

Trading expertise

▶ In order to make profits from trading, investment banks need to invest into the expertise of their traders

Trading expertise

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▶ Trading profits of one investment bank are the losses of another investment bank

Trading expertise

- In order to make profits from trading, investment banks need to invest into the expertise of their traders
- Trading profits of one investment bank are the losses of another investment bank
- Investment banks are competing for profits through expertise

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Signals for traders

▶ **Benefits of trading** ΔV can be positive if diversification and hedging are considered

Signals for traders

▶ Benefits of trading ΔV can be positive if diversification and hedging are considered, in addition of trading profits

Signals for traders

- Benefits of trading ΔV can be positive if diversification and hedging are considered, in addition of trading profits
- Value of the security is V_H with probability π

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Signals for traders

▶ Benefits of trading ΔV can be positive if diversification and hedging are considered, in addition of trading profits

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Trades occurring

▶ Assume a buyer i is only willing to pay $P^* = E[V|L]$

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Trades occurring

▶ Assume a buyer i is only willing to pay $P^* = E\left[V|L\right]$ and has no expertise itself

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Trades occurring

- Assume a buyer i is only willing to pay $P^* = E[V|L]$ and has no expertise itself
- A transaction only occurs if the seller j obtains a low signal

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Trades occurring

▶ Assume a buyer i is only willing to pay $P^* = E[V|L]$ and has no expertise itself

▶ A transaction only occurs if the seller j obtains a low signal

▶ This happens if the value is high, but the signal is wrong or the value low and the signal correct: $\pi(1 - \rho_j) + (1 - \pi)\rho_j$

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Buyer profits

Buyer profits

▶ Trading profits are the value of the security and the trading benefits

▶ $\Pi_B^i = \qquad\qquad (E[V|L] + \Delta V \qquad)$

Buyer profits

▶ Trading profits are the value of the security and the trading benefits, less the price paid

▶ $\Pi_B^i =$ $(E\left[V|L\right] + \Delta V - P^*)$

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Buyer profits

▶ Trading profits are the value of the security and the trading benefits, less the price paid, if the trade happens

▶ $\Pi_B^i = \left(\pi \left(1 - \rho_j\right) \left(1 - \pi\right) \rho_j\right) \left(E\left[V|L\right] + \Delta V - P^*\right)$

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Buyer profits

▶ Trading profits are the value of the security and the trading benefits, less the price paid, if the trade happens

▶ $\Pi_B^i = (\pi (1 - \rho_j) (1 - \pi) \rho_j) (E[V|L] + \Delta V - P^*)$

▶ Value of the security is low as this is the signal of the informed seller

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Buyer profits

- Trading profits are the value of the security and the trading benefits, less the price paid, if the trade happens
- $\Pi_B^i = \left(\pi \left(1 - \rho_j\right) \left(1 - \pi\right) \rho_j\right) \left(E\left[V|L\right] + \Delta V - P^*\right)$
- Value of the security is low as this is the signal of the informed seller, else no trade would happen at this price

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Buyer profits

▶ If the buyer is willing to pay $P^{**} = E[V|H]$, trade will always happen

Buyer profits

▶ If the buyer is willing to pay $P^{**} = E\left[V|H\right]$, trade will always happen as the value of the seller is never above this amount

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Buyer profits

▶ If the buyer is willing to pay $P^{**} = E[V|H]$, trade will always happen as the value of the seller is never above this amount

▶ $P^{**} = Prob(V_H|H)V_H + (1 - Prob(V_H|H))V_L = \rho_j V_H + (1 - \rho_j)V_L$

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Buyer profits

- If the buyer is willing to pay $P^{**} = E[V|H]$, trade will always happen as the value of the seller is never above this amount
- $P^{**} = Prob(V_H|H)V_H + (1 - Prob(V_H|H))V_L = \rho_j V_H + (1 - \rho_j)V_L$
- Trade does not indicate the value of the security

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Buyer profits

- If the buyer is willing to pay $P^{**} = E\left[V|H\right]$, trade will always happen as the value of the seller is never above this amount

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Buyer profits

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- Trade does not indicate the value of the security as it happens regardless of the signal the seller obtains, which is then $E[V] = \pi V_H + (1 - \pi)V_L$

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Buyer profits

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▶ Trader profits: $\hat{\Pi}_B^i = E[V] + \Delta V - P^{**} = \Delta V - (V_H - V_L)e_j$

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Buyer profits

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Maximum signal precision

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Maximum signal precision

▶ Buyers offer the high price if $\hat{\Pi}_B^i > \Pi_B^i$

Maximum signal precision

▶ Buyers offer the high price if $\hat{\Pi}_B^i > \Pi_B^i$

▶ Signal precision must not be too high: $\rho_j \leq \rho^* = \frac{\pi + (1-\pi)\frac{\Delta V}{V_H - V_L}}{1 + (1-2\pi)\frac{\Delta V}{V_H - V_L}}$

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▶ Low signal precision is required as else adverse selection costs are too high for the buyer to offer the high price

Maximum signal precision

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Seller profits

▶ **Total trading benefits** of buyers and sellers are $\hat{\Pi}_S^j + \Pi_B^i = \Delta V$

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Seller profits

- Total trading benefits of buyers and sellers are $\hat{\Pi}_S^j + \Pi_B^i = \Delta V$
- This implies for seller profits of $\hat{\Pi}_S^j = (V_H - V_L)\, e_j$

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▶ Being buyer and seller is equally likely

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Seller profits

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- Being buyer and seller is equally likely
- $\hat{\Pi}^i = \frac{1}{2}\hat{\Pi}_B^i + \frac{1}{2}\hat{\Pi}_S^i - C_i$

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▶ We take into account the costs of expertise

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Optimal expertise

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▶ This gives $\frac{\partial C_i}{\partial e_i} = \frac{1}{2}\left(V_H - V_L\right) > 0$

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Optimal expertise

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- This gives $\frac{\partial C_i}{\partial e_i} = \frac{1}{2}\left(V_H - V_L\right) > 0$
- Maximum expertise is such that $\rho_j \leq \rho^*$

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Optimal expertise

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- This gives $\frac{\partial C_i}{\partial e_i} = \frac{1}{2} \left(V_H - V_L \right) > 0$
- Maximum expertise is such that $\rho_j \leq \rho^*$
- If costs are identical, then expertise is identical

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Optimal expertise

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▶ This gives $\frac{\partial C_i}{\partial e_i} = \frac{1}{2}\left(V_H - V_L\right) > 0$

▶ Maximum expertise is such that $\rho_j \leq \rho^*$

▶ If costs are identical, then expertise is identical, $e_i = e_j$

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▶ Maximum expertise is such that $\rho_j \leq \rho^*$

▶ If costs are identical, then expertise is identical, $e_i = e_j$

▶ Trader profits: $\hat{\Pi}^i = \frac{1}{2}\Delta V - C_i$

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Optimal expertise

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- Maximum expertise is such that $\rho_j \leq \rho^*$
- If costs are identical, then expertise is identical, $e_i = e_j$
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No expertise

▶ If traders have no expertise, $e_i = e_j = 0$ and $C_i = 0$

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No expertise

- If traders have no expertise, $e_i = e_j = 0$ and $C_i = 0$
- Then $\hat{\Pi}^i = \frac{1}{2}\Delta V$

No expertise

- If traders have no expertise, $e_i = e_j = 0$ and $C_i = 0$
- Then $\hat{\Pi}^i = \frac{1}{2}\Delta V$
- Not investing into expertise is more profitable

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- If traders have no expertise, $e_i = e_j = 0$ and $C_i = 0$
- Then $\hat{\Pi}^i = \frac{1}{2}\Delta V$
- Not investing into expertise is more profitable
- If a trader does not invest into expertise, it is profitable for the other trader to do so

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- If traders have no expertise, $e_i = e_j = 0$ and $C_i = 0$
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- This leads to an arms race in the level of expertise

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Over-investment into expertise

▶ With trading a (mostly) zero sum game, traders seek to extract profits from other traders

Over-investment into expertise

▶ With trading a (mostly) zero sum game, traders seek to extract profits from other traders

▶ To extract more profits, they invest into expertise

Over-investment into expertise

- With trading a (mostly) zero sum game, traders seek to extract profits from other traders
- To extract more profits, they invest into expertise, but as everyone does, no benefits are gained

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Over-investment into expertise

- With trading a (mostly) zero sum game, traders seek to extract profits from other traders
- To extract more profits, they invest into expertise, but as everyone does, no benefits are gained
- Investing less into expertise would be preferred by all traders

Over-investment into expertise

▶ With trading a (mostly) zero sum game, traders seek to extract profits from other traders

▶ To extract more profits, they invest into expertise, but as everyone does, no benefits are gained

▶ Investing less into expertise would be preferred by all traders

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Individual rationality

▶ Traders are over-qualified

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Individual rationality

- Traders are over-qualified
- The investment bank directs too much resources towards them

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Individual rationality

- Traders are over-qualified
- The investment bank directs too much resources towards them
- This is individually rational

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Individual rationality

▶ Traders are over-qualified

▶ The investment bank directs too much resources towards them

▶ This is individually rational, but socially suboptimal

Individual rationality

▶ Traders are over-qualified

▶ The investment bank directs too much resources towards them

▶ This is individually rational, but socially suboptimal

This presentation is based on
Andreas Krause: Theoretical Foundations of Investment Banking, Springer Verlag 2024
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