Trading Costs

Karl B. Diether

Fisher College of Business

Overview of Costs

Trading is costly

- Trading costs are usually relatively low in financial markets.
- But they still can dramatically affect the profitability of strategies.

Costs

- Commissions.
- Cannot usually trade at the observed price.
  - Bid/Ask spread.
  - Price impact of trades.
- Operational costs (office space, employing traders, etc).
- Short-sale costs (more on this later).
  - Have to pay extra fees.
  - Hard to locate shares.
  - Have to provide collateral.
  - Sometimes SEC bans short selling.

Implementation Shortfall: Paper vs. Reality

On paper

- Sometimes strategies that look good on paper are only profitable on paper because of trading costs.
- The difference between the pre-cost hypothetical return and the actual return earned by a strategy can be huge.

Implementation Shortfall

The difference between the returns on paper (pre-cost return) and the actual return (after-cost return).

Implementation Shortfall: Paper vs. Reality

Trading costs and implementation shortfalls

- How can failing to take into account trading costs potentially make back-testing a strategy misleading?
- Which costs (commissions, bid-ask spread, price impact, etc) is the most likely to cause an implementation shortfall?
- Is the cost that is biggest on average the one most likely to produce an implementation shortfall?

Commissions

Commission cost by type

Transaction Method	Commission
Online Trading	max($20 or $0.02 per share)
Automated Telephone	max($20 or $0.02 per share)
Orders Desk	$45 + $0.03 per share

As a percentage of price

- The median NYSE stock price during 2007 was $27.88.

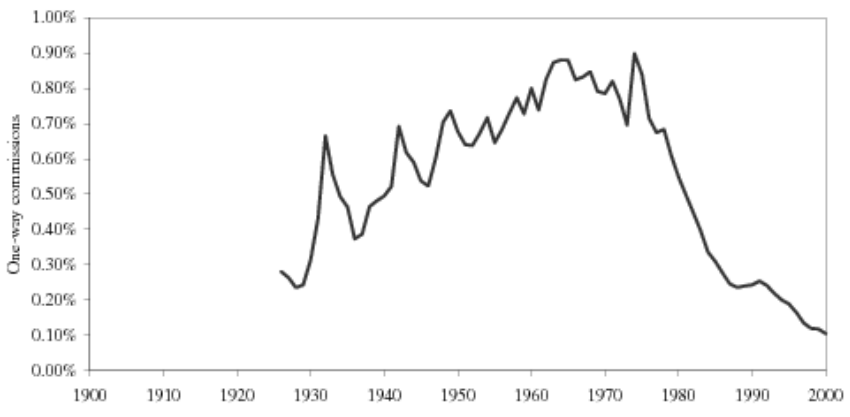
$$\frac{0.02}{27.88} = 0.0007 = 0.07\%.$$

- The median Nasdaq stock price during 2007 was $13.77.

$$\frac{0.02}{13.77} = 0.0007 = 0.15\%.$$

Historical Brokerage Commissions

Average commissions on round-lot transactions in NYSE stocks



source: Jones (2002)

Graph notes

Prior to 1975 commissions were regulated.

Bid-Ask Spread

Bid price

the price at which a dealer is willing to purchase a given number of shares (for example: 100 shares).

Ask price

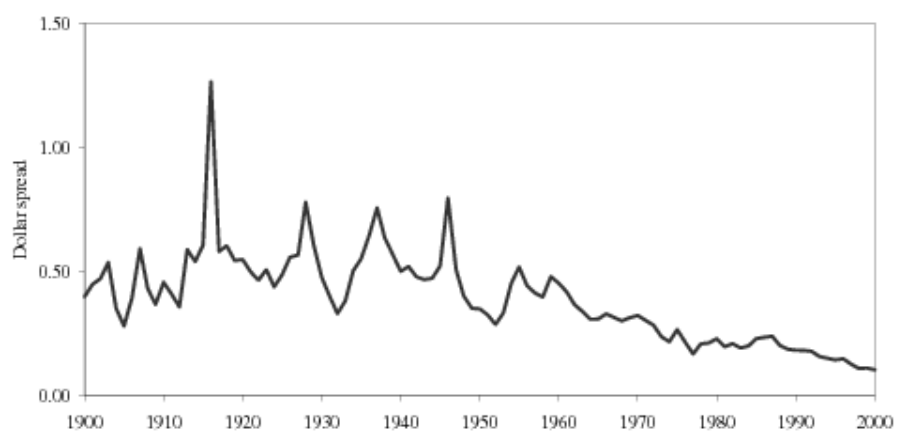
The price at which a dealer will sell a given number of shares.

Bid-Ask spreads in 2005: Diether, Lee and Werner (2005)

	Ask-Bid dollars	(Ask-Bid)/Midquote %
NYSE	0.031	0.113
Nasdaq	0.046	0.220

Historical Bid-Ask Spreads

Average bid-ask spreads in $ for Dow Jones Stocks



source: Jones (2002)

Bid-Ask Spread

Questions

- Why does the bid-ask spread exist?
- Why do Nasdaq stocks have higher spreads on average?
- What might cause spreads to be wide?
- What might cause spreads to widen?
- What type of stocks will have higher spreads on average?

Price Impact

No impact

- If your trade size is smaller than the posted bid-ask amount, then you can buy at the ask and sell at the bid.
- Sometimes you may be able to trade inside the spread.

Trading large amounts

- If you wish to trade a large amount of shares, you may have to trade outside the bid-ask spread or you may move the spread.
  - When you try to sell the price goes down.
  - When you try to buy the price goes up.

Why might a large trade affect prices?

Why might prices go move or the bid-ask spread widen if you try to sell a large amount?

Managing Price Impact

Order splitting

- One solution to price impact is to trade in small increments.
- Split your order into pieces so you can trade at or inside the spread.

Downside

Is there any downside to splitting up your orders into small trades?

Effective Spreads

Effective spreads

- Effective spread (in dollars) = 2*(execution price - midquote)
- Effective spread (%) = 2*(execution price - midquote)/midquote
- Uses actually execution prices so it should capture price impact.

Bid-Ask and effective spreads in 2005: DLW (2005)

	Ask-Bid dollars	$\frac{Ask-Bid}{Midquote}$ %	Effective Spread dollars	Effective Spread %
NYSE	0.031	0.113	0.027	0.099
Nasdaq	0.046	0.220	0.040	0.199

Is it a problem

Is price impact a problem for a typical trade?

Estimating Costs: Bid/Ask Spread

Example

- Suppose you bought IBM one month ago and sold it today. The average price one month ago was \$50, and the average price was \$60 today. What were the round trip trading costs if the bid/ask spread was \$2 in both cases?
- The ask when you bought was \$51 and the bid when you sold was \$59. Therefore the round trip trading costs were:

$$(51 - 50) + (60 - 59) = \$2$$

Estimating Costs: Price Impact

Example

- Suppose the bid is \$49 and the ask is \$51 all day (average price = \$50).
- Suppose you buy a lot of shares and are forced to pay \$52.
- The asking price moves to \$52, but it is temporary and the ask goes back down to \$51.
- In this case the one-way trading costs are,

$$\$52 - \$50 = \$2.$$

Estimating Total Costs

NYSE: One Way

$$\begin{aligned}\text{Total Costs} &= \text{Commisions} + \text{Effective Spreads}/2 \\ &= 0.07\% + 0.099\%/2 = 0.12\%\end{aligned}$$

Nasdaq: One Way

$$\begin{aligned}\text{Total Costs} &= \text{Commisions} + \text{Effective Spreads}/2 \\ &= 0.15\% + 0.199\%/2 = 0.25\%\end{aligned}$$

Bad estimates?

For what kinds of stocks are these estimate likely to be misleading?

Roughly Estimating Costs for a Strategy

Rough estimate for annual returns:

$$r_{\text{after cost}} = r_{\text{before costs}} - \text{annual turnover} \times \text{round-trip trading cost}$$

Example

- Suppose your portfolio earned a pre-cost annual return of 15%. The turnover on your portfolio is 300% annually and the round trip trading costs are 0.5%. What approximately is the after-cost return?

$$r_{\text{after cost}} = 15\% - (300\%)0.5\% = 13.5\%$$

- Note: turnover equals purchases divided by beginning of the period assets.

Summary

Paper vs reality

Sometimes strategies that look good on paper only are profitable on paper because of trading costs.

Major costs discussed

- Commissions.
- Bid/Ask spread.
- Price impact of trades.

Total one-way costs

Probably between 0.12% - 0.25% for a typical stock.