

## **Real Estate Index Funds: Characteristics and Performance Evaluation**

C. Edward Chang and Walt A. Nelson

### **Abstract**

This paper examines operating characteristics, risk and performance measures of all available vehicles for index investing in U.S. real estate funds during the ten-year period from April, 1999, to March, 2009. The authors of this study find real estate index mutual funds and exchange-traded funds exhibit lower Expense Ratios, lower Turnover Rates, and mostly lower Tax Cost Ratios than category averages. As newcomers, real estate exchange-traded funds have had a good start, with the lowest Expense Ratios, lowest Turnover Rates, and lowest Tax Cost Ratios. Vanguard's four index mutual funds over the past ten years have outperformed their counterpart category averages with higher Returns, higher Risks, and higher Risk-Adjusted Returns. On the contrary, Wells' four index mutual funds over the past ten years have underperformed their counterpart category averages with lower Returns, higher Risks, and mostly lower Risk-Adjusted Returns. Four ETFs with at least three-year track record, however, have collectively underperformed index mutual funds over the past five with lower Returns, mostly higher Risks, and mostly lower Risk-Adjusted Returns. Nonetheless, Vanguard's ETF has been able to mostly outperform Vanguard's index mutual funds with higher Returns, lower (or same) Risks, and higher (or same) Risk-Adjusted Returns since its inception.

### **I. Introduction**

Index investing is a strategy that attempts to approximate the performance of a broad market index. Index investing has grown significantly in recent years in the U.S. and other developed countries as investors have become less satisfied with the performance of actively managed alternatives (Baer & Gensler, 2002; Ferri, 2007; Haslem, 2003; Swedroe, 2004). The first index mutual fund (the Vanguard 500 Index Fund, initially operating under the name First Index Investment Trust) was created in 1976. The second index fund didn't see the light of day until eight years later. During the first several years, it was proclaimed a flawed concept: "why would an investor settle for average returns?" After more than three decades, the market share of index funds constitutes 17% of equity fund assets (10% market share by index mutual funds and 7% market share by the exchange-traded funds) (Bogle, 2007).

This paper examines operating characteristics, risk and performance measures of all available vehicles for index investing in U.S. real estate funds during the ten-year period from April, 1999, to March, 2009. In this study, real estate index funds include not only index mutual funds (hereafter "IMFs"), but also their recently emerging close substitutes --- exchange-traded funds (hereafter "ETFs"). Operating characteristics include Expense Ratios, Annual Turnover Rates, and Tax Cost Ratios. Performance measures include Average Annual Returns and Return Percentile Rank in Category, Risks (measured by Standard Deviations and Betas) and Risk-Adjusted Returns (measured by the Sharpe Ratios and Alphas). Our results would help shed light on two issues: First, how do real estate index funds (IMFs and ETFs) perform compared with average of all real estate mutual funds (hereafter AMFs), and thus actively-managed real estate mutual funds? Second, do real estate ETFs perform as well as real estate IMFs?

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## **II. Equity Index Investing and Literature Review**

Broad-based index funds have several advantages. By their very nature, index funds ensure widely diversified assets. They typically cost less to operate than actively managed equity funds because they have lower turnover and transaction costs, and require no research into individual stocks. Consequently, index fund expense ratios are generally lower than those of actively managed equity funds. Other factors being equal, this could increase an index fund investor's return. For investors wishing to minimize taxes, the lower turnover rate of index funds reduces the likelihood of capital gain distributions. Most studies (see Haslem (2003, pp. 308-311) for a recent review) find that actively managed mutual funds do not perform as well as passively managed portfolios. Fund net returns are negatively related to expenses. Moreover, the higher portfolio turnover, the lower fund net returns relative to benchmark indices (Madlem, 1999, p. 20).

This paper investigates how well index investing works on a narrower scale – real estate funds. The percentage of conventional mutual funds that focus on a single sector or industry is about 6%. By contrast, more than 40% of all ETFs are sector or industry funds (Culloton, 2006). The history of sector mutual funds shows investors tend to misuse them. They chase hot returns and then dump the funds when they cool off (O'Neal, 2000). Academic research shows that investors are generally “horrible” market timers (Spence, 2002). Usually the narrower the sector funds, the higher are their costs. Many sector funds are concentrated in a handful of firms (Madlem, 1999, p. 21), because they are composed of slices of market-cap-weighted equity indexes. Khorana and Nelling (1997) find that sector funds tend to be less diversified than other equity funds, and they exhibit larger total risk, but do not entail greater systematic risk.

## **III. Data and Methodology**

Real estate mutual funds and ETFs are defined by Morningstar as domestic equity funds that specialize in real estate. Real estate IMFs and ETFs with at least three-year data available on March 31, 2009, were collected from Morningstar's Principia. Table 1 shows of 229 real estate mutual funds, 8 IMFs from two fund families (Vanguard and Wells) were found. These 8 IMFs were supplemented by 4 ETFs from three fund families (iShares, SPDR, and Vanguard) for this study.

Most tables contain two panels. The first panel is to compare real estate IMFs vs. real estate AMFs. The second panel is to compare real estate ETFs vs. real estate AMFs. In order to make meaningful comparisons, we choose to compare all measures with matching category and duration (time period). Operating characteristics collected, averaged, and reported include: Expense Ratios, Annual Turnover Rates, and Tax Cost Ratios.

Expense Ratio is the annual fee all mutual funds charge investors. Expense Ratio is expressed as the percentage of assets deducted each fiscal year for fund expenses, including 12b-1 fees, management fees, administrative fees, operating costs, and all other asset-based costs incurred by the fund.

Turnover Rate or Ratio is a measure of the fund's trading activity. Turnover Ratio is computed taking the lesser of purchases or sales (excluding all securities with maturities of less than one year) and dividing by average monthly net assets. A Turnover Ratio of 100% does not

necessarily suggest all securities in the portfolio have been traded. The fund might have held 50% of all positions for the past five years and turned over the other 50% of all positions twice throughout the year. A low Turnover Rate would loosely indicate a buy-and-hold strategy. High Turnover would indicate an investment strategy involving considerable buying and selling of securities. The Turnover figure is culled directly from the financial highlights of the fund's Annual Report and is not calculated by Morningstar.

The Morningstar Tax Cost Ratio measures how much a fund's annualized return is reduced by the taxes investors pay on distributions. Funds regularly distribute dividends and capital gains to their investors. Investors then must pay taxes on those distributions during the year they are received. Like an Expense Ratio, the Tax Cost Ratio is usually concentrated in the range between 0% and 5%. A 0% Tax Cost Ratio indicates the fund had no taxable distributions. A higher Tax Cost Ratio indicates the fund was less tax efficient.

Performance measures include conventional Return, Risk, and Risk-Adjusted Return measures as suggested by Bodie, Kane and Marcus (2007). Annual Average Returns are measured by mutual funds' net asset value (NAV) returns and ETFs' market returns. Return Percentile Rank in Category represents the percentile rank the fund's return had in its Morningstar category over the designated time frame. Returns are ranked from highest to lowest, with the best return having a 1% ranking and the worst a 100% ranking. These relative figures are a good way to locate funds that out- or underperformed their peers during a certain time period.

Standard Deviation (a statistical measurement of dispersion about an average) depicts how widely a fund's returns varied over a certain period of time. Investors use the Standard Deviation of historical performance to predict the range of returns most likely for a given fund. When a fund has a high Standard Deviation, the predicted range of performance is wide, implying greater volatility. Morningstar computes the Standard Deviation by using the trailing monthly total returns for the appropriate time period. All monthly Standard Deviations are then annualized. Standard Deviation is also a component in the Sharpe Ratio, a risk-adjusted return measure developed by Nobel Laureate William Sharpe. The Sharpe Ratio is calculated by using both the Standard Deviation and excess return to determine reward per unit of risk. The higher the Sharpe Ratio, the better the fund's historical risk-adjusted return performance. The Sharpe Ratio over a three-year period is calculated for the past 36-month period dividing a fund's annualized excess returns over the risk-free rate by its annualized Standard Deviation. It is recalculated by Morningstar on a monthly basis.

Two statistics from modern portfolio theory are also used to shed some light on funds' market risks and market-risk-adjusted returns. While Standard Deviation is a measure of a fund's absolute volatility, Beta is a measure of a fund's sensitivity to market movements. Morningstar calculates beta by comparing a fund's excess return over Treasury bills to the market's excess return over Treasury bills, so a beta of 1.10 shows that the fund has performed 10% better than its benchmark index in up markets and 10% worse in down markets, assuming all other factors remain constant. A low beta signifies only that the fund's market-related risk is low. Beta is particularly appropriate when used to measure the risk of a combined portfolio of mutual funds. Alpha is a measure of the difference between a fund's actual returns and its

expected performance, given its level of risk as measured by Beta. A positive Alpha figure indicates the fund has performed better than its Beta would predict. In contrast, a negative Alpha indicates the fund's underperformance, given the expectations established by the fund's Beta. For example, the Alpha of 0.86 indicates that the fund produced a return 0.86% higher than its Beta would predict.

#### **IV. Results**

Results of Expense Ratios, Annual Turnover Rates and Three-Year Tax Cost Ratios are tabulated in Table 2. Both IMFs and ETFs, compared with AMFs, appear to have lower Expense Ratios, lower Turnover Rates, and inconclusive Tax Cost Ratios. Vanguard's 3 IMFs exhibit lower Tax Cost Ratios (1.85% vs. 2.58%) while Wells' 4 IMFs exhibit higher Tax Cost Ratios than those of AMFs. ETFs, compared with IMFs, appear to have lower Expense Ratios (0.30% vs. 0.89%), lower Turnover Rates (15.50% vs. 21.50%), and lower Tax Cost Ratios (1.66% vs. 2.79%). Vanguard's ETF, compared with average of Vanguard's IMFs, exhibits lower Expense Ratios (0.10% vs. 0.12%), same Turnover Rates (32.00%), and lower Tax Cost Ratios (1.77% vs. 1.85%).

Average Annual Returns are shown in Table 3. During the ten-year period from April 1999 to March 2009, IMFs appear to display lower Returns (2.76% vs. 3.38%) than AMFs. Nevertheless, Vanguard's 4 IMFs exhibit higher Returns (3.58% vs. 3.38%) while Wells' 4 IMFs exhibit lower Returns than category average. During the five-year period from April 2004 to March 2009, ETFs appear to display inconclusive Returns when compared with category average. ETFs, compared with IMFs, appear to have lower Returns over the past five years. Vanguard's ETF, compared with average of Vanguard's IMFs, exhibits slightly higher Returns (-25.01% vs. -25.04%) during the past three years.

Results of Return Percentile Rank in Category are similar, as shown in Table 4. During the ten-year period from April 1999 to March 2009, IMFs appear to display worse Return Percentile Rank in Category (63.63%) than category average (50.00%). Nonetheless, Vanguard's 4 IMFs, throughout the ten-year period, consistently exhibit better Return Percentile Rank in Category than category averages, while Wells' 4 IMFs exhibit worse Return Percentile Rank in Category than category averages.

Standard Deviations are tabulated in Table 5. Throughout the ten-year period from April 1999 to March 2009, IMFs appear to show higher Standard Deviations (22.41% vs. 21.90%) than category average. During the five-year period from April 2004 to March 2009, ETFs appear to display inconclusive Standard Deviations compared with category averages. ETFs, compared with IMFs, exhibit lower Standard Deviations (33.21% vs. 33.65%) over the three years, but higher Standard Deviations (29.08% vs. 29.05%) over the three five years. Vanguard's ETF, compared with average of Vanguard's IMFs, exhibits slightly lower Standard Deviations (33.14% vs. 33.16%) during the past three years.

Results of Sharpe Ratios are shown in Table 6. Throughout the five-year period from April 2004 to March 2009, IMFs appear to show higher Sharpe Ratios (-0.30% vs. -0.32%) than category average. Furthermore, Vanguard's 4 IMFs exhibit higher Sharpe Ratios (0.14% vs. 0.12%) while Wells' 4 IMFs exhibit lower Sharpe Ratios than category average. During the five-year period from April 2004 to March 2009, ETFs appear to display inconclusive Sharpe

Ratios compared with category averages. ETFs, compared with IMFs, exhibit lower Sharpe Ratios (-0.84% vs. -0.80%) over the three years, and the same Sharpe Ratios (-0.30%) over the three five years. Vanguard's ETF, compared with average of Vanguard's IMFs, exhibits the same Sharpe Ratios (-0.78%) over the past three years.

Results of Betas and Alphas are tabulated in Table 7. During the past three years, IMFs appear to show higher Betas (1.50 vs. 1.47) and higher Alphas (-3.44% vs. -4.26%) than category averages. During the same three-year period, EIFs exhibit higher Betas (1.52 vs. 1.47) and inconclusive Alphas than category averages. ETFs, compared with IMFs, exhibit higher Betas (1.52 vs. 1.50) and lower Alphas (-3.71% vs. -3.44%). Vanguard's ETF, compared with average of Vanguard's IMFs, exhibits the same Betas (1.48) and higher Alphas (-2.53% vs. -2.62%) over the past three years.

## **V. Conclusion**

The authors of this study find real estate index mutual funds and exchange-traded funds exhibit lower Expense Ratios, lower Turnover Rates, and mostly lower Tax Cost Ratios than category averages. Vanguard's four index mutual funds over the past ten years and its exchange-traded fund over the past three years have outperformed their counterpart category averages with higher Returns, higher Risks, and higher Risk-Adjusted Returns. On the contrary, Wells' four index mutual funds over the past ten years have underperformed their counterpart category averages with lower Returns, higher Risks, and mostly lower Risk-Adjusted Returns.

As newcomers, real estate exchange-traded funds have had a good start, with the lowest Expense Ratios, lowest Turnover Rates, and lowest Tax Cost Ratios. Four ETFs with at least three-year track record, however, have collectively underperformed index mutual funds over the past five with lower Returns, mostly higher Risks, and mostly lower Risk-Adjusted Returns. Nonetheless, Vanguard's ETF has been able to mostly outperform Vanguard's index mutual funds with higher Returns, lower (or same) Risks, and higher (or same) Risk-Adjusted Returns since its inception.

**Table I. Numbers and Names of Available Real Estate Index Funds as of March 31, 2009**

Fund Type	Fund Name	With 3-Year Data	With 5-Year Data	With 10-Year Data
Real Estate Mutual Funds		229	200	87
Index Mutual Funds	Vanguard REIT Index	Yes	Yes	Yes
Index Mutual Funds	Vanguard REIT Index Adm	Yes	Yes	Yes
Index Mutual Funds	Vanguard REIT Index Inst	Yes	Yes	Yes
Index Mutual Funds	Vanguard REIT Index Signl	Yes	Yes	Yes
Index Mutual Funds	Wells DJ Wil U.S. REIT In A	Yes	Yes	Yes
Index Mutual Funds	Wells DJ Wil U.S. REIT In B	Yes	Yes	Yes
Index Mutual Funds	Wells DJ Wil U.S. REIT In C	Yes	Yes	Yes
Index Mutual Funds	Wells DJ Wil U.S. REIT In I	Yes	Yes	Yes
Exchange-Traded Funds	iShares C&S Realty	Yes	Yes	
Exchange-Traded Funds	iShares DJ RE Index	Yes	Yes	
Exchange-Traded Funds	SPDR DJ Wilshire REIT	Yes	Yes	
Exchange-Traded Funds	Vanguard REIT Index ETF	Yes		

**Table II. Expense Ratio (%), Annual Turnover (%) and Three-Year Tax Cost Ratio (%)**

A. Index Mutual Funds vs. Category Average						
Fund Name	Expense Ratio		Annual Turnover		Tax Cost Ratio	
	IMF	AMFs	IMF	AMFs	IMF	AMFs
Vanguard REIT Index	0.20	1.48	32.00	110.00	1.83	2.58
Vanguard REIT Index Adm	0.10	1.48	32.00	110.00	1.85	2.58
Vanguard REIT Index Inst	0.09	1.48	32.00	110.00	1.87	2.58
Vanguard REIT Index Signl	0.10	1.48	32.00	110.00		
Wells DJ Wil U.S. REIT In A	1.14	1.48	11.00	110.00	3.63	2.58
Wells DJ Wil U.S. REIT In B	1.89	1.48	11.00	110.00	3.35	2.58
Wells DJ Wil U.S. REIT In C	1.90	1.48	11.00	110.00	3.30	2.58
Wells DJ Wil U.S. REIT In I	1.69	1.48	11.00	110.00	3.71	2.58
Average of Vanguard Funds	0.12	1.48	32.00	110.00	1.85	2.58
T-test (probability)	0.00001***		0.00000***		0.00013***	
Average of All Funds	0.89	1.48	21.50	110.00	2.79	2.58
T-test (probability)	0.04529**		0.00000***		0.27691	
B. Exchange-Traded Funds vs. Category Average						
Fund Name	Expense Ratio		Annual Turnover		Tax Cost Ratio	
	ETF	AMFs	ETF	AMFs	ETF	AMFs
iShares C&S Realty	0.35	1.48	9.00	110.00	1.54	2.58
iShares DJ RE Index	0.48	1.48	7.00	110.00	1.75	2.58
SPDR DJ Wilshire REIT	0.25	1.48	14.00	110.00	1.57	2.58
Vanguard REIT Index ETF	0.10	1.48	32.00	110.00	1.77	2.58
Average	0.30	1.48	15.50	110.00	1.66	2.58
T-test (probability)	0.00034***		0.00024***		0.00029***	

IMF: Index Mutual Fund      ETF: Exchange-Traded Fund      AMFs: Average of All Mutual Funds  
 \*\*\*, \*\*, \*: Significant at the 0.01, 0.05, 0.10 level

**Table III. Average Annual Return (%)**

A. Index Mutual Funds vs. Category Average						
Fund Name	3-Year		5-Year		10-Year	
	IMF	AMFs	IMF	AMFs	IMF	AMFs
Vanguard REIT Index	-25.09	-26.12	-8.78	-9.73	3.54	3.38
Vanguard REIT Index Adm	-25.02	-26.12	-8.70	-9.73	3.60	3.38
Vanguard REIT Index Inst	-25.00	-26.12	-8.68	-9.73	3.61	3.38
Vanguard REIT Index Signl	-25.04	-26.12	-8.74	-9.73	3.56	3.38
Wells DJ Wil U.S. REIT In A	-26.77	-26.12	-10.39	-9.73	2.29	3.38
Wells DJ Wil U.S. REIT In B	-27.35	-26.12	-11.09	-9.73	1.51	3.38
Wells DJ Wil U.S. REIT In C	-27.32	-26.12	-11.07	-9.73	1.53	3.38
Wells DJ Wil U.S. REIT In I	-26.59	-26.12	-10.17	-9.73	2.42	3.38
Average of Vanguard Funds	-25.04	-26.12	-8.73	-9.73	3.58	3.38
T-test (probability)	0.00001***		0.00001***		0.00063***	
Average of All Funds	-26.02	-26.12	-9.70	-9.73	2.76	3.38
T-test (probability)	0.40317		0.47255		0.05049*	
B. Exchange-Traded Funds vs. Category Average						
Fund Name	3-Year		5-Year		10-Year	
	ETF	AMFs	ETF	AMFs	ETF	AMFs
iShares C&S Realty	-28.15	-26.12	-10.13	-9.73		
iShares DJ RE Index	-26.13	-26.12	-10.02	-9.73		
SPDR DJ Wilshire REIT	-26.90	-26.12	-9.39	-9.73		
Vanguard REIT Index ETF	-25.01	-26.12				
Average	-26.55	-26.12	-9.85	-9.73		
T-test (probability)	0.28171		0.33154			

IMF: Index Mutual Fund      ETF: Exchange-Traded Fund      AMFs: Average of All Mutual Funds  
 \*\*\*, \*\*, \*: Significant at the 0.01, 0.05, 0.10 level

**Table IV. Return Percentile Rank in Category**

Fund Name	3-Year		5-Year		10-Year	
	IMF	AMFs	IMF	AMFs	IMF	AMFs
Vanguard REIT Index	43.00	50.00	48.00	50.00	45.00	50.00
Vanguard REIT Index Adm	41.00	50.00	46.00	50.00	44.00	50.00
Vanguard REIT Index Inst	40.00	50.00	45.00	50.00	42.00	50.00
Vanguard REIT Index Signl	41.00	50.00	47.00	50.00	44.00	50.00
Wells DJ Wil U.S. REIT In A	67.00	50.00	72.00	50.00	79.00	50.00
Wells DJ Wil U.S. REIT In B	74.00	50.00	78.00	50.00	88.00	50.00
Wells DJ Wil U.S. REIT In C	74.00	50.00	78.00	50.00	88.00	50.00
Wells DJ Wil U.S. REIT In I	65.00	50.00	69.00	50.00	79.00	50.00
Average of Vanguard Funds	41.25	50.00	46.50	50.00	43.75	50.00
T-test (probability)	0.00040***		0.00615***		0.00109***	
Average of All Funds	55.63	50.00	60.38	50.00	63.63	50.00
T-test (probability)	0.17221		0.04694**		0.05832*	

IMF: Index Mutual Fund      AMFs: Average of All Mutual Funds  
 \*\*\*, \*\*, \*: Significant at the 0.01, 0.05, 0.10 level

**Table V. Standard Deviation (%)**

A. Index Mutual Funds vs. Category Average						
Fund Name	3-Year		5-Year		10-Year	
	IMF	AMFs	IMF	AMFs	IMF	AMFs
Vanguard REIT Index	33.19	32.50	28.71	28.13	22.16	21.90
Vanguard REIT Index Adm	33.16	32.50	28.68	28.13	22.14	21.90
Vanguard REIT Index Inst	33.15	32.50	28.69	28.13	22.14	21.90
Vanguard REIT Index Signl	33.15	32.50	28.68	28.13	22.14	21.90
Wells DJ Wil U.S. REIT In A	34.21	32.50	29.46	28.13	22.70	21.90
Wells DJ Wil U.S. REIT In B	34.14	32.50	29.42	28.13	22.66	21.90
Wells DJ Wil U.S. REIT In C	34.12	32.50	29.40	28.13	22.66	21.90
Wells DJ Wil U.S. REIT In I	34.10	32.50	29.39	28.13	22.65	21.90
Average of Vanguard Funds	33.16	32.50	28.69	28.13	22.15	21.90
T-test (probability)	0.0000***		0.0000***		0.00001***	
Average of All Funds	33.65	32.50	29.05	28.13	22.41	21.90
T-test (probability)	0.00022***		0.00014***		0.00069***	
B. Exchange-Traded Funds vs. Category Average						
Fund Name	3-Year		5-Year		10-Year	
	ETF	AMFs	ETF	AMFs	ETF	AMFs
iShares C&S Realty	34.66	32.50	30.14	28.13		
iShares DJ RE Index	31.72	32.50	27.89	28.13		
SPDR DJ Wilshire REIT	33.31	32.50	29.20	28.13		
Vanguard REIT Index ETF	33.14	32.50				
Average	33.21	32.50	29.08	28.13		
T-test (probability)	0.16208		0.14194			

IMF: Index Mutual Fund      ETF: Exchange-Traded Fund      AMFs: Average of All Mutual Funds  
 \*\*\*, \*\*, \*: Significant at the 0.01, 0.05, 0.10 level

**Table VI. Sharpe Ratio**

A. Index Mutual Funds vs. Category Average						
Fund Name	3-Year		5-Year		10-Year	
	IMF	AMFs	IMF	AMFs	IMF	AMFs
Vanguard REIT Index	-0.78	-0.84	-0.27	-0.32	0.13	0.12
Vanguard REIT Index Adm	-0.78	-0.84	-0.27	-0.32	0.14	0.12
Vanguard REIT Index Inst	-0.78	-0.84	-0.27	-0.32	0.14	0.12
Vanguard REIT Index Signl	-0.78	-0.84	-0.27	-0.32	0.14	0.12
Wells DJ Wil U.S. REIT In A	-0.81	-0.84	-0.32	-0.32	0.08	0.12
Wells DJ Wil U.S. REIT In B	-0.84	-0.84	-0.34	-0.32	0.05	0.12
Wells DJ Wil U.S. REIT In C	-0.84	-0.84	-0.34	-0.32	0.05	0.12
Wells DJ Wil U.S. REIT In I	-0.81	-0.84	-0.31	-0.32	0.09	0.12
Average of Vanguard Funds	-0.78	-0.84	-0.27	-0.32	0.14	0.12
T-test (probability)	0.0000***		0.0000***		0.00299***	
Average of All Funds	-0.80	-0.84	-0.30	-0.32	0.10	0.12
T-test (probability)	0.00263***		0.05239*		0.12743	
B. Exchange-Traded Funds vs. Category Average						
Fund Name	3-Year		5-Year		10-Year	
	ETF	AMFs	ETF	AMFs	ETF	AMFs
iShares C&S Realty	-0.85	-0.84	-0.29	-0.32		
iShares DJ RE Index	-0.88	-0.84	-0.34	-0.32		
SPDR DJ Wilshire REIT	-0.85	-0.84	-0.28	-0.32		
Vanguard REIT Index ETF	-0.78	-0.84				
Average	-0.84	-0.84	-0.30	-0.32		
T-test (probability)	0.50000		0.23197			

IMF: Index Mutual Fund      ETF: Exchange-Traded Fund      AMFs: Average of All Mutual Funds  
 \*\*\*, \*\*, \*: Significant at the 0.01, 0.05, 0.10 level

**Table VII. Three-Year Betas and Alphas (%)**

A. Index Mutual Funds vs. Category Average				
Fund Name	Beta		Alpha	
	IMF	AMFs	IMF	AMFs
Vanguard REIT Index	1.48	1.47	-2.67	-4.26
Vanguard REIT Index Adm	1.48	1.47	-2.59	-4.26
Vanguard REIT Index Inst	1.48	1.47	-2.59	-4.26
Vanguard REIT Index Signl	1.48	1.47	-2.63	-4.26
Wells DJ Wil U.S. REIT In A	1.52	1.47	-3.84	-4.26
Wells DJ Wil U.S. REIT In B	1.52	1.47	-4.71	-4.26
Wells DJ Wil U.S. REIT In C	1.52	1.47	-4.74	-4.26
Wells DJ Wil U.S. REIT In I	1.52	1.47	-3.73	-4.26
Average of Vanguard Funds	1.48	1.47	-2.62	-4.26
T-test (probability)	0.00000***		0.00000***	
Average of All Funds	1.50	1.47	-3.44	-4.26
T-test (probability)	0.00270***		0.02161**	
B. Exchange-Traded Funds vs. Category Average				
Fund Name	Beta		Alpha	
	ETF	AMFs	ETF	AMFs
iShares C&S Realty	1.59	1.47	-3.89	-4.26
iShares DJ RE Index	1.48	1.47	-4.32	-4.26
SPDR DJ Wilshire REIT	1.52	1.47	-4.08	-4.26
Vanguard REIT Index ETF	1.48	1.47	-2.53	-4.26
Average	1.52	1.47	-3.71	-4.26
T-test (probability)	0.08224*		0.13037	

IMF: Index Mutual Fund      ETF: Exchange-Traded Fund      AMFs: Average of All Mutual Funds  
 \*\*\*, \*\*, \*: Significant at the 0.01, 0.05, 0.10 level

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