

# **The Effects of Exchange Traded Funds on Small Cap Stocks**

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It is hypothesized on average, that a company purchased by an ETF will experience an increase in liquidity as measured by bid/ask spreads and trading volume. According to "Liquidity, the Value of the Firm, and Corporate Finance" published in the *Journal of Applied Corporate Finance*, this increase in liquidity will increase valuations. If the null hypothesis proves to be true, it could serve as a strategy for individual investors. Savvy investors could use an ETF purchase as a signal for profitable buying opportunities.

In order to fully understand the proposed strategy, we will begin by discussing the brief history of ETFs. The evolution of ETFs has changed the market and given investors more investing options. However, this new investment vehicle has both pros and cons for its investors. Second, we will discuss the methodology used to test our hypothesis. The following will be explained in great detail within this section: The selection of our ETFs and small cap stocks, the three factors we chose to measure the effects of ETFs on small cap stocks, and the organization of our quantitative models. Third we will present our analysis of the data and how investors can profit as a result of this information.

### **Brief History of ETFs**

An ETF is usually a passively managed basket of stocks meant to track a sector, industry, or broad market index. ETF's can track indices such as the S&P 500, the Dow Jones Industrial Average, or the NASDAQ-100. The concept behind trading an entire basket of stocks began in the late 1970's when technological advances allowed institutional investors to electronically trade an entire portfolio. The earliest attempt at creating an ETF share was in 1989. Index Participation Shares (IPS) allowed individuals to invest in a basket of stocks meant to represent the S&P 500. However, IPS failed due to legal issues and was found illegal by a federal court in Chicago<sup>1</sup>. The Toronto Stock Exchange and Leland, O'Brian, Rubinstein Associates made more failed attempts before the American Stock Exchange introduced Standard and Poor's Depository Receipts (SPDRs) in 1993<sup>2</sup>. The SPDR was the first of these securities to be widely accepted by the market and finally took off in the late 90's. Since ETFs inception, the number of funds has grown exponentially as well as the accumulated assets backing them.

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<sup>1</sup> (Gastineau, 2001)

<sup>2</sup> (Gastineau, 2001)

## **The Pros and Cons of ETFs**

There are a variety of positive and negative consequences associated with investing in ETFs. Advantages include access to instant diversification, prices that update in real time throughout the day, and the ability to short and buy on margins similar to individual equity positions. In contrast to some mutual funds, there are no load fees. Rather there tends to be a lower expense ratio and lower capital gain distribution taxes. However, some ETFs are thinly traded and, as a result, have high bid/ask spreads that result in higher transaction costs to investors. In addition, many long-term investors do not find an advantage in the ability to short, buy on margin, or track prices intraday. Recent innovations include the development of actively managed ETFs that would buy and sell shares more frequently than their traditional counterparts.<sup>3</sup>

## **What is Liquidity?**

Liquidity refers to an asset's ease of conversion to cash without a significant loss in value. An illiquid security is characterized by a wide bid/ask spread that market makers require to take on the additional risk to buy or sell the security. An illiquid security will also trade at lower volumes than liquid securities. According to recent research<sup>4</sup>, an increase in liquidity can lead to an increase in price per share. Bid/ask spreads and trading volume metrics are both used in the following analysis.

## **Methodology**

To test the hypothesis ten ETFs were chosen. The ETFs were selected from different fund families, across various industries. Some funds had a combination of large and small capitalization stocks while others had only small capitalization stocks. Funds were required to have an inception date of 2003 or later. Then five small capitalization stocks were selected from each fund. For the purpose of this study small capitalization stocks were classified as securities with a market capitalization of three billion dollars or less. The ticker symbols for the 10 selected ETFs are FXI, PHO, VBR, VFH, VHT, PTF, PWY, JKK, VTV, and KBE. A list of fund names and the stocks selected from each fund is included as Exhibit 1.

To illustrate the evaluation method for each set of data, the FXI fund will be referenced for the duration of this section. The closing price, trade volume, closing bid price, and closing ask price were collected on a daily basis for FXI and each of the five stocks selected from the fund. The difference

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<sup>3</sup> (Garver, 2008)

<sup>4</sup> (Bogoslaw, 2008)

between the securities' closing bid and ask price was used to calculate the spread of each stock and ETF. The data was collected for 14 days before the inception of the ETF and then the first 14 days after the stock was purchased by the ETF. For example FXI began trading on October 8, 2004. FXI's daily price data was collected from September 20, 2004 to October 27, 2004 for a total of twenty-eight data points. To control for market conditions, the daily closing prices of the S&P 500 Index and the Russell 2000 Index were obtained over the same 28 day period as the ETF that was being tested. The S&P 500 Index was selected to illustrate movement of the overall stock market and the Russell 2000 Index was selected to represent the movement of Small Cap stocks. All ETF and stock data were gathered using the Center for Research in Security Prices database. Market Cap information was collected from Yahoo Finance. This process was replicated for each ETF listed above.

To analyze the data we took the percent change in daily price using the basic formula:  $\text{Percent change} = (\text{Value}_F - \text{Value}_I) / \text{Value}_I$ . Next we took the percent change of the stock and divided it by the percentage change of the index to obtain a return in excess of the market. We defined this as our Alpha for each stock. This had the effect of eliminating market fluctuations in the data and systematic risk. In order to determine the difference in pre-ETF data versus post-ETF data we used the Analysis of Variance (ANOVA). An ANOVA is a statistical method that measures the difference between two sets of data and includes a p-value that indicates the statistical significance of those differences. P-values of less than 0.10 were considered significant. The Alpha of each stock, daily price, trading volume, and the bid/ask spread were analyzed using this technique.

## **Results**

From our analysis of 50 stocks and 10 ETFs the average 14-day daily percentage price change significantly changed in only one instance. Therefore, we can conclude that the Alpha of a stock is not affected by inclusion in an ETF basket. The average of the daily prices had the most dramatic results. A statistical significant change was observed 80 percent of the time after inclusion in an ETF. In addition, 72.5 percent of the stocks with a significant p-value saw an increase in their 14-day average after being purchased by an ETF. The relationship of price between pre and post ETF groups returned the most insightful and statistically significant results.

Liquidity metrics such as volume and bid/ask spread had unanticipated results. Only 24 percent of the 50 stocks showed significant results in regards to trade volume. Among these stocks, volume increased

only 42 percent of the time. Similarly, spread was significantly affected in 8% of the 50 stocks. In line with our hypothesis the spread narrowed for 75% of these stocks. However, it should be noted that according to our research, liquidity as measured by volume and spread are not regularly affected by ETF inclusion.

### **Inferences drawn from Research**

The changes in pricing as a result of a stocks inclusion in an ETF should present investors with possible investment opportunities. For example, a savvy investor who purchases a small cap stock at the inception of the ETF would capture a significant gain as the price of the asset increases as a result of it's inclusion. An investor who purchased one of the small cap stocks in our research would likely see an increase in price per share in the short-term. Whether this price appreciation is related to liquidity becomes irrelevant to the strategy.

Liquidity as measured by trade volume and the spread did not change as we thought that they would. However, there is a significant increase in price which is in-line with the hypothesis. These facts infer that there must be other qualitative factors that are influencing the price performance of these stocks. It is possible that other explanations exist such as ETFs are created in bull markets that carry price momentum. Other factors could include investor awareness<sup>5</sup> and an associated positive market sentiment.

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<sup>5</sup> (Honghui Chen, 2006)

## Exhibit 1

### The Total list of Small Cap Stocks (Part II)

	Name	Symbol	Fund	Fund Inception Date
1.	Fuel Systems Solutions Inc.	FSYS	FXI	October 5, 2004
2.	Ballard Power systems Inc.	BLDP	FXI	October 5, 2004
3.	Quantum Fuel Systems Technologies Worldwide Inc.	QTTWW	FXI	October 5, 2004
4.	American Inc.	ARGN	FXI	October 5, 2004
5.	Verenium Corporation	VRNM	FXI	October 5, 2004
6.	Tetra Tech Inc.	TTEK	PHO	December 6, 2005
7.	Insituform Technologies	INSU	PHO	December 6, 2005
8.	Watts Water Technologies Inc. (CL A)	WTS	PHO	December 6, 2005
9.	Badger Meter Inc.	BMI	PHO	December 6, 2005
10.	Ameron International Corp.	AMN	PHO	December 6, 2005
11.	Cullen/Frost Bankers Inc.	CFR	VBR	January 26, 2004
12.	Whiting Petroleum Corp.	WLL	VBR	January 26, 2004
13.	PerkinElmer Inc.	PKI	VBR	January 26, 2004
14.	OGE Energy Corp.	OGE	VBR	January 26, 2004
15.	Watson Pharmaceuticals Inc.	WPI	VBR	January 26, 2004
16.	American Capital Ltd.	ACAS	VFH	January 26, 2004
17.	Janus Capital Group Inc.	JNS	VFH	January 26, 2004
18.	Eaton Vance Corp.	EV	VFH	January 26, 2004
19.	Developers Diversified Realty Corp. REIT	DDR	VFH	January 26, 2004
20.	Federated Investors Inc.	FII	VFH	January 26, 2004
21.	Covance Inc.	CVD	VHT	January 26, 2004
22.	Beckman Coulter Inc.	BEC	VHT	January 26, 2004
23.	Millipore Corp	MIL	VHT	January 26, 2004
24.	Charles River Laboratories Inc.	CRL	VHT	January 26, 2004
25.	Techne Corporation	TECH	VHT	January 26, 2004
26.	Lexmark International Inc.	LXK	PTF	October 12, 2006
27.	TIBCO Software Inc.	TIBX	PTF	October 12, 2006
28.	Wind River Systems Inc.	WIND	PTF	October 12, 2006
29.	CIBER Inc.	CBR	PTF	October 12, 2006
30.	Parametric Technology Corp.	PMTC	PTF	October 12, 2006
31.	Prestige Brands Holdings Inc.	PBH	PWY	March 3, 2005
32.	Polaris	PII	PWY	March 3, 2005
33.	NutriSystem	NTRI	PWY	March 3, 2005
34.	Vaalco Energy Inc.	EGY	PWY	March 3, 2005
35.	Investment Technology Group Inc.	ITG	PWY	March 3, 2005
36.	Waste Connections	WCN	JKK	June 28, 2004
37.	Comstock Resources	CRK	JKK	June 28, 2004
38.	F5 Networks	FFIV	JKK	June 28, 2004
39.	HLTH Corporations	HLTH	JKK	June 28, 2004
40.	Immucor Inc.	BLUD	JKK	June 28, 2004
41.	Pulte Homes Inc	PHM	VTV	January 26, 2004
42.	Dynegy Inc.	DYN	VTV	January 26, 2004
43.	Oshkosh Corporation	OSK	VTV	January 26, 2004
44.	Williams-Sonoma Inc.	WSM	VTV	January 26, 2004
45.	Jabil Circuit Inc.	JBL	VTV	January 26, 2004
46.	CVB Financial Corp	CVBF	KBE	November 8, 2005
47.	United BankShares Inc.	UBSI	KBE	November 8, 2005
48.	Prosperity Bancshares Inc.	PRSP	KBE	November 8, 2005
49.	First Merit Corp	FMER	KBE	November 8, 2005
50.	Signature Bank	SBNY	KBE	November 8, 2005

## Exhibit 2 ETF Charts

### FXI

iShares FTSE/Xinhua China 25 Index		Price		Daily Price Change		Volume		Bid/Ask Spread	
		Average	P-Value	Average	P-Value	Average	P-Value	Average	P-Value
Beta = 1.58									
FSYS	Pre ETF	4.97	0.00	2.17	0.26	104430.00	0.17	0.03	0.44
	Post ETF	5.66		-15.40		73449.07		0.03	
BLDP	Pre ETF	5.57	0.00	4.47	0.44	1538925.64	0.11	0.01	0.80
	Post ETF	6.95		10.13		759790.79		0.01	
QTWW	Pre ETF	5.57	0.00	1.20	0.45	215,442.93	0.02	0.03	0.34
	Post ETF	6.95		-1.67		471,743.57		0.02	
ARGN	Pre ETF	3.68	0.09	-0.27	0.83	10561.64	0.91	0.10	0.00
	Post ETF	2.82		5.47		10889.71		0.05	
VRNM	Pre ETF	8.38	0.28	3.13	0.21	98363.93	0.76	0.03	0.68
	Post ETF	8.48		13.76		94038.00		0.03	

**Avg/ Avg Change**                      **8.20%**    0.07    **-536.73%**    0.44                      **7.48%**    0.40    **-10.28%**                      0.45

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### PHO

Powershares Palisades Water Index		Price		Daily Price Change		Volume		Bid/Ask Spread	
		Average	P-Value	Average	P-Value	Average	P-Value	Average	P-Value
Beta = unlisted									
TTEK	Pre ETF	15.87	0.49	9.29	0.95	104430.00	0.17	0.03	0.44
	Post ETF	15.99		8.83		73449.07		0.03	
INSU	Pre ETF	19.80	0.46	8.15	0.50	93,052.29	0.05	0.03	0.83
	Post ETF	19.64		3.42		148,645.86		0.03	
WTS	Pre ETF	28.77	0.00	0.82	0.12	146,042.86	0.00	0.10	0.24
	Post ETF	29.94		6.50		290,557.14		0.03	
BMI	Pre ETF	39.63	0.04	12.85	0.49	23407.14	0.76	0.15	0.81
	Post ETF	41.54		4.45		21850.00		0.14	
AMN	Pre ETF	45.40	0.38	-1.04	0.69	14578.57	0.71	0.07	0.14
	Post ETF	45.52		-0.42		15985.71		0.13	

**Avg/ Avg Change**                      **1.82%**    0.27    **101.62%**    0.55                      **26.41%**    0.34    **2.23%**                      0.49

4.00

## VBR

Vanguard Small Cap Value		Price		Daily Price Change		Volume		Bid/Ask Spread	
Beta = 1.15		Average	P-Value	Average	P-Value	Average	P-Value	Average	P-Value
PKI	Pre ETF	19.18	0.00	-0.71	0.12	104430.00	0.17	0.03	0.44
	Post ETF	21.02		2.74		73449.07		0.03	
OGE	Pre ETF	23.70	0.00	-2.22	0.17	278578.57	0.32	0.03	0.32
	Post ETF	24.48		0.72		242907.14		0.04	
WPI	Pre ETF	47.18	0.33	-3.07	0.43	1167850.00	0.18	0.02	0.50
	Post ETF	47.54		-0.11		920800.00		0.02	
WLL	Pre ETF	19.64	0.05	-1.58	0.33	195221.43	0.51	0.05	0.49
	Post ETF	20.04		1.51		177371.43		0.04	
CFR	Pre ETF	40.35	0.03	2.05	0.80	185521.43	0.60	0.04	0.00
	Post ETF	40.92		1.37		170764.29		0.01	

**Avg/ Avg Change**                      **3.40%**    0.08    **-188.48%**    0.37                      **-16.14%**    0.36                      **-9.01%**                      0.35

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## VFH

Vanguard Financials		Price		Daily Price Change		Volume		Bid/Ask Spread	
Beta = 1.19		Average	P-Value	Average	P-Value	Average	P-Value	Average	P-Value
ACAS	Pre ETF	30.16	0.00	-0.50	0.38	104430.00	0.17	0.03	0.44
	Post ETF	32.11		-9.58		73449.07		0.03	
JNS	Pre ETF	16.60	0.15	1.89	0.30	1365564.29	0.28	0.02	0.80
	Post ETF	16.84		-10.41		1160989.00		0.01	
EV	Pre ETF	36.79	0.00	1.24	0.23	350885.71	0.10	0.03	0.02
	Post ETF	37.79		-3.60		292624.00		0.04	
DDR	Pre ETF	33.09	0.00	-0.41	0.67	303678.57	0.89	0.03	0.42
	Post ETF	34.00		0.35		311943.21		0.02	
FII	Pre ETF	30.71	0.08	0.55	0.43	565114.29	0.17	0.03	0.59
	Post ETF	31.30		-1.36		404733.36		0.04	

**Avg/ Avg Change**                      **3.05%**    0.05    **44.88%**    0.40                      **-17.38%**    0.32                      **13.95%**                      0.45

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## VHT

Vanguard Health Care		Price		Daily Price Change		Volume		Bid/Ask Spread	
		Average	P-Value	Average	P-Value	Average	P-Value	Average	P-Value
Beta = .74									
CVD	Pre ETF	28.11	0.00	5.37	0.34	104430.00	0.17	0.03	0.44
	Post ETF	29.67		0.06		73449.07		0.03	
BEC	Pre ETF	52.52	0.00	-1.53	0.66	278578.57	0.11	0.06	0.47
	Post ETF	54.52		-0.50		360157.14		0.04	
MIL	Pre ETF	45.86	0.00	-12.06	0.22	529735.71	0.48	0.03	0.53
	Post ETF	51.19		1.29		407007.14		0.03	
CRL	Pre ETF	37.60	0.00	-7.89	0.27	399321.43	0.32	0.03	0.30
	Post ETF	40.75		0.96		508992.86		0.05	
TECH	Pre ETF	38.67	0.01	6.02	0.19	230819.21	0.38	0.04	0.96
	Post ETF	39.63		0.31		211693.29		0.04	

**Avg/ Avg Change**                      **6.37%**    0.002    **-96.74%**    0.34            **-0.87%**    0.29    **1.55%**            0.54

## PTF

Powershares Technology		Price		Daily Price Change		Volume		Bid/Ask Spread	
		Average	P-Value	Average	P-Value	Average	P-Value	Average	P-Value
Beta = unlisted									
LXK	Pre ETF	59.18	0.00	1.55	0.77	104430.00	0.17	0.03	0.44
	Post ETF	61.66		0.83		73449.07		0.03	
TIBX	Pre ETF	8.85	0.00	8.87	0.33	5,415,901.21	0.05	0.01	0.70
	Post ETF	9.25		0.16		3,199,880.29		0.01	
WIND	Pre ETF	10.83	0.06	0.92	0.99	767644.29	0.38	0.01	1.00
	Post ETF	10.99		0.91		885942.07		0.01	
CBR	Pre ETF	6.67	0.00	0.34	0.57	161,314.29	0.01	0.02	0.69
	Post ETF	7.04		-0.44		333,057.14		0.02	
PMTC	Pre ETF	17.95	0.00	2.12	0.18	1886321.86	0.57	0.01	0.61
	Post ETF	19.68		-1.37		1537668.50		0.01	

**Avg/ Avg Change**                      **6.33%**    **0.08**    **-108.08%**    0.57            **6.56%**    0.24    **8.28%**            0.69

**PWY**

Powershares Small Cap Value		Price		Daily Price Change		Volume		Bid/Ask Spread	
		Average	P-Value	Average	P-Value	Average	P-Value	Average	P-Value
Beta = 1.12									
PBH	Pre ETF	17.96	0.35	-1.98	0.21	104430.00	0.17	0.03	0.44
	Post ETF	17.86		-22.97		73449.07		0.03	
PII	Pre ETF	70.34	0.00	0.79	0.86	348714.29	0.39	0.05	0.41
	Post ETF	72.50		1.42		312400.00		0.03	
NTRI	Pre ETF	5.67	0.24	27.57	0.73	394,657.14	0.09	0.05	0.50
	Post ETF	5.88		42.55		239,878.57		0.04	
EGY	Pre ETF	4.98	0.00	12.39	0.33	298778.57	0.30	0.02	0.29
	Post ETF	4.34		-5.30		3209335.71		0.02	
ITG	Pre ETF	19.43	0.00	3.97	0.81	261,592.86	0.03	0.01	0.11
	Post ETF	18.23		5.15		328,128.57		0.03	
<b>Avg/ Avg Change</b>		<b>-0.01%</b>	<b>0.04</b>	<b>216.42%</b>	<b>0.59</b>	<b>184.06%</b>	<b>0.20</b>	<b>23.83%</b>	<b>0.35</b>

**JKK**

iShares Morningstar Small Growth		Price		Daily Price Change		Volume		Bid/Ask Spread	
		Average	P-Value	Average	P-Value	Average	P-Value	Average	P-Value
Beta = 1.3									
WCN	Pre ETF	38.32	0.00	-1.79	0.59	104430.00	0.17	0.03	0.44
	Post ETF	29.13		0.15		73449.07		0.03	
CRK	Pre ETF	19.72	0.03	-4.85	0.44	441207.14	0.47	0.03	0.37
	Post ETF	19.38		-0.80		392078.57		0.04	
FFIV	Pre ETF	24.87	0.01	7.53	0.80	1629839.36	0.28	0.02	0.50
	Post ETF	23.57		5.16		1211678.00		0.03	
HLTH	Pre ETF	9.30	0.00	0.91	0.47	3,590,701.50	0.05	0.01	0.77
	Post ETF	8.44		3.48		2,425,634.71		0.01	
BLUD	Pre ETF	30.66	0.15	-1.48	0.14	204602.29	0.12	0.04	0.04
	Post ETF	28.50		6.71		435192.79		0.01	
<b>Avg/ Avg Change</b>		<b>-2.73</b>	<b>0.01</b>	<b>-98.37%</b>	<b>0.49</b>	<b>2.76%</b>	<b>0.22</b>	<b>10.43%</b>	<b>0.34</b>

**VTV**

Vanguard Large Cap Value		Price		Daily Price Change		Volume		Bid/Ask Spread	
Beta = .96		Average	P-Value	Average	P-Value	Average	P-Value	Average	P-Value
PHM	Pre ETF	44.45	0.15	-8.76	0.39	1,981,585.71	0.00	0.06	0.58
	Post ETF	45.17		0.93		1,249,392.86		0.04	
DYN	Pre ETF	4.94	0.00	12.19	0.14	8030685.71	0.24	0.01	0.41
	Post ETF	4.31		-1.13		5911957.14		0.01	
OSK	Pre ETF	55.10	0.00	-6.78	0.25	243135.71	0.99	0.09	0.63
	Post ETF	57.92		-1.05		242321.43		0.07	
WSM	Pre ETF	32.90	0.03	-5.06	0.24	672314.29	0.85	0.03	0.42
	Post ETF	32.34		1.29		649664.29		0.02	
JBL	Pre ETF	30.38	0.00	5.09	0.06	2,037,135.71	0.06	0.02	0.91
	Post ETF	29.28		-0.84		1,578,064.29		0.02	
<b>Avg/ Avg Change</b>		<b>7.10%</b>	<b>0.42</b>	<b>-109.27%</b>	0.22	<b>-17.91%</b>	0.43	<b>-19.11%</b>	0.59

**KBE**

SPDR KBW Bank Index		Price		Daily Price Change		Volume		Bid/Ask Spread	
Beta = .86		Average	P-Value	Average	P-Value	Average	P-Value	Average	P-Value
CVBF	Pre ETF	19.70	0.01	0.65	0.83	72258.57	0.32	0.03	0.59
	Post ETF	20.26		1.08		88494.86		0.03	
UBSI	Pre ETF	36.91	0.00	0.50	0.46	103,589.21	0.01	0.05	0.96
	Post ETF	37.84		1.35		75,643.50		0.05	
PRSP	Pre ETF	31.04	0.01	-2.10	0.15	114907.07	0.13	0.05	0.12
	Post ETF	30.45		1.79		212170.29		0.04	
FMER	Pre ETF	26.55	0.07	-0.42	0.16	191600.14	0.56	0.03	0.33
	Post ETF	26.82		1.98		205248.00		0.02	
SBNY	Pre ETF	26.55	0.07	-1.89	0.20	135,049.29	0.06	0.05	0.54
	Post ETF	26.82		2.18		100,425.43		0.04	
<b>Avg/ Avg Change</b>		<b>1.10%</b>	0.03	<b>-148.31%</b>	0.36	<b>12.32%</b>	0.22	<b>-10.14%</b>	0.51

## **Disclaimers**

This material does not constitute a solicitation or offer of securities; it is informational purposes only. All data is as provided and is not audited or independently verified. Historical data has been obtained from sources thought to be reliable; however, no guarantee of accuracy is being made. Past performance is not a guide to future results. No representation is being made that any investment strategy will likely achieve profits or losses similar to those obtained in hypothetical testing or actual trading.

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