The Impact of Index Adds and Deletes on Investment Returns

An Exploration of Index Rebalancing

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Summary

- Do adds and deletes affect index returns?
- Is the S&P effect still alive?
- Are there similar effects in other indexes?
- Optimizing an Index Rebalancing Policy
- Conclusions

What causes the "S&P effect"?

- Information Hypothesis?
  - Improved liquidity → Lower future trading cost
  - More widely followed by analysts
  - More demand after addition(imperfect substitutes)
- Price-Pressure Hypothesis?
- Appears that both hypotheses are consistent with our results

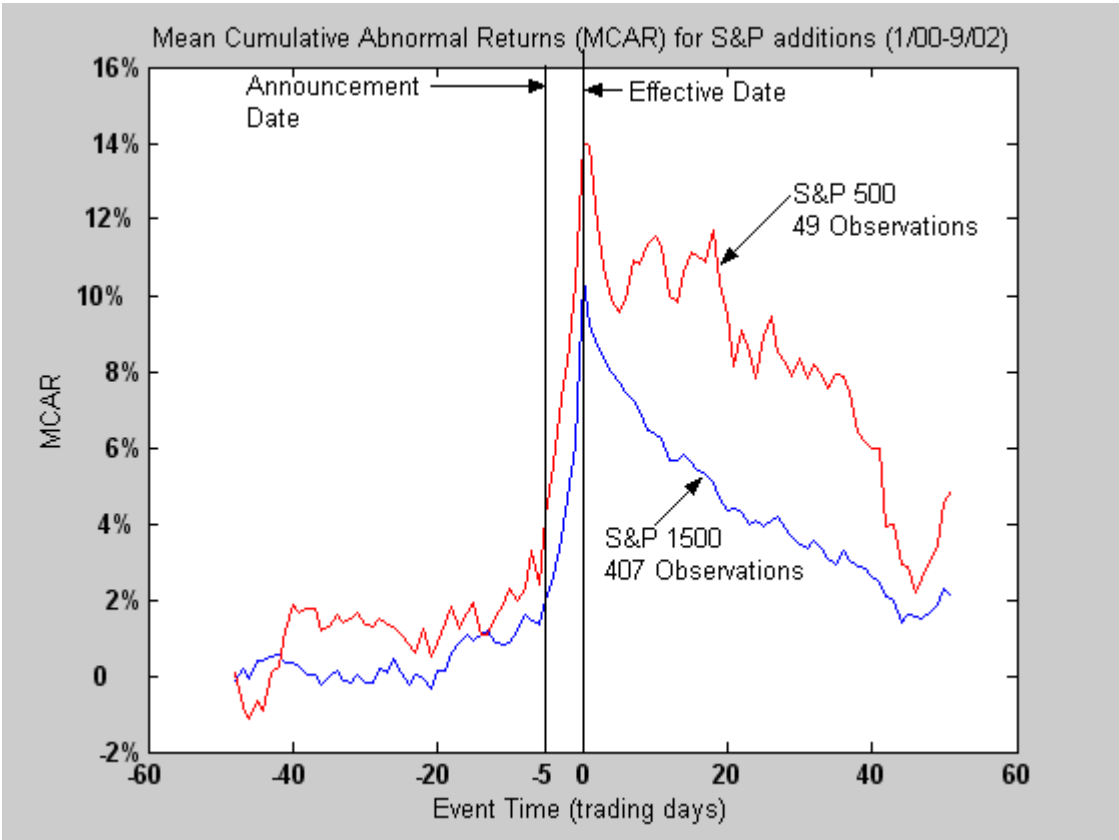
Index Rebalancing Event Studies

- U.S. Stock Indexes
  - Russell 3000, S&P 1500, Dow Jones US TMI, Nasdaq 100
- Only included “pure additions” to the broad indexes
  - Example - stock moving from Russell 1000 to Russell 2000 not included as an addition
- 0 in Event time is effective date of add/delete actions

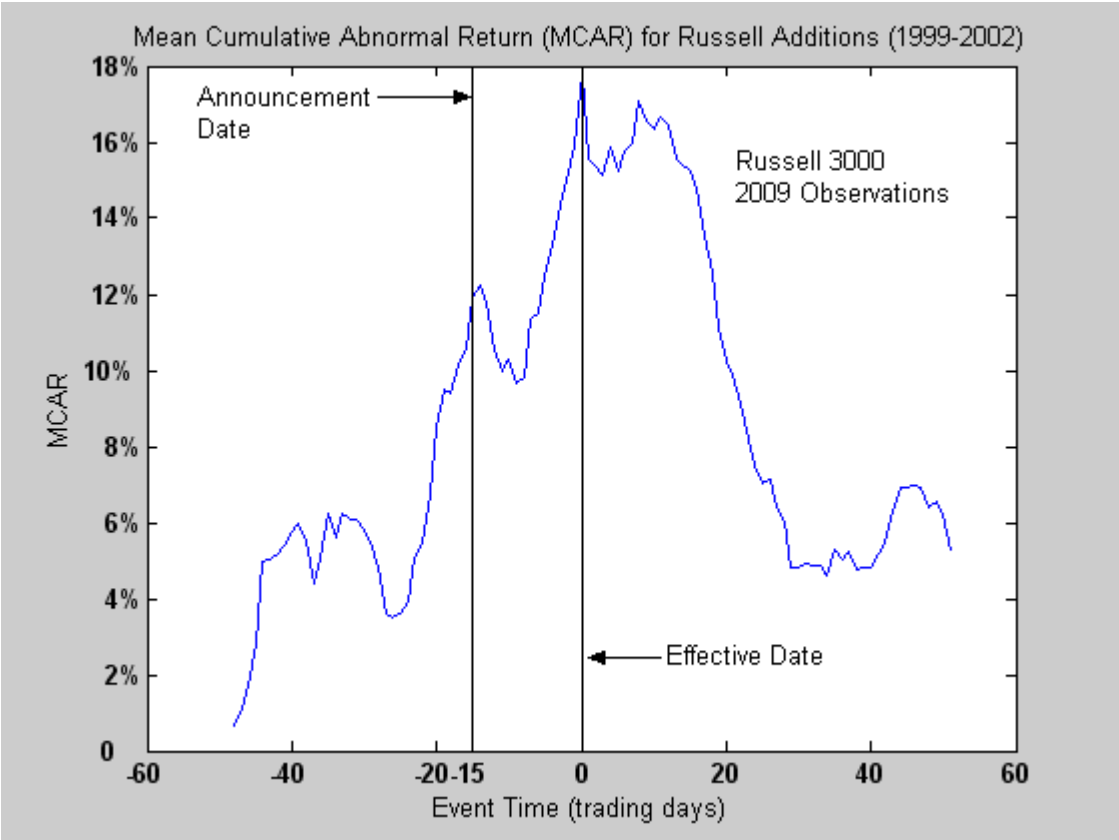
Event Study Methodology

- Extracted daily log return data for all stocks in the study from the QuantalPRO database
- Translated calendar time to event time
- Abnormal return = Stock return–benchmark return
- Calculated cumulative abnormal returns:
  - 50 days prior to 50 days after effective date

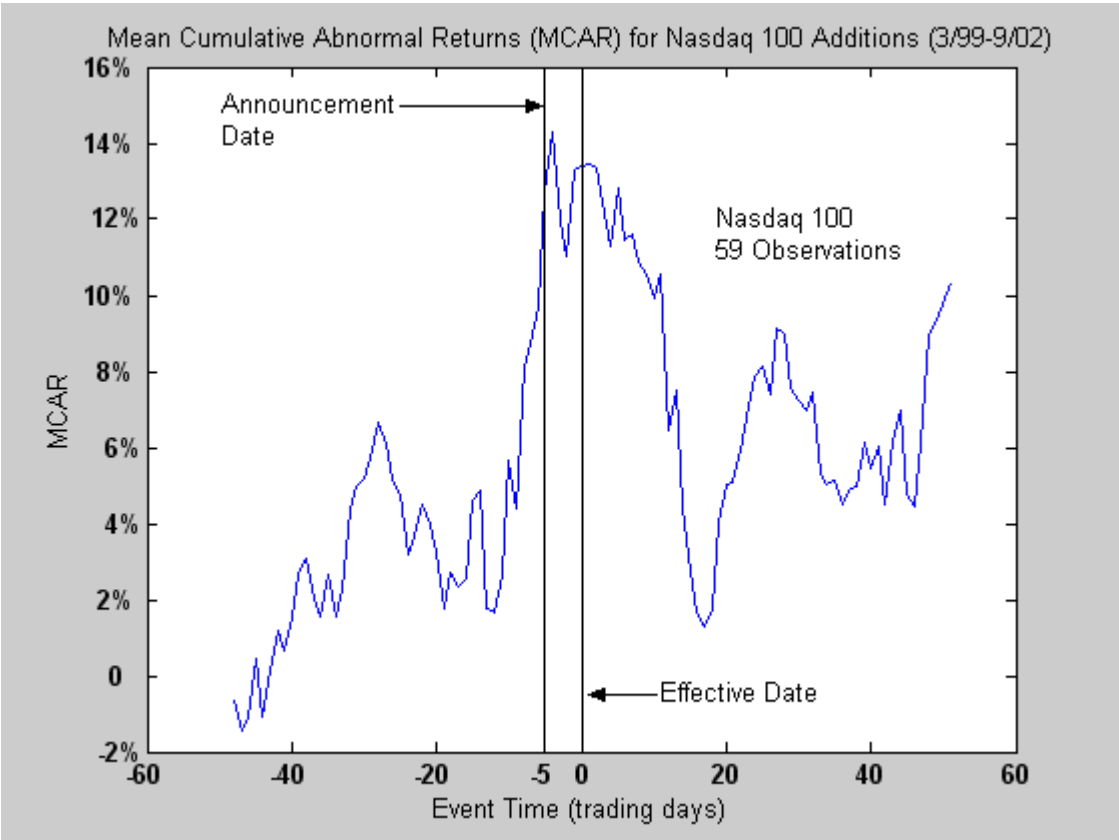
Event Study: S&P Additions (Jan-00 thru Sept-02)



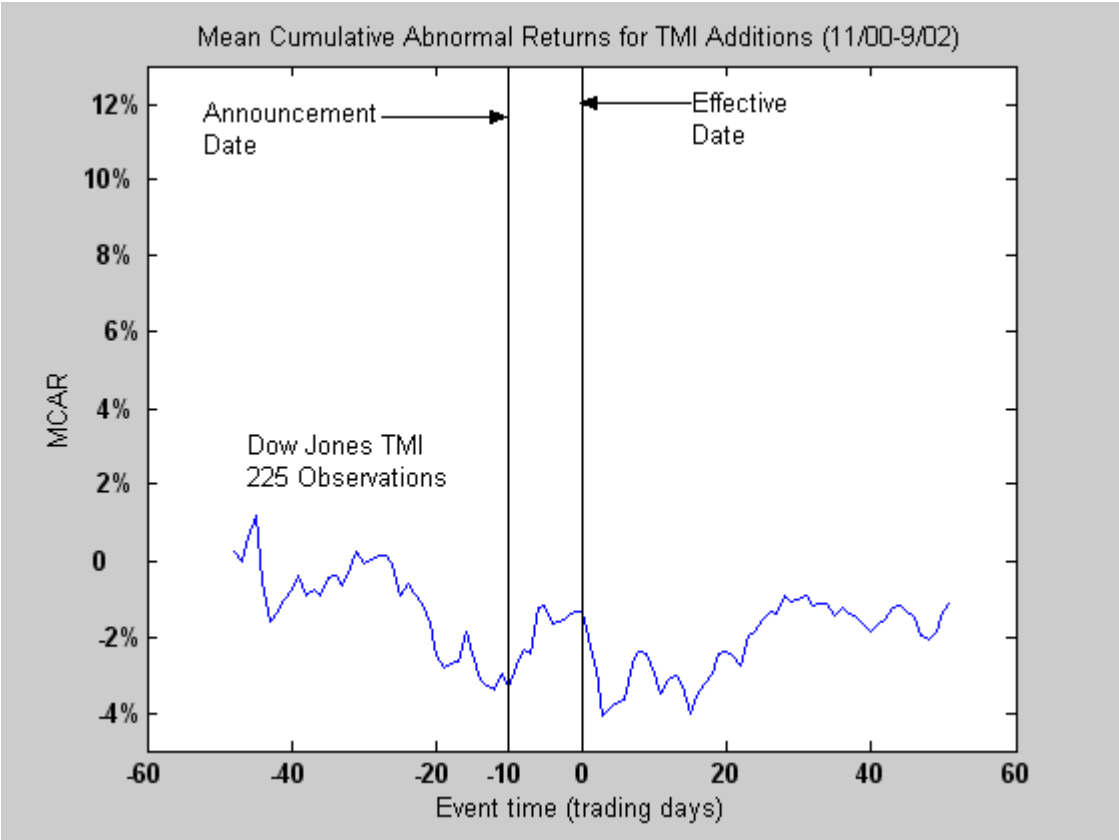
Event Study: Russell 3000 Additions (June-1999 thru June-2002)



Event Study:Nasdaq 100 Additions (March-99 thru Sept-2002)



Event Study: Dow Jones US TMI Additions (Nov-00 thru Sept-02)



Impact of Rebalancing Trades

Index	% held by Indexers		Market Impact	Turnover 2002	Rebalance Drag
S&P 500	>10%		5%	5.0%	25 bps
S&P 1500	Varies		7%	3.4%	25 bps
Russell 2000	6%		10%	16.8%	168 bps
Russell 3000	Varies		10%	1.3%	13 bps
Nasdaq 100	3%		3%	5.6%	17 bps
DJ US TMI	<0.01%		0%	1.8%	<1 bps

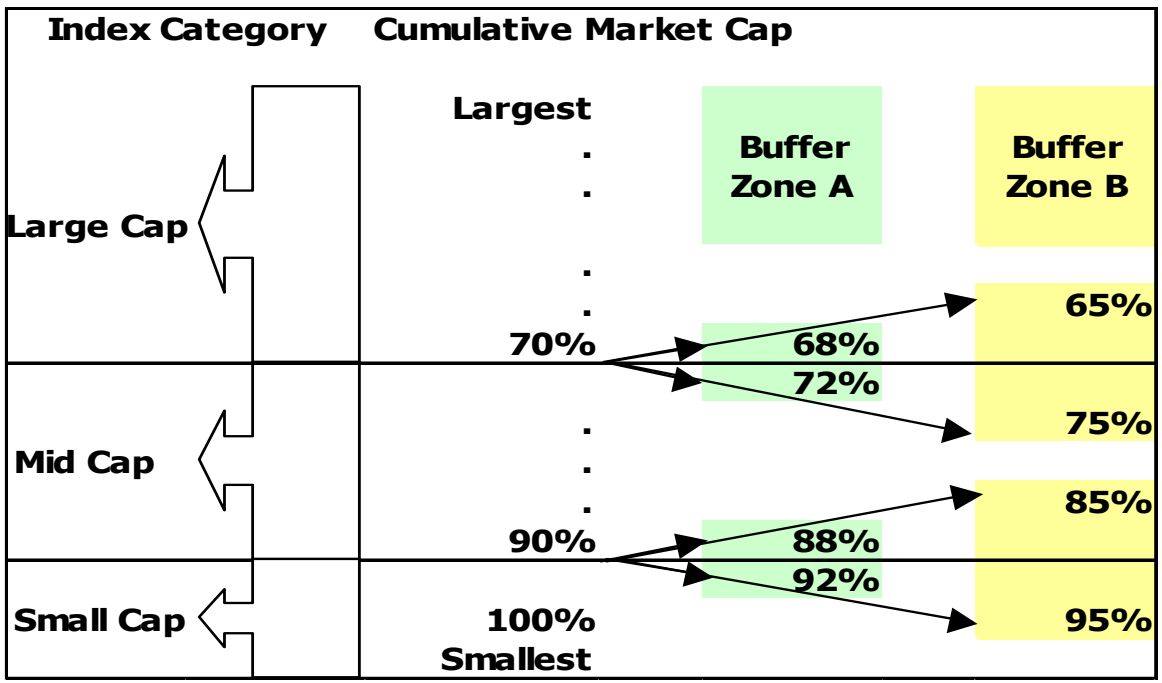
- Index turnover is calculated as the market cap of the pure additions & deletions divided by the market cap of the index. Market impact is based on the event studies. (S&P 500 market impact is based on Beneish & Whaley(2002)-more observations) Rebalance Drag=Turnover*market impact

Index Providers Rebalance Policies I

Index	**Rebalance Frequency**	**Inclusion Criteria**	**Buffer Zone?**
Russell Family	Annual	Float-Adjusted Market Cap	No
S&P Family	As needed	Various Criteria	In concept
NASDAQ 100	Annual	Float-Adjusted Market Cap	Yes
Dow Jones TMI	Quarterly	Float-Adjusted Market Cap	Yes

Buffer Zone

How does a buffer zone work? An upward moving stock won't be added to the higher market cap category until it passes the upper boundary; a downward moving stock won't be deleted from its current category until it passes the lower boundary.



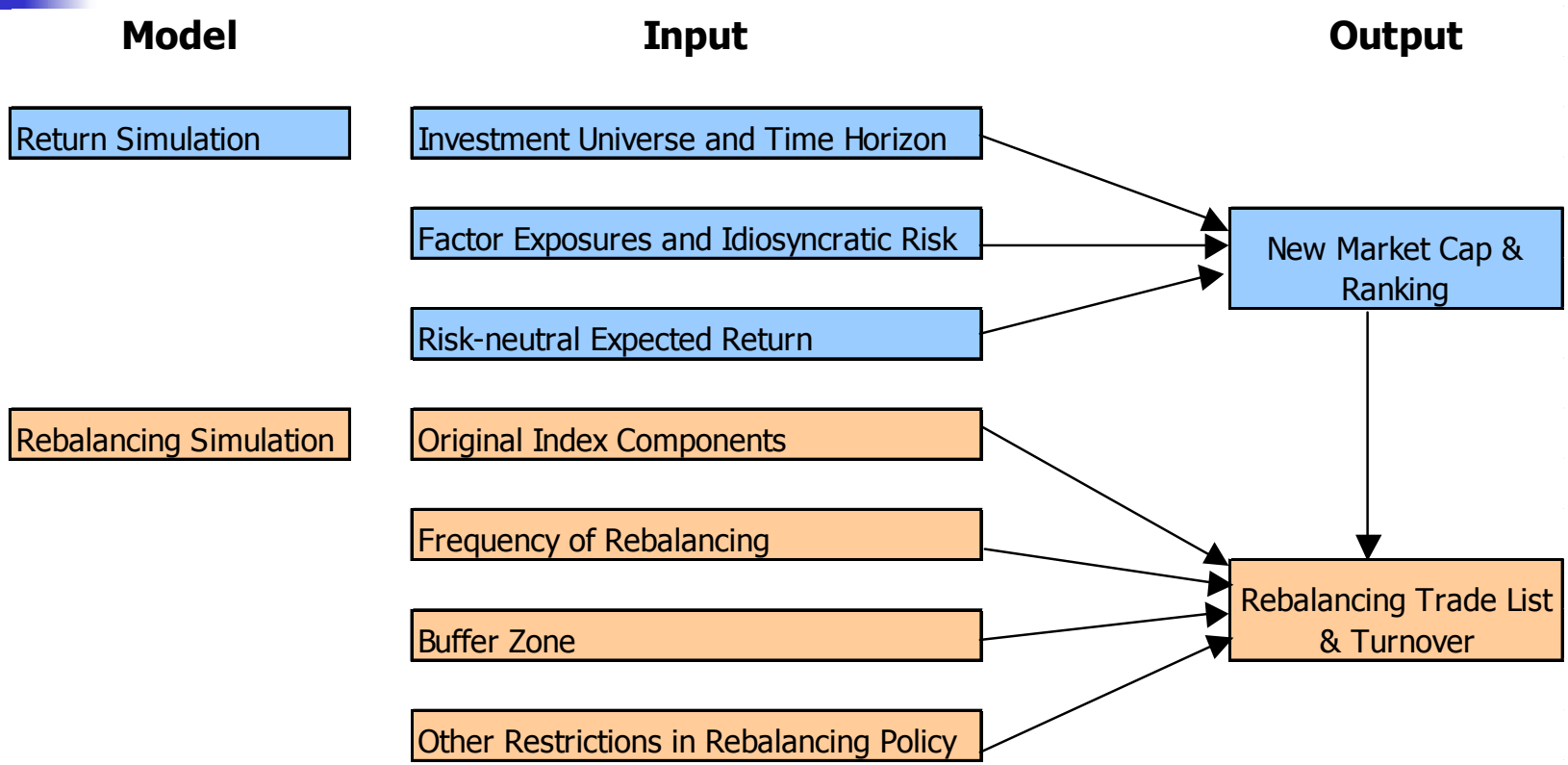
Index Providers Rebalance Policies II

Index	Transparency	Changes Announced
Russell Family	Yes	3 weeks prior
S&P Family	No	1-5 days prior
NASDAQ 100	Yes	5 days prior
Dow Jones TMI	Yes	10 days prior

Optimizing Buffer Zone Size and Rebalance Frequency

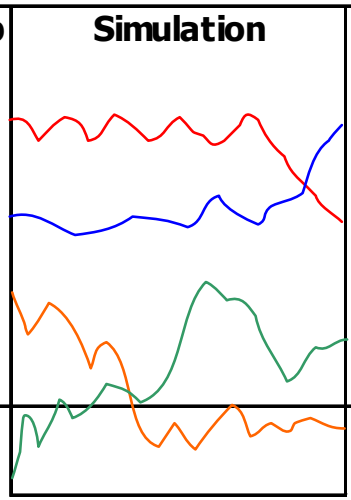
- A factor based returns model (Quantal) was used to simulate trading activities of index rebalancing
- Simulated addition/deletion lists were generated based on different rebalancing policies
- The trade-off between rebalancing costs and representativeness of the index was analyzed

Model Flow Chart I



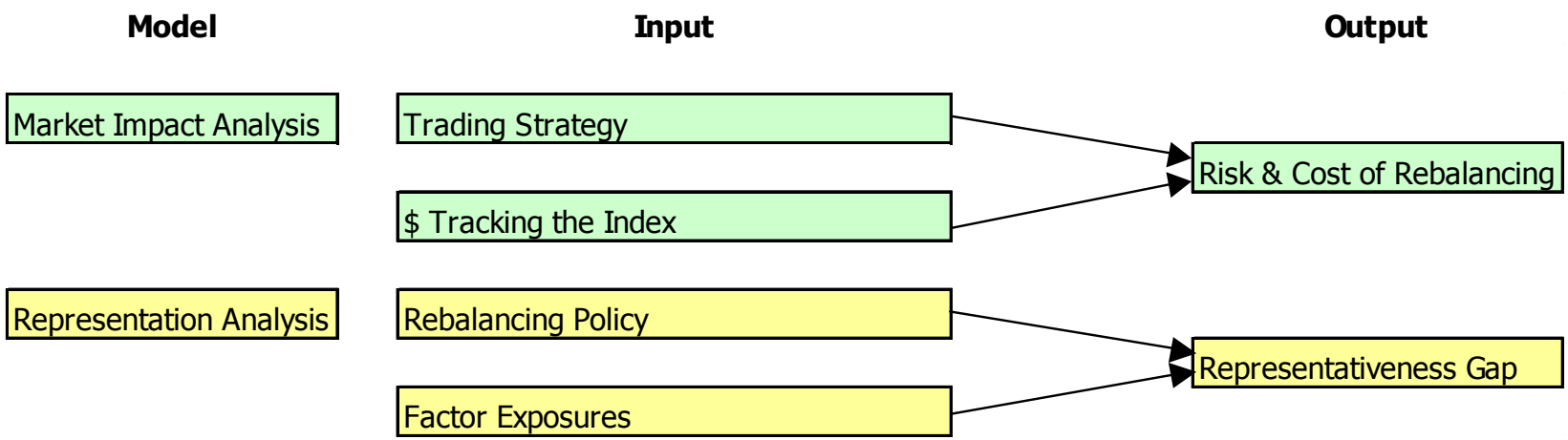
Model Result I

Stocks	Ranking	Mkt Cap	Simulation	Mkt Cap	Ranking	Stocks
MSFT	1	$ 300		$ 290	1	GE
GE	2	$ 250		$ 250	2	MSFT
C	3	$ 200		$ 120	3	INTC
INTC	4	$ 100		$ 110	4	C



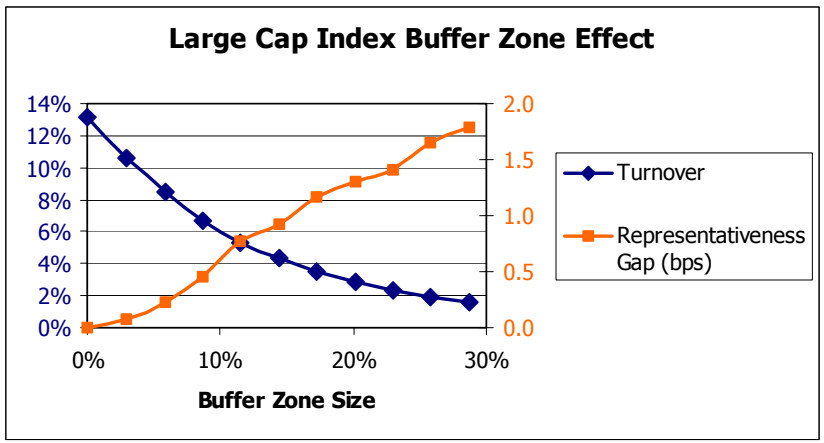
- Index tracks the top 3 stocks with largest market cap in the U.S.
- Trade List = buy INTC, sell C
- Turnover = (110 + 120)/(290+250+110) = 35%

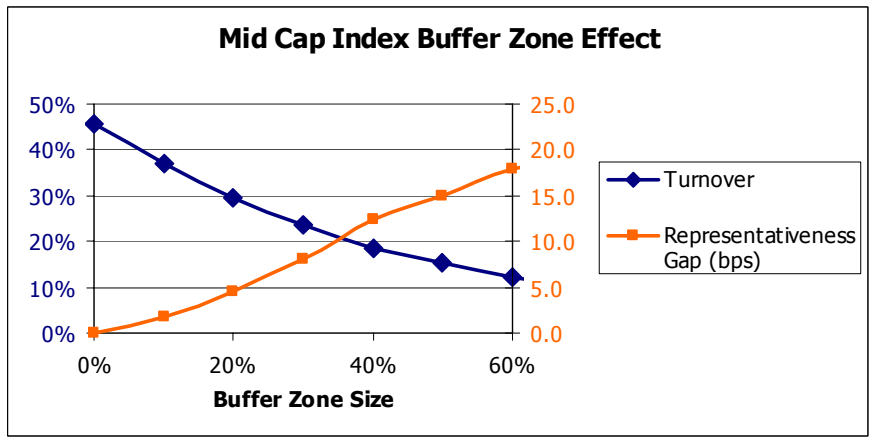
Model Flow Chart II



Rebalancing Trade-off: Trading cost vs. Representativeness I

- Buffer Zone technique reduces trading cost but increases representativeness gap vs. the zero-tolerance index

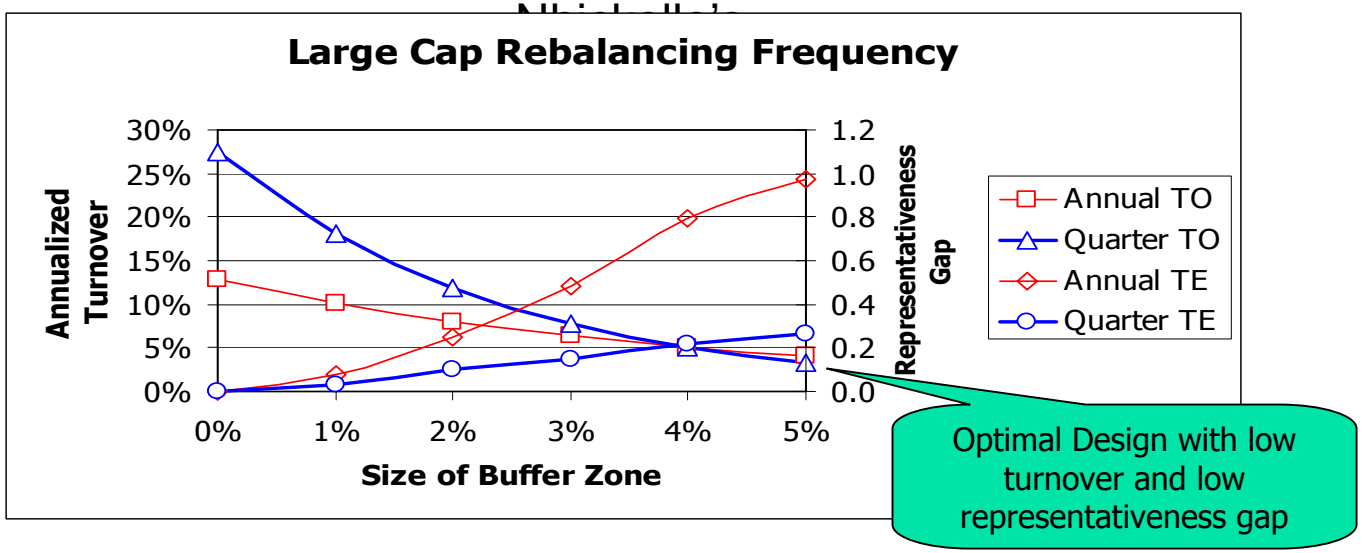




- Buffer Zone Size is defined as market cap of buffer zone/market cap of index
- Representativeness gap compares index with buffer zone to index with no buffer zone
- Turnover is the % of the index market cap traded upon rebalancing

Rebalancing Trade-off: Trading cost vs. Representativeness II

- More frequent rebalancing increases turnover, but reduces representativeness gap
- Optimize buffer zone size for the best result



• Assume the total mkt cap is approximately $10 trillion, large cap represents 70% of the total market capitalization.

Conclusions

- Index Investors – Bear the brunt of the rebalance drag. They can choose their index accordingly.
- Portfolio Managers - Mitigate the index drag by timing their trading, but history may not repeat, and they incur business risk due to potential under-performance and tracking error.
- The solution should come from the index providers. If they don't solve the problem their business risk involves investors moving to a new index and lost indexing fees.

What have index providers done to make their indexes more fund-friendly?

- Establish buffer zones for adds/deletes
- Adjust weighting for free-float
- Communicate their rebalancing policies

Potential Ideas for Future

- Add and delete stocks in increments
- Optimize the turnover vs. representativeness, using buffer zones and frequency, based on objectives of the index investors
- Rebalancing optimization model could be reconfigured to be used by the portfolio manager in addition to the index provider