

Academic Findings on ETFs

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Effect of ETFs on Markets

- ETFs provide enormous benefits as have already been pointed out:
 - More efficient capital gains tax distribution
 - Low fees
 - French (2008) estimates 67 bp improvement net returns
 - Liquidity
 - Removes the task for large institutional investors to rebalance when wanting market exposure
 - Makes it easy for institutions to hedge market risk
- The attractiveness of the assets have created large demand and growth
 - This demand has implications for capital markets

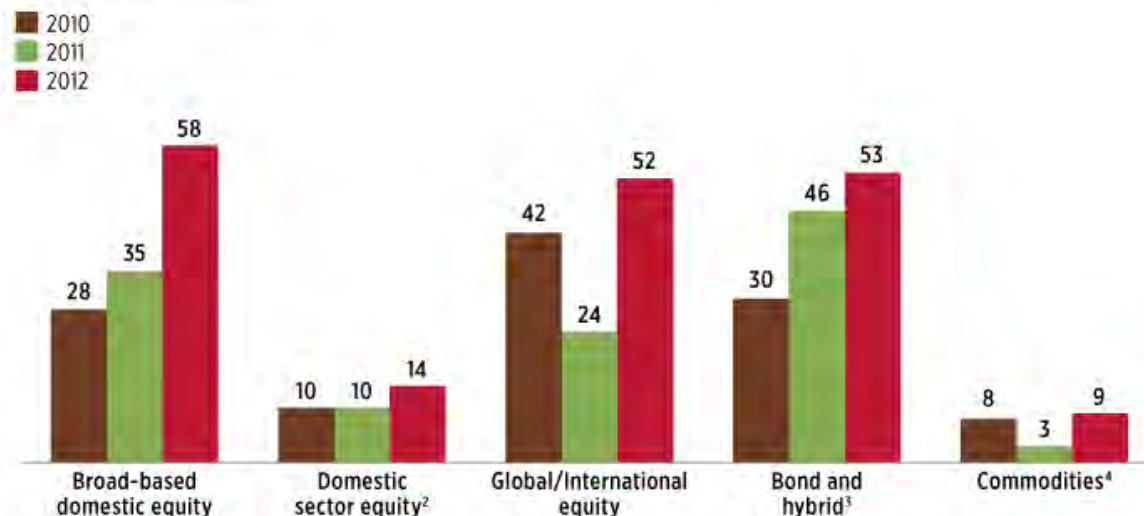


Growth in ETFs

Figure 3.4

Net Issuance of ETF Shares¹ by Investment Classification

Billions of dollars, 2010–2012



- Net new issuance in US was \$183 billion in 2012 (15-18% growth)
 - BMO estimates Canada's growth over past 5 and 10 years as 18% and 28%
- 9% of assets managed in US are through ETFs
 - Compared to 6-7% in Canada
- ETFs and related products 40% trading volume in US markets
- In the US, over 8 trillion tied to indices
 - 1.4 trillion ETFs
 - S&P 3.5 trillion (index-related funds)
 - Russell 3.9 trillion



Some issues to consider

1. Interferes with prices and returns of stocks
2. Avoidance of non-index firms
 - To reduce tracking error
3. Increased correlation between stocks in the index
 - Reduces diversification benefits
4. Feedback loops which can destabilize prices
 - Arising from sudden price movements on the index
 - Arising from demand effects
5. Pricing Inefficiencies of ETFs
6. Synthetics



Effect on firms in the index

- Researchers look at what happens to stocks when they are added to the index
 - Find that new additions jump 9% (not explained by liquidity)
 - Every time there is an addition, that means approximately 8.7% of a firm's stock has to be bought (ie. \$915 million S&P linked assets chasing index stocks with 10.5 trillion in market cap)
 - Berkshire Hathaway increased from \$68 to \$76 (12%) with its inclusion
 - Some contention over whether this suggests a downward sloping demand curve



Effect on firms in the index

	Evaluation Period (1989-2000)	Abnormal Returns	Turnover (% increase over median trading day)
Additions	Announcement Day	5.446%	270%
	Announcement to Effective Day	8.9%	1130%
	Announcement +60 Days	6.189%	
Deletions	Announcement Day	-8.46%	250%
	Announcement to Effective Day	-14.43%	1750%
	+60 days	0.394%	

From Chen, Noronha, and Singal (2004)

- Because of the price impact, there is a drag on index fund returns (Petajisto, 2011)
 - Buy after inclusion and sell after the deletion
 - Turnover drag on the index followers of around 50bp

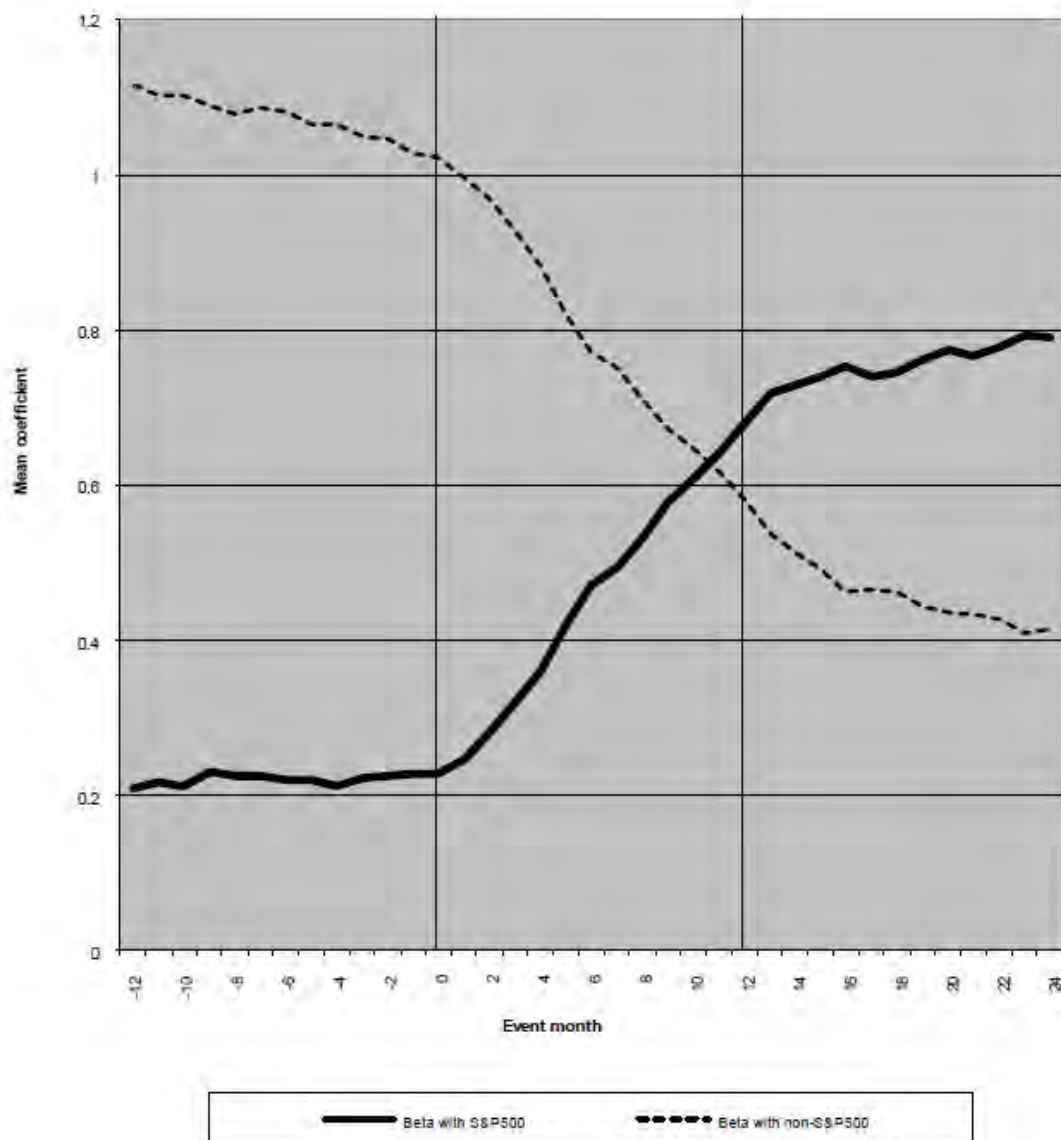


Effect on firms outside index

- Avoidance of non-index assets results from tracking errors
 - Suppose a manager is benchmarked to an index
 - Choice between two stocks with similar returns
 - Manager will always choose the stock in the index and avoid the stock outside the index to reduce tracking error
- Not just demand effects of index funds, but also the effect of managers benchmarked to the index
- Benchmarking may prevent or limit investors from seeking high return non-index firms



Comovement with index

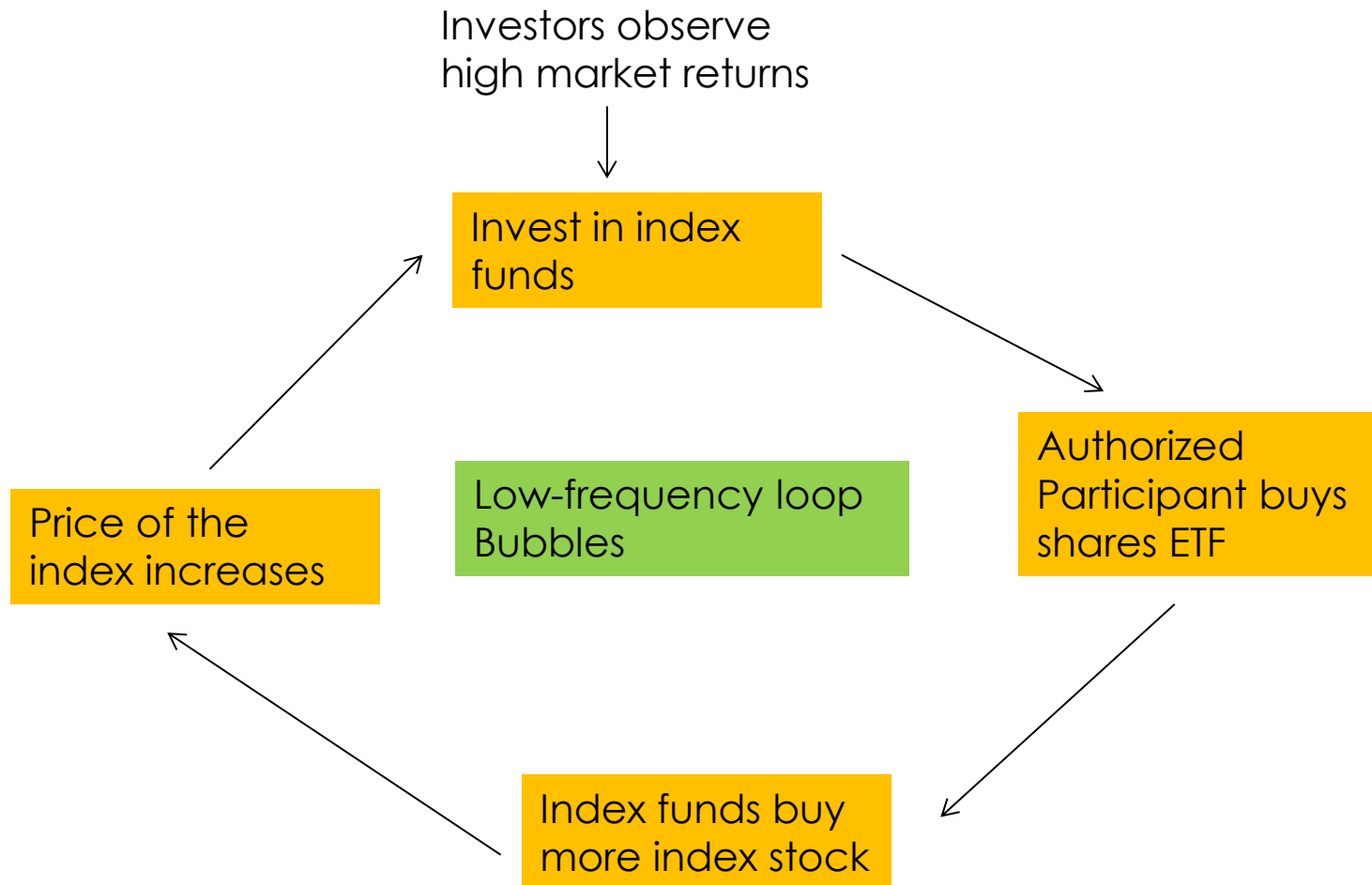


Stocks which join the S&P index tend to correlate more with the other firms in the index and less with stocks out of the index

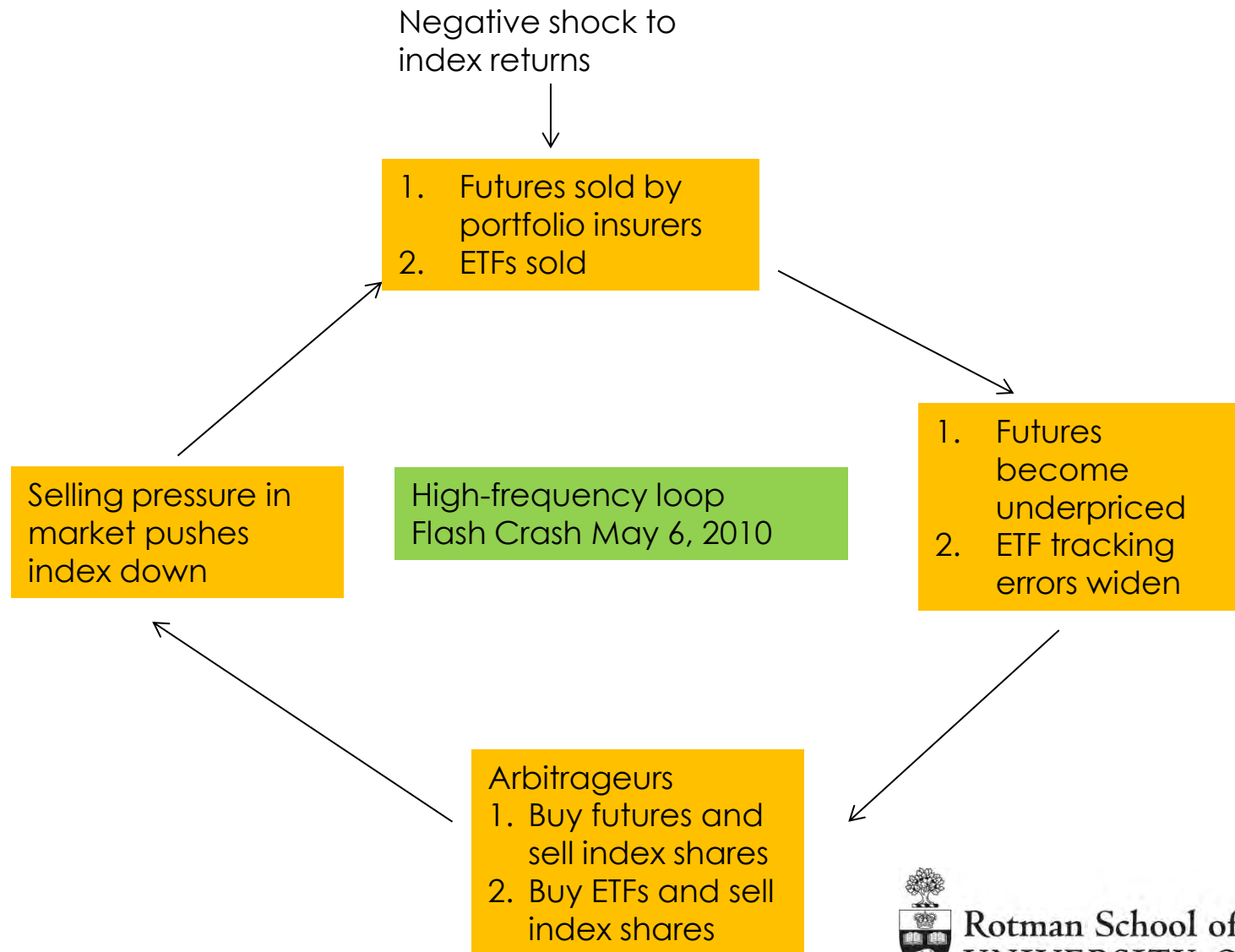
Less diversification benefits

Barberis, Shleifer, and Wurgler (2005)

Market Instability



Market Instability

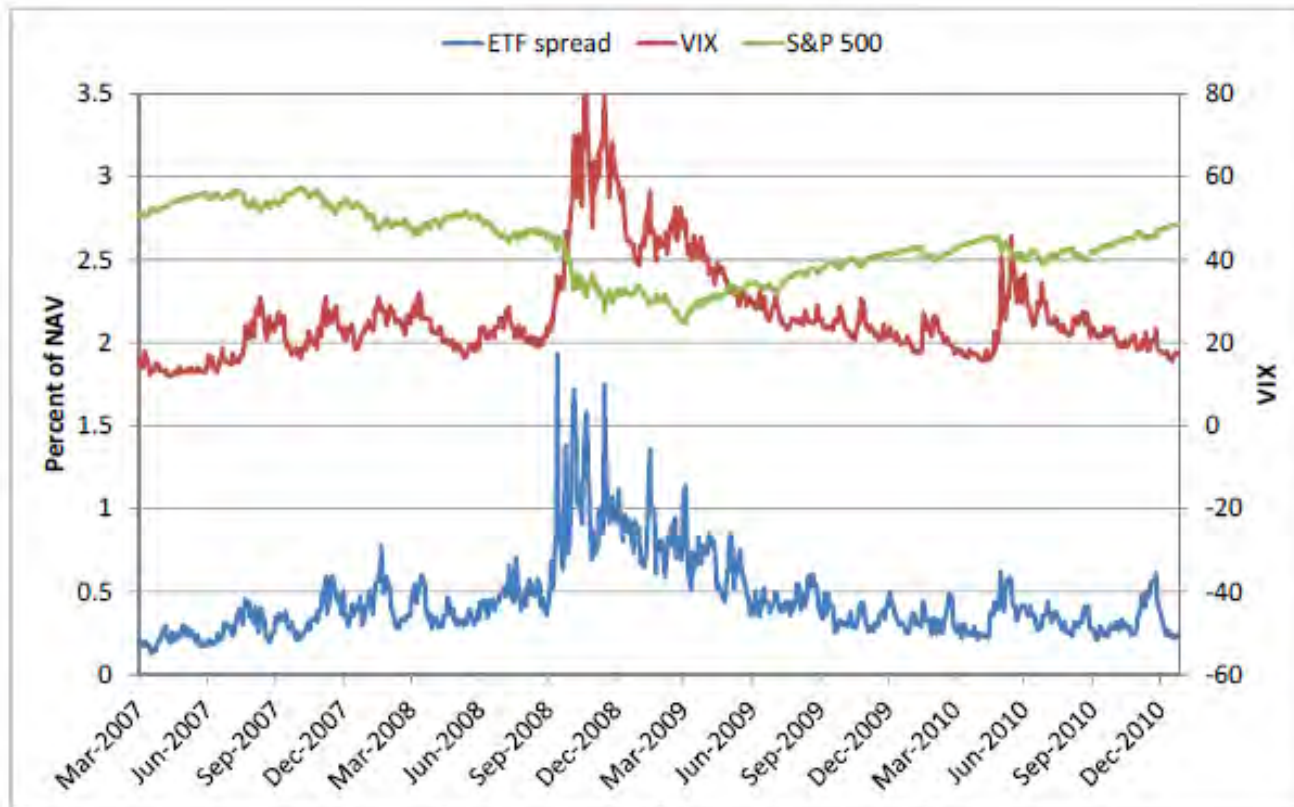


Pricing inefficiencies

- Many believe that the tracking error on ETFs is small because of the role of Authorized Participants
- Petajisto (2013) shows that the discrepancy between ETF share prices and NAV is quite substantial
 - On average discrepancy is 14bp (not distinguishable from zero)
 - Standard deviation however is large: 66 bp so on average fluctuates in band 260 bp
- Why?
 - Stale-pricing: Underlying securities don't include real prices but ETF prices incorporates real market value (110 bp)
 - Transactional costs and limits to arbitrage that may prevent Authorized Participants from arbitraging (150 bp)
 - Lots of demand or supply of ETF shares placing pressures on arbitrage



Pricing inefficiencies



- ETF spread widens when arbitrage capital becomes scarce
- Riskiness of the overall market has large effects on the efficiency of pricing



Profits and price inefficiencies

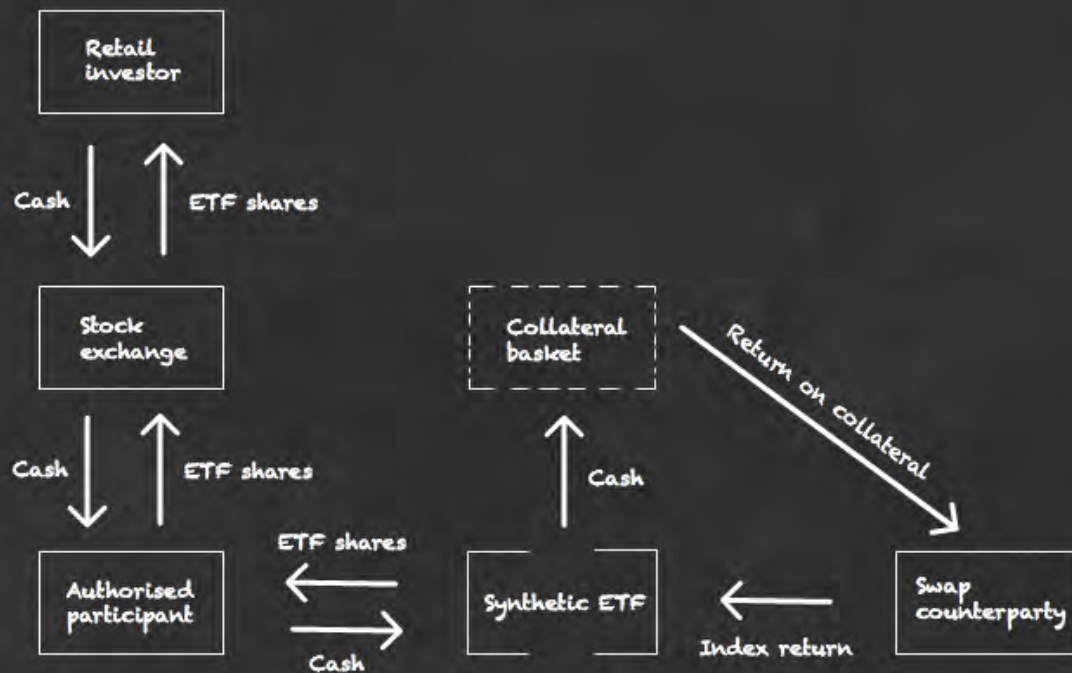
- Profits to be made
 - Buy the discount ETFs and sell the premium ETFs
 - Alphas range around 10% and actually increase to 25% if only focus on less-traded ETFs with greater stale pricing issues (but execution becomes more problematic)
 - Market-neutral strategy
- Very attractive for statistical arbitrageurs and high frequency trades because of mean reversion

Excluded funds	Model	Intercept	Info ratio	Volatility (residual)	Beta			
					MktRf	SMB	HML	UMD
None	None	10.51 (9.96)	5.09	2.06				
	CAPM	10.53 (10.06)	5.13	2.05	-0.01 (-1.44)			
	FF	10.66 (10.11)	5.25	2.03	-0.01 (-1.05)	-0.03 (-2.32)	0.00 (-0.15)	
	Carhart	10.63 (10.09)	5.24	2.03	-0.01 (-1.30)	-0.03 (-2.27)	-0.01 (-0.49)	-0.01 (-1.36)



Synthetic ETF

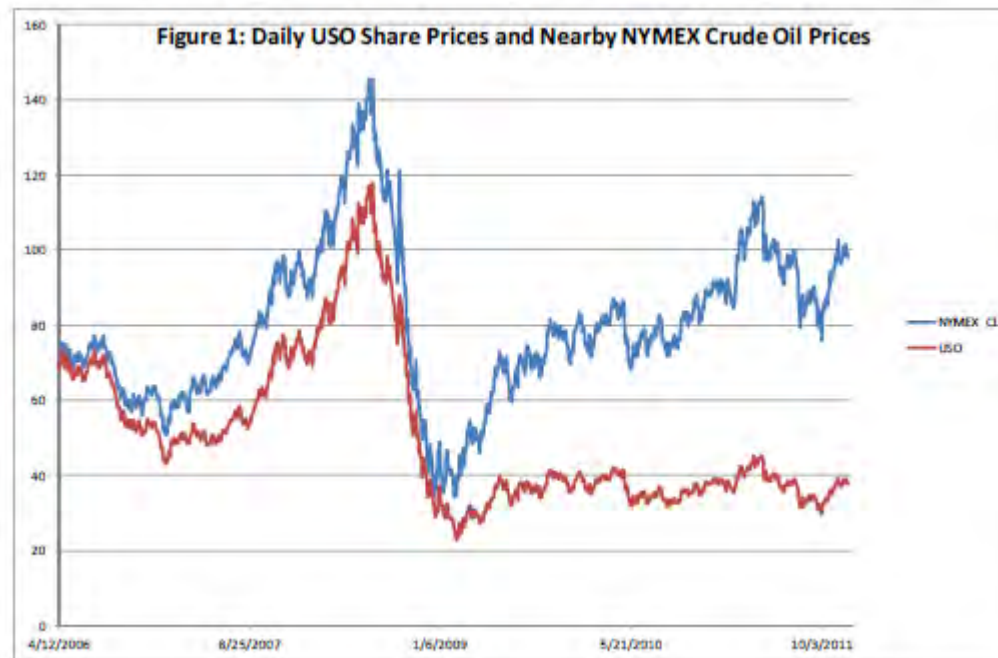
A synthetic ETF in action



- Instead of buying underlying securities, these funds have swaps or futures which deliver the underlying returns
- Raises 2 issues:
 1. Counterparty risk which exacerbates in volatile times when more pressure
 2. Futures have a rollover date which traders know ETFs have to rollover and can front-run



Synthetic ETF



- USO in red (ETF of US oil prices) and the underlying in blue
- Large discrepancy in the price which some attribute to the costs of front-running on the underlying futures
 - Front-runners force ETFs to sell the expiring futures at low prices and buy the longer dated futures at a high price at rollover



Conclusions

Enormous benefits to ETFs but we are starting to see some of the impact these instruments have on markets

1. Index inclusion alters stock returns and creates drag on index funds
2. Changes the correlation of stocks in the index
3. May worsen market instability through feedback loops
 - Flash crash
4. Price inefficiencies are observed and worsen in volatile times
 - For commodities, price discrepancy possibly linked to synthetic ETFs and front-running

