



## Dimensional vs. ETFs

July 2004



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### Objectives

#### **ETF and Index Funds:**

Provide investors with a way to own and track an indexed portfolio at a low cost.

#### **Dimensional:**

Provide consistent exposure to identifiable asset classes at a low cost through portfolio engineering and patient trading. Please refer to the Funds prospectus for more information on fees and expenses.

## Structure: Asset Class Exposure

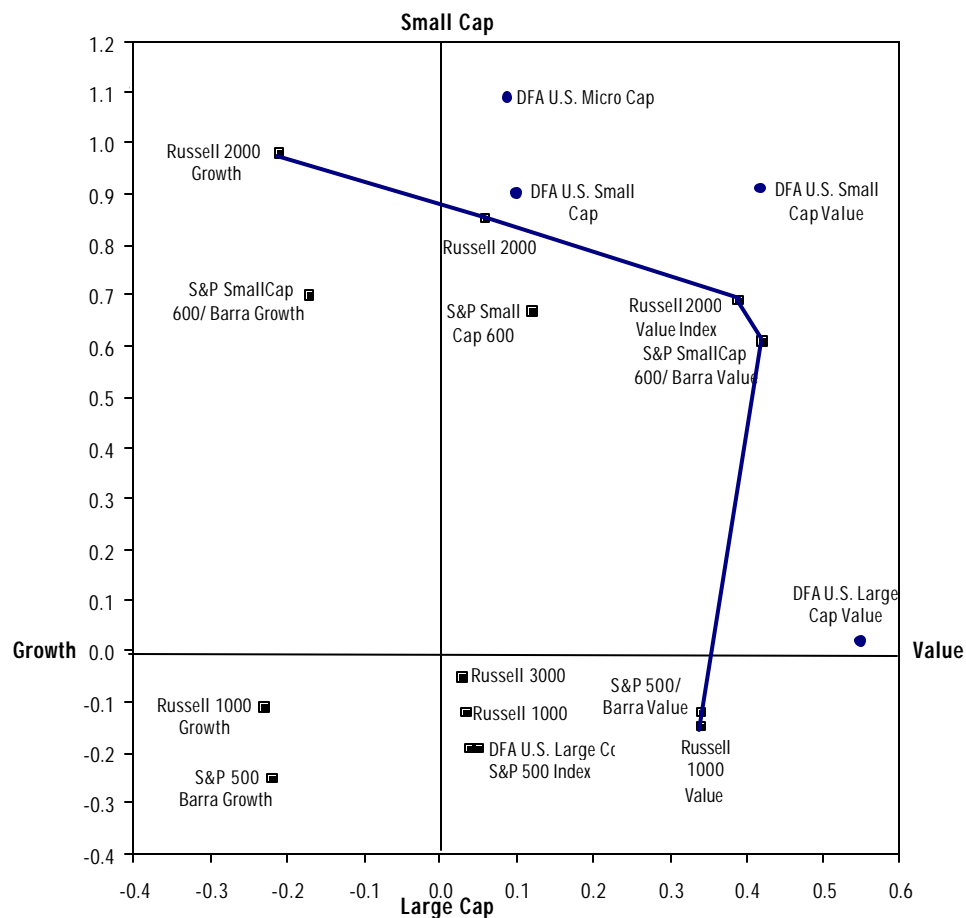
**DFA provides stronger tilts to less liquid risk factors—small and value.**

U.S. Small Cap	Average Mkt Cap (\$mm)	Average Book-to-Mkt
iShares Russell 2000 Index	770	0.28
iShares S&P Small Cap 600 Index	892	0.32
<b>DFA U.S. Micro Cap Portfolio</b>	<b>397</b>	<b>0.49</b>
<b>DFA U.S. Small Cap Portfolio</b>	<b>841</b>	<b>0.47</b>
<b>U.S. Small Cap Value</b>		
iShares Russell 2000 Value Index	758	0.45
iShares S&P Small Cap 600/Barra Value Index	763	0.53
<b>DFA U.S. Small Cap Value Portfolio</b>	<b>708</b>	<b>0.80</b>

Source: iShares data courtesy of Morningstar, as of March 31, 2004.  
The information presented above is for illustrative purposes only.

# Dimensional vs. ETFs

## Three-Factor Regression Results: Domestic Equities Monthly Returns: January 1979-March 2004



Manager	Size (\$)	Value (h)	R <sup>2</sup>	Start Date
Russell 3000 Index	-0.05	0.03	1.00	Jan-79
DFA U.S. Large Company	-0.19	0.04	0.99	Jan-79
Russell 1000 Index	-0.12	0.03	1.00	Jan-79
S&P 500 Index	-0.19	0.05	0.99	Jan-79
Russell 1000 Growth Index	-0.11	-0.23	0.96	Jan-79
S&P 500/ Barra Growth Index	-0.25	-0.22	0.96	Jan-79
DFA U.S. Large Cap Value	0.02	0.55	0.87	Jan-79
Russell 1000 Value Index	-0.15	0.34	0.95	Jan-79
S&P 500/ Barra Value Index	-0.12	0.34	0.96	Jan-79
DFA U.S. Micro Cap	1.09	0.09	0.95	Jan-79
DFA U.S. Small Cap	0.90	0.10	0.97	Jan-79
Russell 2000 Index	0.85	0.06	0.96	Jan-79
S&P SmallCap 600 Index	0.67	0.12	0.86	Jan-94
Russell 2000 Growth Index	0.98	-0.21	0.97	Jan-79
S&P SmallCap 600/ Barra Growth Index	0.70	-0.17	0.85	Jan-94
DFA U.S. Small Cap Value	0.91	0.42	0.94	Jan-79
Russell 2000 Value Index	0.69	0.39	0.89	Jan-79
S&P SmallCap 600/ Barra Value Index	0.61	0.42	0.83	Jan-94

**Conclusion: DFA strategies provide sharper exposure to risk dimensions.**

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## Structure: Asset Class Exposure

**DFA provides more diversified exposure to asset classes.**

<b>U.S. Small Cap</b>	<b>Holdings</b>	<b>Real Estate</b>	<b>Holdings</b>
iShares Russell 2000 Index	1,939	iShares Cohen & Steers Realty Majors	31
iShares S&P Small Cap 600 Index	601	<b>DFA Real Estate Securities Portfolio</b>	<b>133</b>
<b>DFA U.S. Mico Cap Portfolio</b>	<b>2,822</b>		
<b>DFA U.S. Small Cap Portfolio</b>	<b>3,340</b>		
<b>DFA Tax-Managed U.S. Small Cap</b>	<b>3,024</b>		
		<b>International Large Cap</b>	
		iShares MSCI EAFE Index Fund	793
		<b>DFA Large Cap International Portfolio</b>	<b>977</b>
<b>U.S. Small Cap Value</b>			
iShares Russell 2000 Value Index	1,280		
iShares S&P Small Cap 600/ Barra Value Index	373		
<b>DFA U.S. Small Cap Value Portfolio</b>	<b>1,660</b>		
<b>DFA Tax-Managed U.S. Small Cap Value</b>	<b>1,825</b>		

Source: Morningstar, as of March 31, 2004.  
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### ETF Tracking

- ETF claim: Institutional investors should execute creation/redemption units to arbitrage away any premium/discount to NAV.

If ETF Price > Underlying NAV

- redeem unit (short the fund)
- receive underlying shares in-kind (long the stocks)
- sell shares in the market (deposit stocks to cover short)

If ETF Price < Underlying NAV

- create unit (long the fund)
- cheaper underlying shares delivered to the ETF

- Reliably tight tracking of price to NAV requires liquidity of underlying shares.



### ETF Costs

- Retail brokerage commissions.
- Creation/Redemption unit transaction fees for institutional participants.
- Trading spreads.
  - Less liquid and/or more concentrated market segments are expensive.
  - ETFs forced to track index; handcuffed by reconstitution.
  - DFA adds value through structure and execution.
    - Flexible weighting
    - Patient trading



### ETF Costs: Creation/Redemption Fees

Trading costs and creation/redemption unit transaction costs to the ETF sponsor can be higher in less liquid asset classes.

Underlying Index	Unit Transaction Fee	Value of Unit	Fee/ Unit Value (bps)
S&P 500	\$10,000	\$4.48 mm	0.2
Russell 2000	\$37,500	\$4.47 mm	1.0
Russell 3000	\$57,500	\$2.73 mm	2.1
S&P Europe 350	\$60,000	\$2.62 mm	2.3

Value of unit is based on 50,000 iShares. Transaction is calculated as fixed fee plus the maximum variable fee. Unit value as of June 30, 2003.

## ETF Costs: Trading Spreads

The bid/ask spread is larger for less liquid stocks.

Range (\$Millions)	Names	Daily Trading Volume		Bid/Ask Spread
		Shares (mm)	Value (\$mm)	
18,157 - 282,290	100	7.45	277.71	0.07
2,826 - 18,157	400	1.88	49.58	0.08
1,118 - 2,826	500	0.63	11.79	0.15
353 - 1,118	1,000	0.30	3.59	0.28
138 - 353	1,000	0.08	0.69	0.56
0 - 138	2,387	0.04	0.12	3.24

Source: Bridge Trading Systems, April 16, 2003.



## ETF Costs: Trading Concerns

	Total Number Names	Average Volume (000s shares)*	Number of Names < \$500 mm	Average Volume (000s shres)*
<b>U.S. Small Cap</b>				
iShares Russell 2000 Index	1,965	266	1,198	163
iShares S&P Small Cap 600 Index	586	207	269	144
<b>DFA U.S. Small Cap Portfolio</b>	<b>3,378</b>	<b>182</b>	<b>2,607</b>	<b>96</b>
<b>DFA U.S. Micro Cap Portfolio</b>	<b>2,858</b>	<b>127</b>	<b>2,591</b>	<b>95</b>
<b>U.S. Small Cap Value</b>				
iShares Russell 2000 Value Index	1,294	171	207	127
iShares S&P Small Cap 600/ Barra Value Index	365	206	814	133
<b>DFA U.S. Small Cap Value Portfolio</b>	<b>1,744</b>	<b>162</b>	<b>1,502</b>	<b>87</b>

Average volume calculated from median daily volume over a randomly chosen 10-day period, 8/12/03-8/21/03.

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## ETF Costs: Spreads, Premiums, and Discounts

- Average domestic ETF spread: 0.33%
- Versus cap-weighted average spread: 0.09%
  - Abundance of ETFs tracking less liquid asset classes drives up the simple average spread.

Range (\$Millions)	Names	Daily Trading Volume		Bid/Ask Spread
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- Average international ETF spread: 0.87%

Source: Salomon Smith Barney. "Snapshot study" performed 40 random snapshots of all ETFs in January 2002.



### ETF Costs: Spreads, Premiums, and Discounts

Index	Days With Premium > 1%	Days With Discount > 1%
S&P Global 100	4	20
S&P Global Financials	13	4
S&P Global Technology	13	9
S&P Global Telecom	28	14
S&P Europe 350	54	15

**ETFs tracking less liquid and concentrated indices trade with premiums or discounts more frequently.**

Source: iShares prospectus, August 1, 2003. Days between July 2002 and June 2003.

## ETF Costs: Spreads, Premiums, and Discounts

Domestic ETF	Bid P/D	Mid P/D	Ask P/D
Average	-0.09%	0.01%	0.11%
Maximum	1.46%	1.64%	3.58%
Minimum	-1.21%	-0.70%	-0.58%

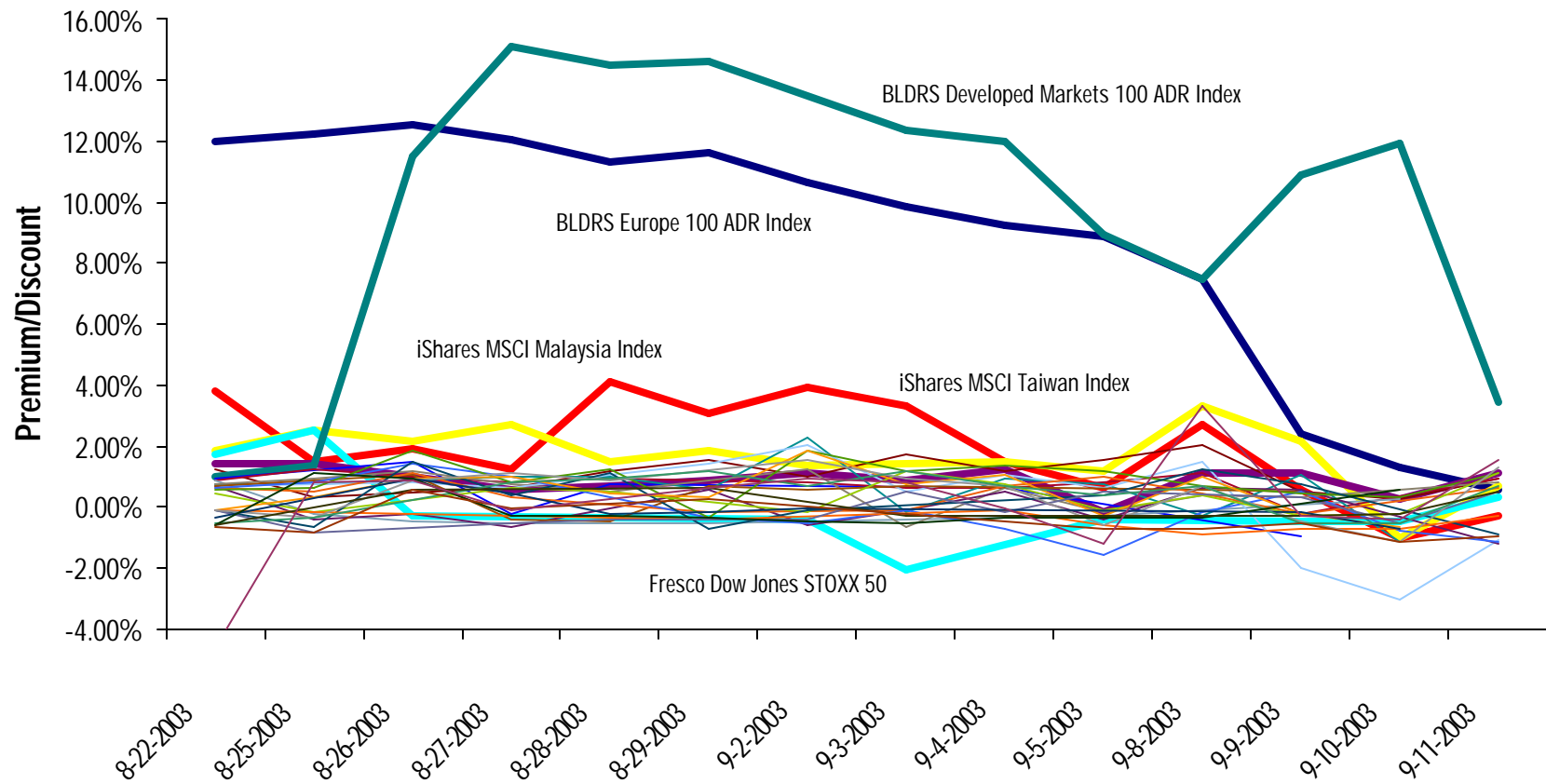
- Average negative return impact is **-0.20%**.
- Potential negative return impact is **-4.79%**.
- Potential positive return impact is **2.04%**.

International ETF	Bid P/D	Mid P/D	Ask P/D
Average	-0.48%	-0.05%	0.38%
Maximum	2.46%	2.78%	3.10%
Minimum	-3.90%	-3.36%	-2.95%

- Average negative return impact is **-0.86%**.
- Potential negative return impact is **-7.00%**.
- Potential positive return impact is **5.41%**.

Source: Salomon Smith Barney. "Snapshot study" performed 40 random snapshots of all ETFs in January 2002. Bid, Mid & Ask premiums and discounts of ETFs are relative to those of the underlying pool of assets. For example, bid P/D = ETF bid - pool bid.

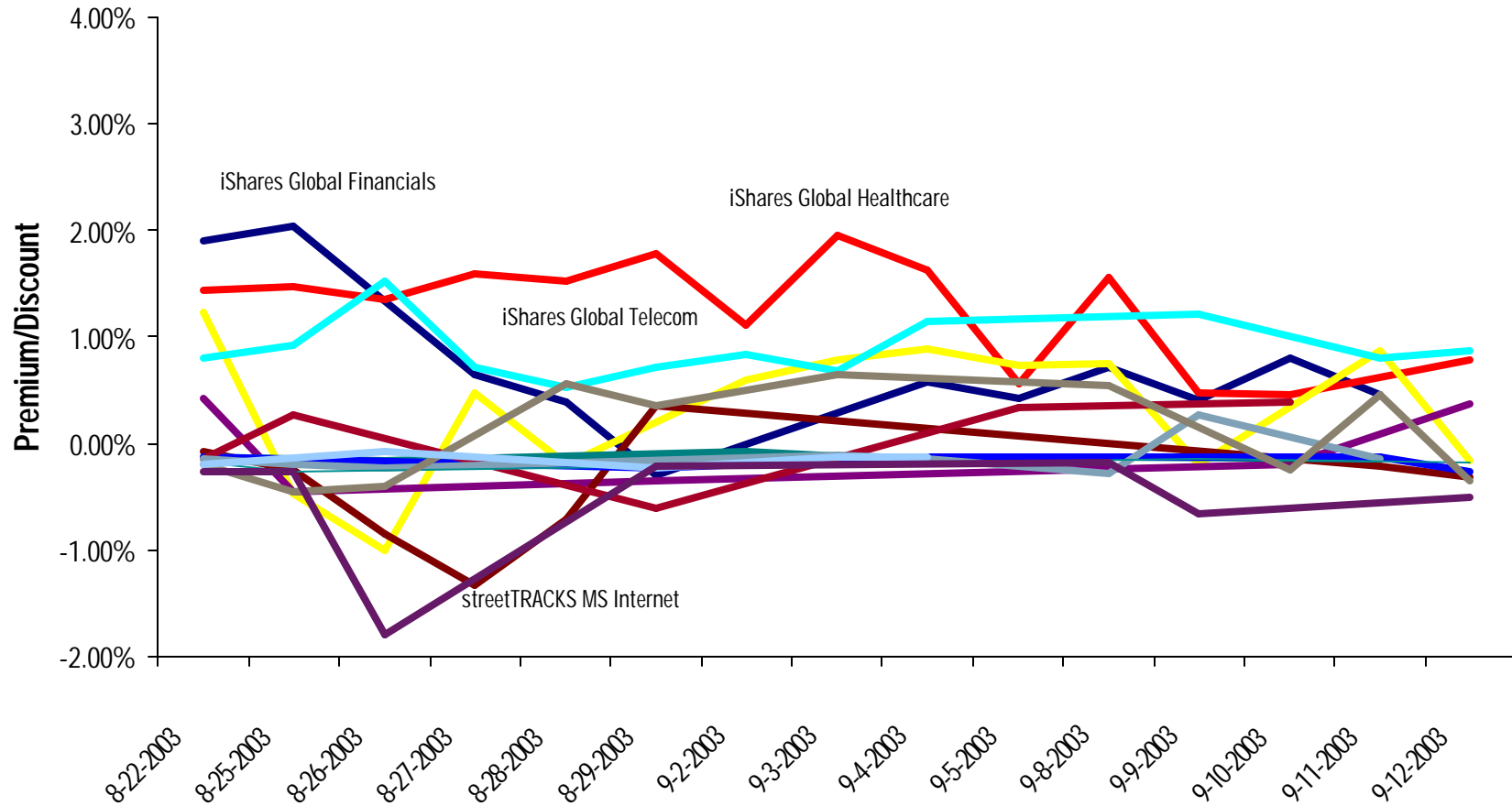
## ETF Costs: International ETFs



Source: etfconnect.com

# Dimensional vs. ETFs

## ETF Costs: Sector ETFs

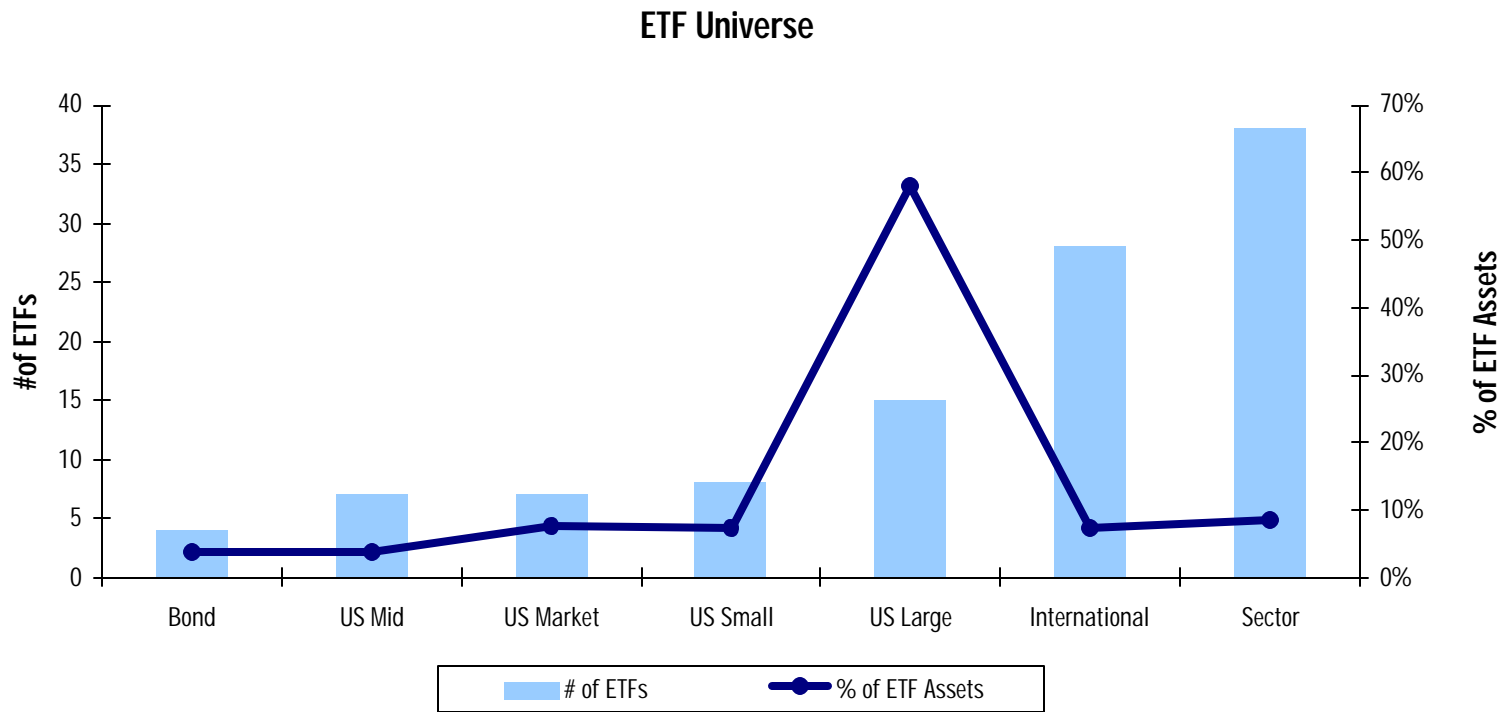


Source: etfconnect.com



## Dispersion of ETF Assets

- ETFs investing in less liquid and more concentrated market segments generally have fewer assets under management.



### Impact of ETF Size

- An investor seeking to trade a smaller ETF is exposed to price pressure of lower volumes and larger spreads.
- “Smaller ETFs are much less liquid, and experts believe that...they may suffer even worse liquidity (and higher spreads) as volume shifts to more popular ETFs.”  
— Journal of Portfolio Management, Summer 2003