Transaction Costs & Market Impact[1]

Algorithmic Trading & Quantitative Strategies

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In addition to these notes, the required readings are:

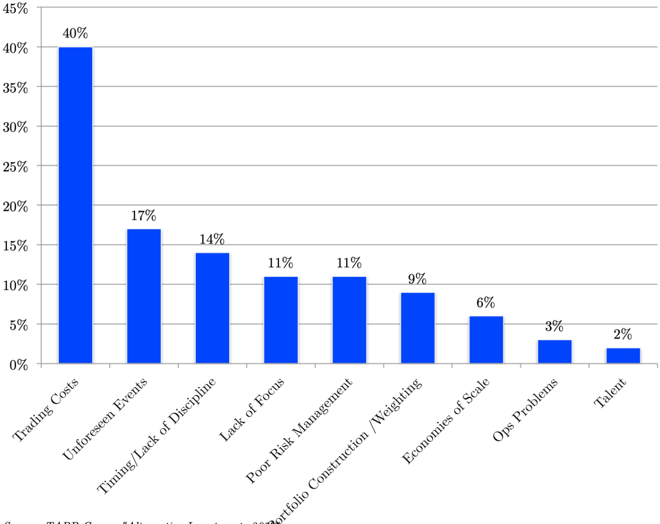
- "MarketImpact.pdf" handout.
- Familiarize yourself with the most recent transaction cost reports by Virtu Financial. They produce good U.S. equity reports.[2]

Optional reading:

- Peruse some of the research reports by Pragma such as *"On the Limits of Markouts and Venue Curation"* (October 2021) and *"Measuring Execution Quality – Finding the Signal in the Noise"* (November 2020).

[2] Some key questions to consider: How are costs summarized and reported? What are the costs, and what do they depend on?

Example: Where Is Alpha Lost? (U.S. Domestic Equity Managers)



Source: TABB Group, "Alternative Investments 2007"

Explicit and Implicit Transaction Costs

Some transaction costs (t-costs) are not known before we trade. We refer to t-costs that are known up front before trading as *explicit costs*, and those that are not as *implicit costs*:

- Explicit costs include commissions, bid-ask spreads, taxes, and foreign exchange costs.
- Implicit costs include market impact, and opportunity costs.

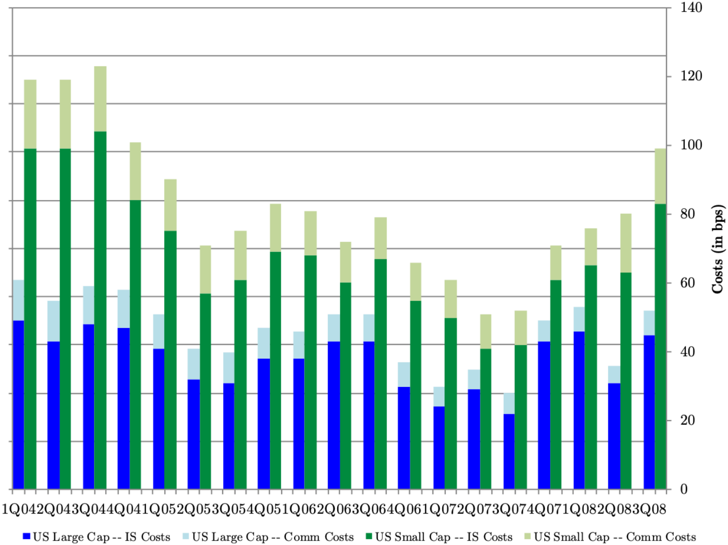
Implementation Shortfall

We define the *implementation shortfall* (also referred to as *slippage*) of an order, $\mathcal{C}$, as the difference between the arrival price and average execution price of the order (Treynor, 1981; Perold, 1988)

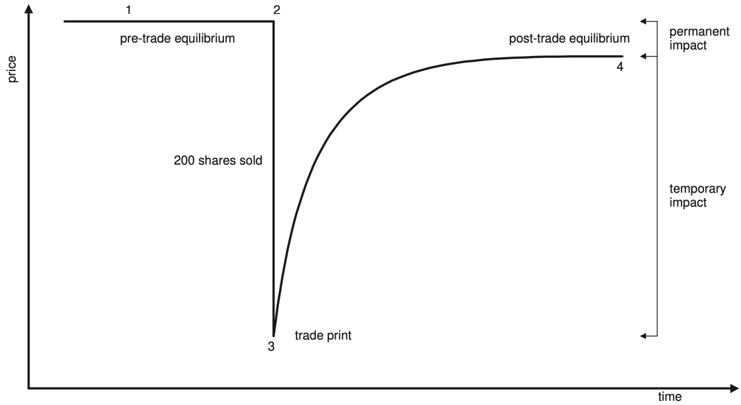
$$\mathcal{C} = \text{arrival price} - \text{average execution price} \tag{1}$$

The *arrival price* is the mid price of the security prevailing at the time the order is submitted, typically truncated to the next open price if submitted outside market hours.

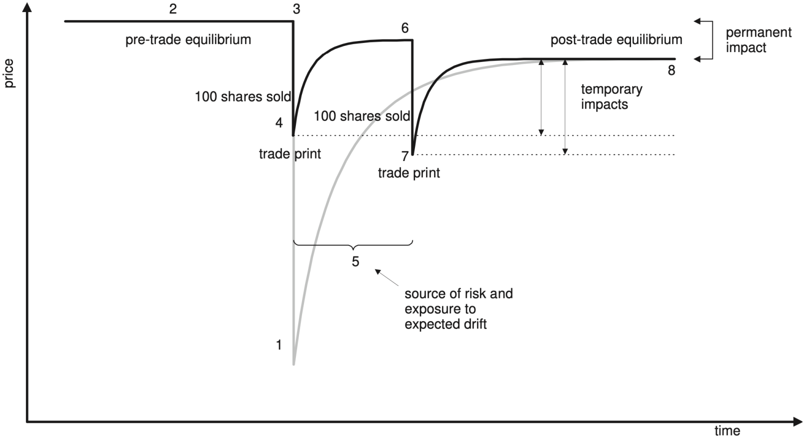
Example: Transaction Costs (Large Vs. Small Cap, 2004Q1–2008Q3)



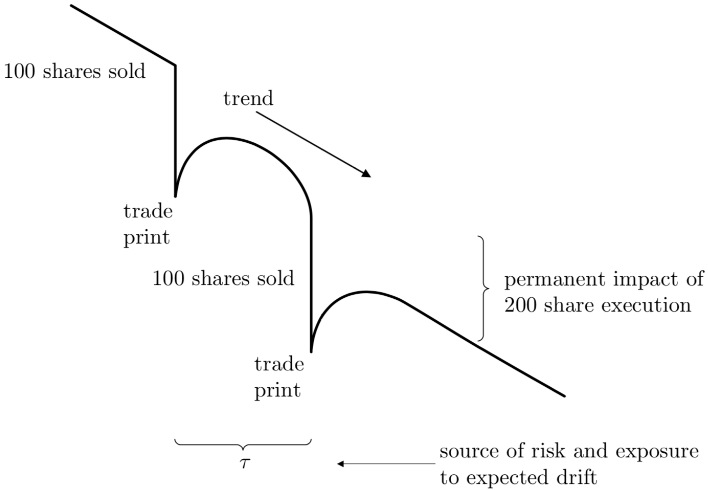
Idealized Market Impact: Selling 200 Shares In One Trade



Idealized Market Impact: Selling 200 Shares In Two Trades



Idealized Market Impact: Selling 200 Shares In Two Trades With Alpha



References

Perold, Andre F. (1988). "The Implementation Shortfall: Paper Versus Reality". In: *Journal of Portfolio Management* 14.3, pp. 4–9.

Treynor, Jack L. (1981). "What Does It Take To Win The Trading Game?" In: *Financial Analysts Journal* 37.1, pp. 55–60.