

Abstract

In an age of increasing scrutiny surrounding risk and return, the use of various investment vehicles to achieve diversification and manage the trade-off between risk and return has become ubiquitous throughout the investment decision making process. In particular, the use of real estate investments within the context of diversification and modern portfolio theory has garnered a great deal of attention since the housing crisis during the 2007-2009 timeframe. The purpose of this paper is to provide an analysis of real estate investments, specifically REIT stocks, and evaluate the impact of real estate on an investor's portfolio. Using three equity stocks and three REIT stocks, this paper provides an analysis of each stock's average annual return, standard deviation, correlation, beta, and portfolio impacts across three time horizons, 1) Pre-Housing Crisis (January 2002 – June 2007, 2) House Crisis (July 2007 – August 2009), and 3) Post-Housing Crisis (September 2009 – November 2014). In turn, this analysis indicates real estate not only increases diversification within a portfolio, but enables an investor to more effectively manage risks and returns through the use of different investment vehicles.

Security Selection

The equity and REIT stocks selected for this analysis were Apple, Inc. (NasdaqGS: AAPL), EOG Resources (NYSE: EOG), Costco Wholesale Corporation (NasdaqGS: COST), PS Business Park (NYSE: PSB), W.P. Carey, Inc. (NYSE: WPC), and Vornado Realty Trust (NYSE: VNO).

Equity Stocks

The equity stocks are classified as blue chip stocks, which are highly established, well-recognized, and financially sound companies. AAPL is classified as a mega cap stock (market cap is in excess of \$200B), and EOG and COST are classified as large cap stocks (market cap is between \$10B and \$200B). These equity stocks were selected in order to provide a more accurate comparison between publicly traded equities and REITs, which would have been difficult to obtain if small cap or less established stocks were used. A description of each equity stock is provided below.

Apple, Inc.

AAPL is a multi-national corporation, led by CEO Tim Cook, which was founded in 1977 and is headquartered in Cupertino, California. AAPL designs, manufactures, and markets mobile communication and media devices, personal computers, and portable digital music players worldwide (SEC 10-k Filing, *Apple, Inc. FY14 Annual Report*). Moreover, the company sells a variety of related software, services, accessories, networking solutions, and third party digital content and applications (SEC 10-k Filing, *Apple, Inc. FY14 Annual Report*). AAPL is part of the technology industry and the electronic equipment sector.

AAPL maintains a significant portion of market share within the electronic equipment sector and boasts strong sales growth over the last three years of 16.8%. The company has maintained a relatively stable net and operating profit over the last three years as well as margin compression due to its growth and expansion via acquisitions, increases in capital expenditures, and increases in operating expenses in portion to and sales growth. As of

, 30/2014, AAPL's Forward P/E Ratio is 13.98, P/S is 3.96, P/B is 6.26, and dividend yield is .60%.

EOG Resources

EOG was founded in 1985 and is headquartered in Houston, Texas. EOG is one of the top independent oil and gas companies in the world, and takes pride in its ability to explore for, develop, produce, and market crude oil and natural gas (SEC 10-k Filing, *EOG Resources FY13 Annual Report*). In turn, EOG is considered to be a major player within the oil and gas industry. Regarding the industry itself, the oil and gas industry is comprised of the "up-stream" component, "mid-stream" component, and "downstream" component, and EOG is classified as an upstream company within the industry. Upstream refers to companies that are vital to the process of extracting crude oil and natural gas from shale plays using techniques such as hydraulic fracturing. In contrast, a downstream company would be a provider of natural gas and crude oil such as Chevron (CVX), Exxon Mobile Corporation (XOM), Valero Energy Corporation (VLO), and Marathon Petroleum Corporation (MPC). EOG is unique to the oil and gas industry because it is one of only a hand full of companies that has enhanced its operations via backward integration. As a result, EOG's supply chain and operational capabilities provide the firm with significant differentiators across the oil and gas landscape.

EOG is a very capital intensive business; therefore, PP&E and capital expenditures are critical to the growth of the business, among other items. Over the last three years, EOG's return on assets has increased from 4.4% to 7.2%. Moreover, the firm's return on PP&E has increased from 5.1% to 8.4%. EOG also continues to drive increasing profitability margins via reductions in operational expenditures while increasing sales. Over the last three years, EOG increased sales by 42% and net income by 101%. In terms of EOG's common stock, as of 11/30/2014, EOG's Forward P/E is 17.73, P/S is 3.05, P/B is 2.91, and dividend yield is 0.70%.

Costco Wholesale Corporation

COST is multi-national corporation, led by Craig Jelinek, which was founded 1976 and is headquartered in Issaquah, Washington. Moreover, COST is a wholesale business with a discount store strategy that operates within the consumer goods industry, and focuses on offering a wide-variety of brand label and private label products and services via membership warehouses (Yahoo Finance, *Costco Business Summary*). Specifically, COST provides products and services such as dry and institutionally packaged foods, alcoholic and non-alcoholic beverages, cleaning and institutional office supplies, appliances, electronics, health care and beauty items, hardware, garden and patio supplies, home furnishings, meat and deli items, gas stations, food courts, pharmacies, optical and jewelry supplies, and photo processing centers (Yahoo Finance, *Costco Business Summary*). COST's business model focuses on customer loyalty and delivering a "one-stop-shop" type of shopping experience. COST prides itself on providing top tier products and services at competitive prices via no-frill, self-service warehouses. Furthermore, COST differs from other retailers and wholesalers such as Walmart (WMT), Macy's, Inc. (M), or Target (TGT) because it obtains and provides items in bulk packaging and centers its strategic efforts on enhancing the value and cost savings passed through to customers.

In contrast to EOG, COST is less capital intensive; however, reinvestment in capital expenditures has become apparent over the last few years as COST continues to expand its footprint domestically and internationally. In turn, working capital is one of the primary indicator of COST's financial health and positioning due to the nature its business. Over the last years, COST's inventory turnover has decreased from 12.64 to 12.04, accounts receivable turnover has decreased from 99.39 to 95.86, and accounts payable turnover has decreased from 8.58 to 8.30. Typically, a reduction in these ratios would indicate difficulties for the firm; however, given the company's current state of expansion they should be monitored in order to determine their impacts on sales and profitability. Over the last three years, COST's sales have increased 13.6% while gross profit margins have also increased from 12.4% to 12.6%. Additionally, net income has increased during the same time frame by 20.4% while net profit margins have remained relatively stable around 1.8%. In terms of COST's common stock, as of 11/30/2014, COST's Forward P/E is 24.89, P/S is 0.54, P/B is 4.97, and dividend yield is 1.00%.

REIT Stocks

Similar to the equity stocks, the REIT stocks used for this analysis are well established and financially sound REITs. The market cap of VNO is approximately \$21B while the market caps of WPC and PSB are \$7B and \$2B, respectively. Descriptions of each REIT and a highlight of their financial positions are provided below.

PS Business Park

PSB, formerly Public Storage Properties XI, Inc. until its name change in 1998, was founded in 1983 and is based in Glendale California (SEC 10-k Filing, *PS Business Park FY13 Annual Report*). The REIT focuses on the acquisition, development, ownership, and operation of commercial properties (SEC 10-k Filing, *PS Business Park FY13 Annual Report*). The trust owns and develops commercial real estate properties throughout the United States. Specifically, the REIT focuses on multi-tenant flex, office, and industrial parks in Arizona, California, Florida, Maryland, Oregon, Texas, Virginia, and Washington (SEC 10-k Filing, *PS Business Park FY13 Annual Report*).

The REIT's funds from operations (FFO) increased over the last four years by 33.29% from \$124,420M to \$165,845M (SEC 10-k Filing, *PS Business Park FY13 Annual Report*). Additionally, PSB's adjusted funds from operations (AFFO) increased over the last four years by 21.0% from \$131,748M to \$159,410M (SEC 10-k Filing, *PS Business Park FY13 Annual Report*). As a result, PSB continues to increase its residual cash flow to investors and provides a strong capacity for dividend payouts. Moreover, sales and net income have increased over the last three years by 20.77% and 13.16%. In term of PSB's stock, as of 11/30/2014, the Forward P/E is 16.75, P/S is 5.79, P/B is 3.04, and dividend yield is 2.50%.

W.P. Carey, Inc.

WPC, led by CEO Trevor Bond, was founded in 1973 and is headquartered in New York, NY (SEC 10-k Filing, *W.P. Carey, Inc. FY13 Annual Report*). WPC is a leading global owner and manager of commercial real estate properties net leased to companies on a long-term basis (SEC 10-k Filing, *W.P. Carey, Inc. FY13 Annual Report*). Additionally, WPC acts an advisor to a series of income-oriented and non-traded REITs, and manages over 1,000 properties in 21

countries. WPC primarily focuses on industrial, warehouse, distribution, office, and retail facilities, which are net leased to companies (SEC 10-k Filing, *W.P. Carey, Inc. FY13 Annual Report*). Some contracts are structured in the form of sales-leaseback transactions in order to provide corporate tenants with favorable financing terms.

WPC's FFO increased over the last three years by 6.19% from \$182,662M to \$193,966M, and AFFO increased by 55.76% from \$188,853 to \$294,151 (SEC 10-k Filing, *W.P. Carey, Inc. FY13 Annual Report*). WPC has also experienced an increasing sales trend over the last three years of 58.16%; however, net income has experienced significant volatility due to increases in interest expense from substantial leverage incurred by the company as well as increases in operating expenses. Net income decreased by 55.33% from 2011 to 2012 then subsequently increased by 59.14% from 2012 to 2013. Given the substantial leverage in 2012 and 2013 as well as the significant influx of capital expenditures, it is evident that WPC is seeking to pursue additional commercial real estate projects and ventures in order to maximize residual cash flow for investors. In term of WPC's stock, as of 11/30/2014, the Forward P/E is 37.86, P/S is 10.04, P/B is 1.83, and dividend yield is 5.50%.

Vornado Realty Trust

VNO, led by Steven Roth, has over 4,000 employees and is headquartered in New York, NY. The REIT invests in a broad range of commercial real estate throughout the United States (SEC 10-k Filing, *Vornado Realty Trust FY13 Annual Report*). Specifically, VNO owns, develops, and manages office buildings, sizeable residential properties, retail properties, hotels, and regional malls. VNO predominantly owns office buildings and corporate locations that are leased to tenants such as Google (SEC 10-k Filing, *Vornado Realty Trust FY13 Annual Report*). VNO also engages in the issuance of mortgage and mezzanine loans for real estate (SEC 10-k Filing, *Vornado Realty Trust FY13 Annual Report*).

VNO's FFO decreased over the last three years by 42.70% from \$1,265.1M to \$724.9M, which indicates decreasing cash generated by the REIT's operations (SEC 10-k Filing, *Vornado Realty Trust FY13 Annual Report*). VNO's sales have remained relatively constant for the last few years around \$2.7B while net profit has declined by 28.13% from 2011 to 2013. One particular reason for lackluster metrics over the last few years can be attributed to the increasing cost of revenue for VNO. Over the last three years, cost of revenue has increased 7.13% from 2011 to 2013 while sales have only increased 2.15%. Additionally, increases in VNO's operations appear to be providing some strain for the firm in the midst of its growth. VNO has remained a highly reputable firm and remains market perform to buy recommendation by analysts; however, it will be important for investors to monitor the business as it moves through some of its dispositions, acquisitions, and financings. In term of VNO's stock, as of 11/30/2014, the Forward P/E is 21.25, P/S is 8.17, P/B is 3.98, and dividend yield is 2.60%.

Average Annual Return Analysis

The average annual return is one of several indicators used to analyze an investment over a specified period of time. In order to evaluate the equity and REIT stocks selected, monthly historical stock prices were obtained from 2002 – 2014, and the annual returns were calculated for each stock. Once the annual returns were calculated for each month, an average

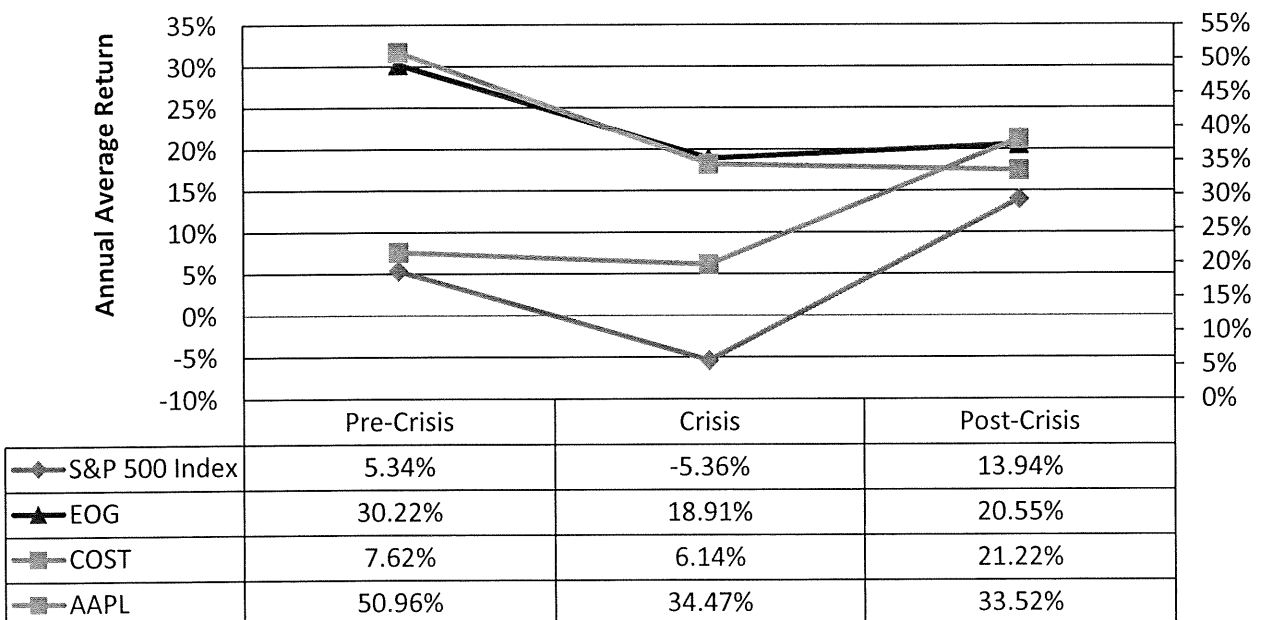
of the annual returns was calculated for each stock across the pre-housing crisis, housing crisis, post-housing crisis time horizons as well as the overall time horizon. The average annual returns for each stock are provided in table 1.

Table 1: Annual Average Returns of Equity and REIT Stocks

Class	Stock	Pre-Crisis	Crisis	Post-Crisis	Overall
REIT	PSB	14.05%	11.28%	13.73%	13.05%
	WPC	12.63%	10.04%	25.02%	16.91%
	VNO	23.63%	8.95%	16.22%	16.05%
Equity	AAPL	50.96%	34.47%	33.52%	40.21%
	EOG	30.22%	18.91%	20.55%	24.66%
	COST	7.62%	6.14%	21.22%	12.05%
Market	S&P 500	5.34%	-5.36%	13.94%	5.85%

Based on the returns presented in table 1, AAPL and EOG have the highest annual average returns followed by the REIT stocks and COST. Interestingly, both the REIT and equity stocks outperformed the market, which was 5.85%, over the 12 year duration. Upon analyzing each time segment, there is an apparent decline in average annual returns during the housing crisis and economic recession; however, the two equity stocks with the highest returns, AAPL and EOG, and the REIT stock with the highest average annual return, VNO, appear to be the most affected by the crisis. The other two REIT stocks, WPC and PSB, are impacted by the crisis, but not to the same extent as AAPL, EOG, and VNO. WPC and PSB may not have been impacted to the same extent as VNO because WPC and PSB appear to be more diversified from a property perspective and they don't have residential holdings like VNO.

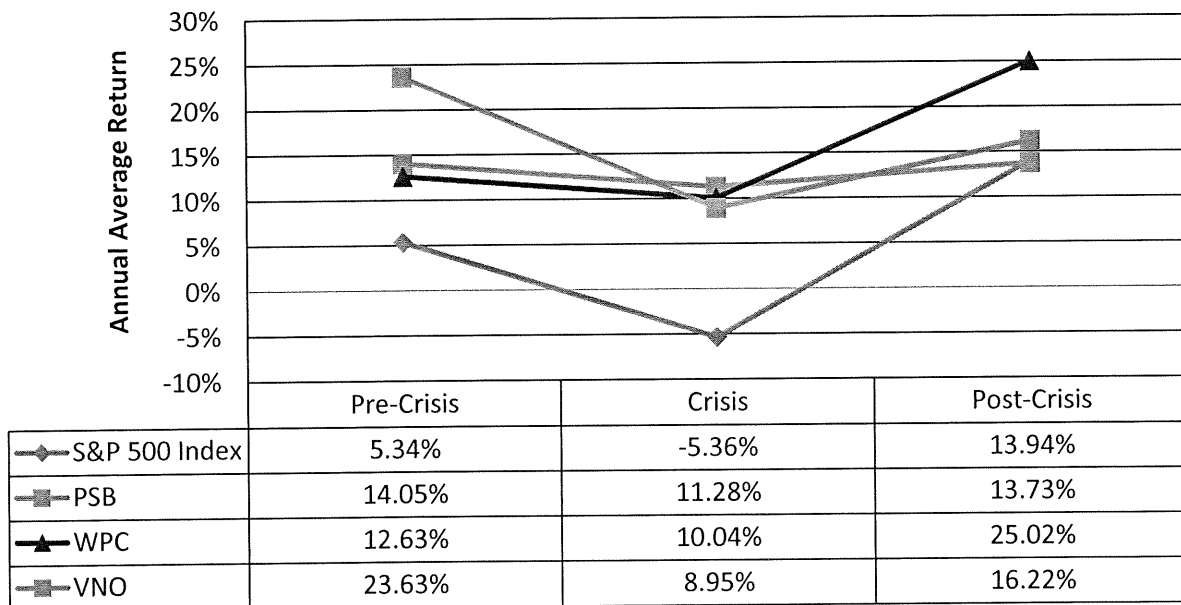
Chart 1: Equity Stock Average Returns by Time Horizon, Jan 2002 - Nov 2014



The other equity stock, COST, appears to be rather unscathed from the crisis. One reason is COST appeals to consumers seeking to save money and reduce personal expenditures; therefore, during a period of economic downturn it is anticipated that a business such as COST may not be impacted as much as other firms. Consumers with less disposable income and economic conditions that increase the price elasticity of products and services invariably place downward pressure on the buying power of the dollar and force consumers toward discount stores such as COST. In turn, AAPL and EOG are more affected than COST due to the elasticity of consumer products, crude oil, and natural gas.

As previously mentioned, each stock was impacted in a different way by the housing crisis. Likewise, each stock rebounded from the housing crisis differently. Charts 1 and 2 provide a visual depiction of the annual average returns of the equity and REIT stocks, and provide a basis for analyzing the trends for each set of returns. Upon analyzing the equity stocks, COST emerged from the housing crisis with better growth than AAPL and EOG. COST's successful growth in average annual returns is contributed to a combination of economic conditions and firm growth. Monetary policy has enabled interest rates to remain low, which subsequently enables debt to be more attractive for companies because they can finance growth using cheap debt. In turn, COST has taken advantage of favorable interest rates and continued to expand its presence domestically and internationally. Moreover, COST's strategy and business model, which focuses on customer loyalty and discount products, has enabled the firm to continue to take advantage of low employment rates and price conscious consumers.

Chart 2: REIT Stock Average Returns by Time Horizon, Jan 2002 - Nov 2014



EOG, on the other hand, appears to have recovered to some degree; however, the fluctuations in the price of crude oil and natural gas have added another layer to EOG's challenges in its recover process. Additionally, EOG has faced economic pressures from a global perspective. Specifically, government regulations and legislation, relations with OPEC, and global price volatility related to barrels of crude oil and natural gas have limited its recovery.

Similarly, AAPL’s annual average returns have remained stable since the housing crisis. Two major contributing factors to AAPL’s lack of increase in average annual returns are increasing industry competition and change in management (i.e. the replacement of Steve Jobs and creative stagnation at AAPL). Despite significant rebounds from these stocks, the average annual returns still remain higher than the REIT stocks.

Regarding the recovery of REIT stocks, WPC has achieved the highest average annual returns post-crisis as compared to its average annual returns during the pre-crisis and crisis time periods. As indicated in Chart 2, WPC experiences a slight decline during the housing crisis time period, but subsequently doubles its average annual returns during the post-crisis period. One of the reasons WPC has been able to achieve strong returns post-crisis is related to the REITs global diversification in commercial properties. In contrast to WPC, PSB and VNO are focused on the U.S. real estate market; however, PSB has greater commercial real estate diversification within the U.S. market than VNO, which has enabled PSB to maintain relatively consistent returns during the pre-crisis, crisis, and post-crisis time periods. Additionally, VNO has substantial residential holdings that led to a steeper decline during the crisis time horizon than PSB and WPC. As a result, the average annual returns of VNO have been impacted by the housing crisis to a greater degree than WPC and PSB. Consequently, VNO has experienced a significant recovery from the crisis period to the post-crisis period due to the Federal Reserve’s monetary policies related to quantitative easing and low interest rates, the implementation of financial regulations such as Dodd-Frank, increasing manufacturing and industrial production, declining unemployment, and rising housing starts. In particular, according to the U.S. Census Bureau, housing starts, housing completions, and building permits have increased each year since 2010, which has enabled VNO to experience strong recovery during the post-crisis time frame.

Standard Deviation Analysis

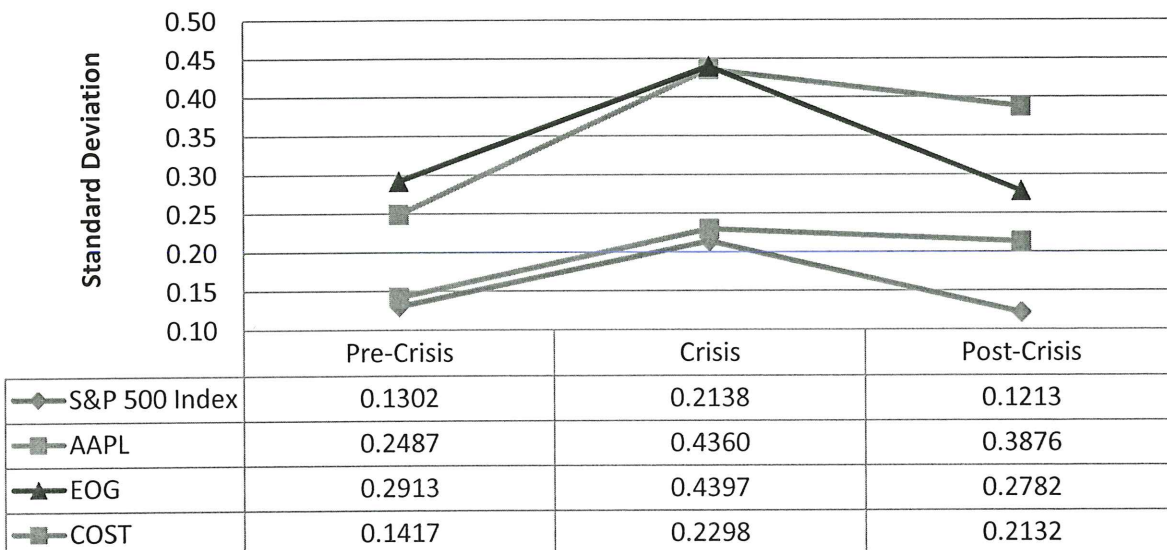
In addition to the average annual return, the standard deviation is another indicator employed to analyze the performance and characteristics of each security. Specifically, the standard deviation is a useful measure to understand the risk associated with investing in a specific investment vehicle. Similar to the average annual returns, the standard deviations of each REIT and equity stock were calculated for each time horizon (pre-crisis, crisis, and post-crisis). The S&P 500 index standard deviations were also calculated in order to provide a benchmark for comparative purposes. The standard deviations are provided for each security in table 2.

Table 2: Standard Deviations of Equity and REIT Stocks

Class	Stock	Pre-Crisis	Crisis	Post-Crisis	Overall
REIT	PSB	0.1910	0.2854	0.1965	0.2165
	WPC	0.2079	0.3046	0.1489	0.2107
	VNO	0.2045	0.4792	0.1912	0.2857
Equity	AAPL	0.2487	0.4360	0.3876	0.3602
	EOG	0.2913	0.4397	0.2782	0.3262
	COST	0.1417	0.2298	0.2132	0.1950
Market	S&P 500	0.1302	0.2138	0.1213	0.1480

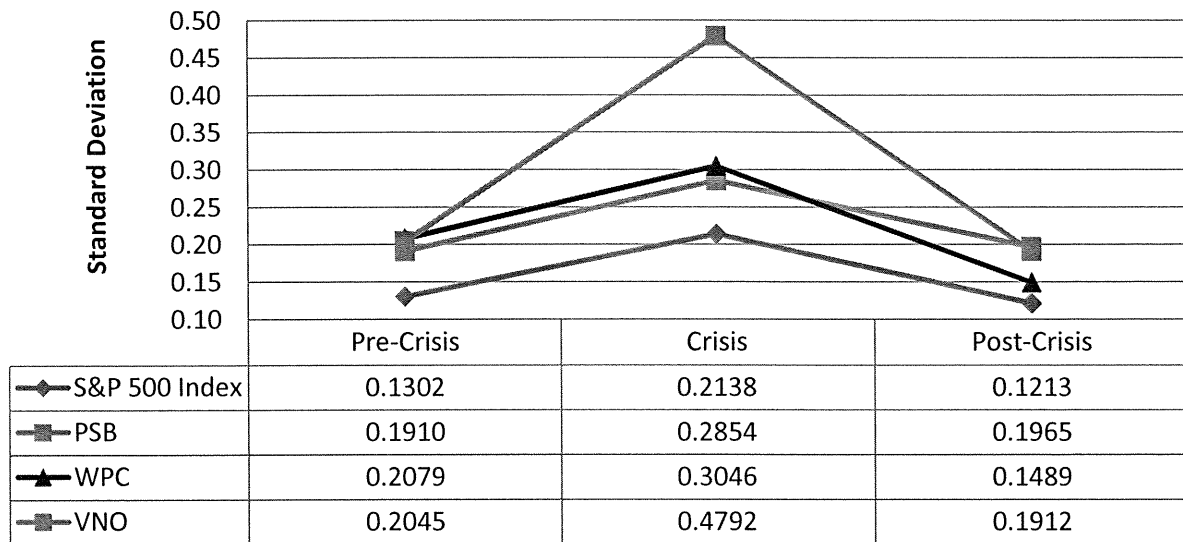
Based on the standard deviations presented in table 2, the equity stocks have the highest overall standard deviation, or risk, associated with them. In particular, AAPL is the most risky stock among the equity stocks as well as among all stocks analyzed. Conversely, the REIT stocks have a lower standard deviation, or risk, associated with them than the equity stock; however, for the reasons mentioned in the average annual return section, COST is the least risky security among the equity and REIT stocks. Aside from the equity and REIT stocks, the S&P 500 Index has the lowest standard deviation. The primary reason the S&P 500 Index has the lowest risk is diversification. The S&P 500 Index is a diversified group of the leading 500 companies; therefore, risk is spread across the companies in the index. In contrast, the REIT and equity stocks are one trust or company; therefore, diversification is based on that specific investment and the characteristics of the investment. In turn, risk is a function of the trust or company attributes as opposed to the attributes of the entire market or a broader sample of the market.

Chart 3: Equity Stock Standard Deviations by Time Horizon, Jan 2002 - Nov 2014



However, it is important to note that REITs have an element of diversification due to the type of properties and different property characteristics. Charts 3 and 4 provide a more in-depth analysis of the standard deviations associated with the equity and REIT stocks. Based on the information depicted in Charts 3 and 4, the standard deviation increases for each stock from the pre-crisis time period to the crisis time period; however, it's important to note the standard deviation increases by a greater percentage for the equity stocks as opposed to the REIT stocks. The standard deviation of PSB, WPC, and VNO increased by 49.4%, 46.5%, and 134.3% whereas AAPL, EOG, and COST increased by 75.3%, 50.9%, and 62.1%. Moreover, the standard deviation of the S&P 500 Index increased by 64.2%. The standard deviation of VNO, however, had the highest increase (.2747) and highest standard deviation (.4792) among all investments, which indicates that trusts with residential holdings experienced a significantly different impact on their risk profile than REITs without residential holdings.

Chart 4: REIT Stock Standard Deviations by Time Horizon, Jan 2002 - Nov 2014



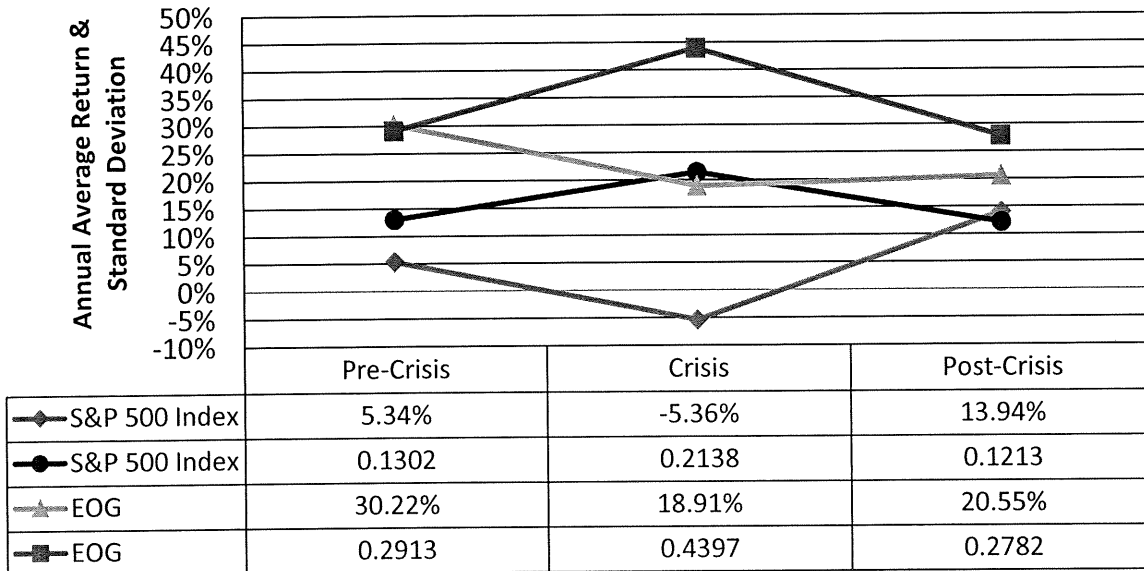
In turn, the risks associated with REITs can, arguably, be grouped into two segments, 1) REITs with residential holdings, and 2) REITs without residential holdings. Since the housing market experienced the most significant problems due to the housing bubble, credit default swaps, irrational exuberance, and investor misconceptions about real estate, among other things, the data regarding VNO provides a potential explanation for the disparity between commercial and residential holdings. Meaning, REITs with residential holdings were impacted more by the factors that led to the housing crisis than the REITs without residential holdings. Moreover, the standard deviation gap among WPC, VNO, and PSB address the key differences in each REIT structure. As previously mentioned, WPC is globally diversified, which allows the investment trust to minimize the impact on its business from U.S. real estate specific risks, and PSB is domestically diversified to a greater degree than VNO, which enables the trust to avoid or minimize the type of risks such as residential real estate risks that VNO has exposure to in the market. As a result, the extensive diversification of commercial real estate properties enabled WPC and PSB to limit the impacts of the housing crisis on their investment trusts. Moreover, the aforementioned analysis shows how the type of properties, property characteristics, and property diversification are all important components of a REIT investment.

Furthermore, Charts 3 and 4 reveal the same trend for both equity and REIT stocks. Equity and REIT stocks exhibit a similar “triangle” trend, which shows the standard deviations increasing substantially from the pre-crisis to crisis period then declining substantially, or reversing, from the crisis to post-crisis period. In turn, the housing crisis didn’t solely affect real estate related investments, but it affected the broader market and led to an economic contagion that increased the risk profile of all investments. The increase in equity stock standard deviations, however, was an indirect result of the housing crisis. The housing crisis was the catalyst for rising unemployment, negative GDP growth, declines in leading economic indicators, reductions in disposable income and consumer spending, and decreasing productivity that eventually led to the increase in the riskiness of equities.

Housing Crisis Analysis: Risks & Returns Before, During, and After the Crisis

In order to further understand the implications of the standard deviation and average annual returns on the equity and REIT stocks, it's important to analyze how they interact. Based on Charts 1 and 2, the average annual returns of each equity and REIT stock decline from the pre-crisis to crisis time period then increase from the crisis to post-crisis time period. However, in contrast to the average annual returns, Charts 3 and 4 show the standard deviations of each equity and REIT stock increasing from the pre-crisis to crisis time period then declining from the crisis to post-crisis time period. As a result, the returns and standard deviations are inversely related to each other during the housing crisis. Hence, when the standard deviation of an investment increases, the return on the investment decreases, and vice versa.

Chart 5: EOG and S&P 500 Risk & Return Profiles, Jan 2002 - Nov 2014

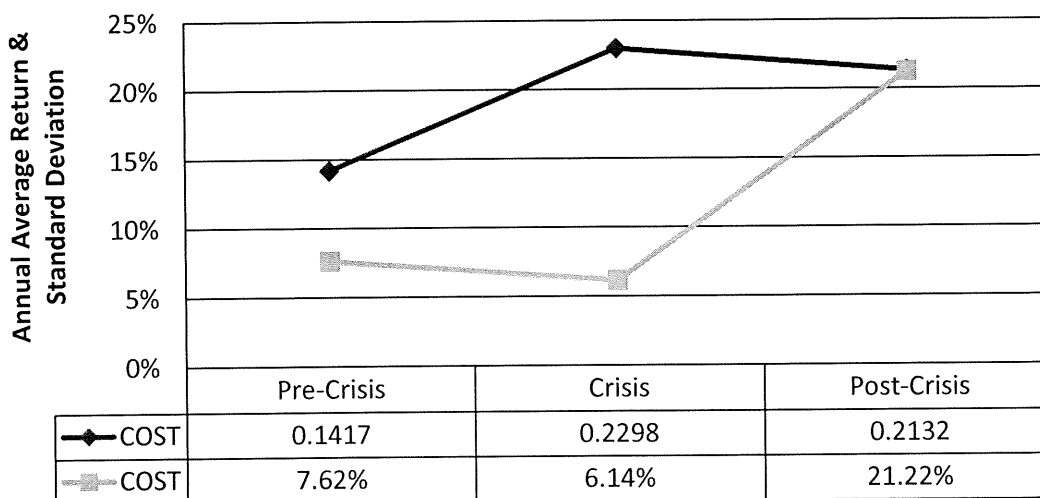


However, the relationship between a stock's standard deviation and average annual returns is not always inversely related. It is important to understand that when the standard deviation of a stock increases, the risk of the stock subsequently increases because there is a greater degree of volatility and dispersion of returns around the stock's mean of returns, which indicates less uncertainty and reliability of constant returns. Therefore, the inverse relationship between the REIT and equity stock's standard deviations and average annual returns is more apparent during the housing crisis than before or after the housing crisis because there are a greater number of factors contributing to the creation of a highly volatile and complex economic environment. In turn, the risks for each REIT and equity stock are lower during the pre and post-housing crisis time periods than during the housing crisis time period.

Chart 5 provides a depiction of the relationship between standard deviation and average annual returns using EOG and the S&P 500 Index. The chart shows that an increase in volatility of EOG and the market directly impacts the returns expected from each investment. Therefore, as previously mentioned, an increase in the volatility of returns leads to an increase in the risk of a stock and the level of uncertainty in anticipated returns. Upon further analyzing

EOG and the equity stocks, EOG has the highest standard deviation, .4397, during the housing crisis time horizon and the second lowest average annual return, 18.91%, among equity stocks; therefore, EOG is considered to be the riskiest equity stock during the housing crisis. In contrast, AAPL has the highest average annual return, 34.47%, among equity stocks and a slightly lower standard deviation than EOG, .4360, during the house crisis time period, as shown in charts 1 and 3. Interestingly, APPL also has the highest standard deviation, .3876, and the highest average annual return, 33.52%, during the post-crisis period whereas EOG has the lowest average annual returns, 20.55%, and second lowest standard deviation, .2782, during the post-crisis time period among all equity stocks, as shown in charts 1 and 3. As a result, AAPL is considered to be the riskiest equity stock during the post-crisis time frame (the factors contributing to the riskiness of EOG and APPL are mentioned in the average annual returns section).

**Chart 6: COST Risk & Return Profiles,
Jan 2002 - Nov 2014**

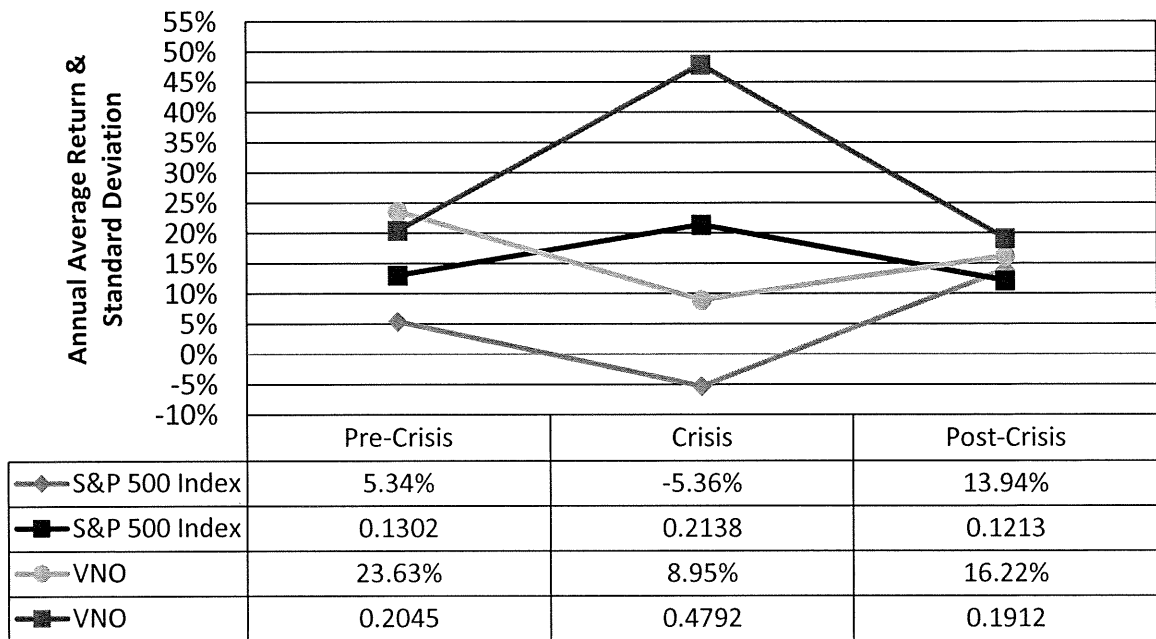


Regarding the least risky equity stock, COST is considered be the least risky equity stock, as well as the least risky overall stock, due to the strength of its business model and high degree of immunity to most of the poor economic conditions that led to significant constraints and issues for a multitude of other firms such as EOG and AAPL. As shown in chart 6, COST experienced a rather slight decline in returns despite the increase in its standard deviation during the housing crisis; however, the firm maintained a relatively lower standard deviation before and after the housing crisis. Therefore, although volatility increased during the housing crisis and only subsided slightly after the crisis, returns appear to unaffected across the 12 year time horizon and volatility remains relatively lower than the rest of the equity stocks and slightly higher than the overall market.

Transitioning from equity stocks to REIT stocks, WPC and PSB have fairly similar risk and return profiles as well as minimal volatility compared to VNO. PSB and WPC have starkly similar standard deviations and returns before and during the housing crisis, but the differences in business models, structure, and property diversification eventually provide different outcomes for each REIT during the post-crisis period, as shown in charts 2 and 4. WPC's global

diversification appears to provide the firm with an ability to reduce risk and provide growing yet consistent returns for investors as it emerges from the housing crisis whereas PSB appears to be providing more stable returns with a moderate risk level for investors. VNO, however, experiences the most significant fluctuations in returns among the REIT stocks as evidenced by its standard deviation, which is .2857 over the 12 year time horizon. As shown in chart 7, the volatility of VNO increases substantially during the housing crisis, and the volatility of the stock is significantly greater than the S&P 500 Index.

Chart 7: VNO and S&P 500 Risk & Return Profiles, Jan 2002 - Nov 2014



Moreover, the standard deviation of VNO, .4792, is the highest among the equity and REIT stocks during the housing crisis. Interestingly, WPC had the highest standard deviation, .2079, and lowest average annual return, 12.36%, among REIT stocks during the pre-crisis time period whereas VNO had a slightly lower standard deviation, .2045, and the highest average annual return, 23.63%, among REIT stocks during the pre-crisis time period. Conversely, WPC had the lowest standard deviation, .1489, and highest average annual return, 25.02%, during the post-crisis time period among REIT stocks whereas PSB had the highest standard deviation, .1965, and lowest average annual return, 13.73%, during the post-crisis time period among REIT stocks. In turn, the trends before and after the housing crisis provide further evidence regarding the instability and uncertainty of returns when the standard deviation move closer to 1.0.

Correlation Analysis

The correlations between each stock were calculated in addition to the standard deviations and average annual returns to assess the movement of each stock in relation to another over the previously indicated time periods, 1) pre-crisis, 2) crisis, and 3) post-crisis. Correlation matrices have been developed for each time horizon, which are provided in tables 3, 4, 5, and 6.

Table 3: Pre-Crisis Correlation Matrix, Jan 2002 – June 2007

	PSB	WPC	VNO	AAPL	EOG	COST
PSB	1.0000	0.4398	0.5731	0.0754	0.2444	0.1313
WPC	0.4398	1.0000	0.4880	0.1667	0.0878	0.0093
VNO	0.5731	0.4880	1.0000	0.2408	0.2183	0.1990
AAPL	0.0754	0.1667	0.2408	1.0000	0.4201	0.3810
EOG	0.2444	0.0878	0.2183	0.4201	1.0000	0.0172
COST	0.1313	0.0093	0.1990	0.3810	0.0172	1.0000

Based on the Pre-Crisis Correlation Matrix (table 3), the REIT stocks are strongly correlated with one another and exhibit positive correlation. The REIT stocks exhibit a correlation between .40 and .60, which is expected for stocks with similar characteristics (i.e. investing in commercial real estate). The correlations for the equity stocks, however, appear to be moderately correlated with one another. The equity stocks exhibit positive correlation and move together; however, the correlation among the equity stocks isn't as strong as the REIT stocks. One particular item to note, from an equity perspective, is the correlation between EOG and COST, which is not a strong correlation. The correlation is so close to zero that these two stocks have almost no correlation with one another. Upon analyzing the REIT and equity stocks together, there appears to be a very low correlation between REIT and equity stocks, which indicates that the securities have relatively high correlations within their individual asset classes, but not among each other. This attribute can be particularly important when developing a portfolio and selecting investments because the risks and returns of one asset class can be offset or minimized by the risks and returns of another asset class.

Table 4: Crisis Correlation Matrix, July 2007 – Aug 2009

	PSB	WPC	VNO	AAPL	EOG	COST
PSB	1.0000	0.3117	0.6510	0.3823	0.3542	0.4518
WPC	0.3117	1.0000	0.4039	0.3998	0.2737	0.5189
VNO	0.6510	0.4039	1.0000	0.4117	0.2928	0.5770
AAPL	0.3823	0.3998	0.4117	1.0000	0.4322	0.5763
EOG	0.3542	0.2737	0.2928	0.4322	1.0000	0.3544
COST	0.4518	0.5189	0.5770	0.5763	0.3544	1.0000

The Crisis Correlation Matrix, table 4, exhibits a significant change among the relationships of each stock. First, the correlations among the REIT stocks decrease from the pre-crisis to crisis period except for the correlation between PSB and VNO. The reason this relationship leads to an increase in correlation as opposed to other REIT relationships is PSB and VNO are primarily invest in real estate within the U.S. marketplace. WPC, on the other hand, has real estate properties globally; therefore, the diversification of properties across different demographics provides WPC with a hedge against volatility and risk for the company. In contrast, VNO and PSB are exposed to similar economic factors, which cause their returns to move together.

Furthermore, the Crisis Correlation Matrix shows that equity stocks are more closely correlated during the crisis period as opposed to the pre-crisis period. The increase in correlation is primarily due to each company experiencing similar impacts from the decline in the economy's health. The correlation between EOG and COST experienced the most substantial increase from the pre-crisis to crisis period while the correlation between APPL and EOG increased, but stay fairly constant. In turn, the correlations among securities within the equity class increased in correlation because the returns of all equity securities were impacted to some degree by the collapse of the U.S. economy, which led to declining returns (i.e. moving in the same direction) for all equity securities. Additionally, the Crisis Correlation Matrix shows an increase in the correlations among REIT and equity stocks, which indicates that equity securities were strongly affected by the housing crisis. More importantly, the correlations among equity and REITs stocks reveal that the returns of both investment classes were moving in the same direction and were the byproduct of similar factors.

Table 5: Post-Crisis Correlation Matrix, Sept 2009 – Nov 2014

	PSB	WPC	VNO	AAPL	EOG	COST
PSB	1.0000	0.5119	0.6906	0.3080	0.4323	0.0174
WPC	0.5119	1.0000	0.5011	0.1199	0.3428	0.0259
VNO	0.6906	0.5011	1.0000	0.3199	0.3985	0.1772
AAPL	0.3080	0.1199	0.3199	1.0000	0.2856	0.2508
EOG	0.4323	0.3428	0.3985	0.2856	1.0000	-0.0569
COST	0.0174	0.0259	0.1772	0.2508	-0.0569	1.0000

Upon transitioning from the crisis time period to the post-crisis time period, the Post-Crisis Correlation Matrix, table 5, further supports the strong correlations among the REIT stocks. Specifically, the positive correlation between VNO and PSB has increased from the pre-crisis period, .5731, to the post-crisis period, .6906, by more than .10. The correlations between VNO and WPC and PSB and WPC have also increased, but remained within a range of .06. As a result, this matrix supports the thesis that assets within a particular investment class move together. In contrast to the REIT stocks, the correlations among the equity stocks have decreased from the pre-crisis and crisis time periods. Interestingly, the correlation between COST and EOG has become negative during the post-crisis period, which indicates the two securities are moving in opposite directions of one another.

Table 6: Overall Correlation Matrix, Jan 2002 – Nov 2014

	PSB	WPC	VNO	AAPL	EOG	COST
PSB	1.0000	0.4122	0.6167	0.2316	0.3423	0.1977
WPC	0.4122	1.0000	0.4362	0.2233	0.2450	0.1894
VNO	0.6167	0.4362	1.0000	0.3202	0.2951	0.3327
AAPL	0.2316	0.2233	0.3202	1.0000	0.3844	0.4044
EOG	0.3423	0.2450	0.2951	0.3844	1.0000	0.1016
COST	0.1977	0.1894	0.3327	0.4044	0.1016	1.0000

Overall, the correlations among the REIT and equity stocks, as indicated in table 5, remain higher than the pre-crisis period shown in table 3, and indicate low to moderate correlation, which is anticipated given the expansionary phase of the economy. As a result, the expansion of the economy has led to a recovery of the housing market and financial market, which supports the increase in returns of equity and REIT stocks (i.e. the upward movement of securities with one another). However, it is important to note that the correlations between equity and REIT securities remain relatively low as compared to the correlations among the securities within a particular asset class. Therefore, an investor can potentially benefit from investing in multiple asset classes such as equities and REITs because the movement of securities across asset classes is not strongly correlated. Table 6, the Overall Correlation Matrix, emphasizes this investment concept. Given the 12 year time horizon, REIT stocks are more closely correlated within one another than with equity stocks, and vice versa. There are some exceptions such as the correlation between EOG and COST vs. VNO and COST; however, the concept generally holds true from asset class to asset class.

Beta Analysis

The last quantitative attribute used to analyze REIT and equity securities is beta. Beta is used to assess the measure of volatility, or systematic risk, for each equity and REIT security as compared to the S&P 500 Index. In order to calculate beta, the covariance between each security's return (both equity and REIT) and the S&P 500 Index's return was divided by the variance of the S&P 500 Index. The beta was calculated for each stock over the pre-crisis, crisis, and post-crisis time periods, as shown in table 7.

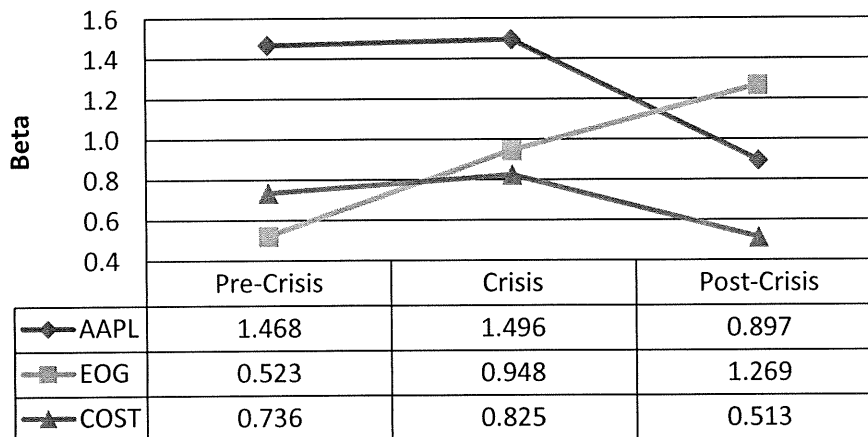
Table 7: Stock Betas

Class	Stock	Pre-Crisis	Crisis	Post-Crisis	Overall
REIT	PSB	0.286	1.009	0.827	0.721
	WPC	0.228	1.041	0.816	0.728
	VNO	0.597	1.910	1.081	1.243
Equity	AAPL	1.468	1.496	0.897	1.261
	EOG	0.523	0.948	1.269	0.896
	COST	0.736	0.825	0.513	0.702
Market	S&P 500	1.000	1.000	1.000	1.000

Based on an analysis of each stock's beta, the most volatile stock over the 12 year time horizon is AAPL; however, the most volatile REIT stock is VNO. In contrast, the least risky, or volatile, security over the 12 year time horizon is COST and the least volatile REIT security is PSB (WPC has a slightly higher beta, but would be considered to possess the same level of volatility). From a time period perspective, the beta of each security within the REIT and equity asset class increased from the pre-crisis to post-crisis period. The reasoning for the increase in beta is similar to the explanation provided in the discussion related to standard deviation. The decline of the housing market coupled with falling economic indicators created a highly unstable financial environment. In turn, the volatility and risks associated with each REIT and equity stock aligned more closely with the risks and volatility of the entire market. Moreover, the

increase in beta indicates greater exposure to systematic risk for each security during the crisis time period; therefore, diversification for an investor becomes increasingly difficult from a strategic and tactical allocation standpoint. Charts 8 and 9 provide an additional assessment of each asset class during the crisis period as well as the pre-crisis and post-crisis periods.

**Chart 8: Betas for Equity Stocks,
Jan 2002 - Nov 2014**

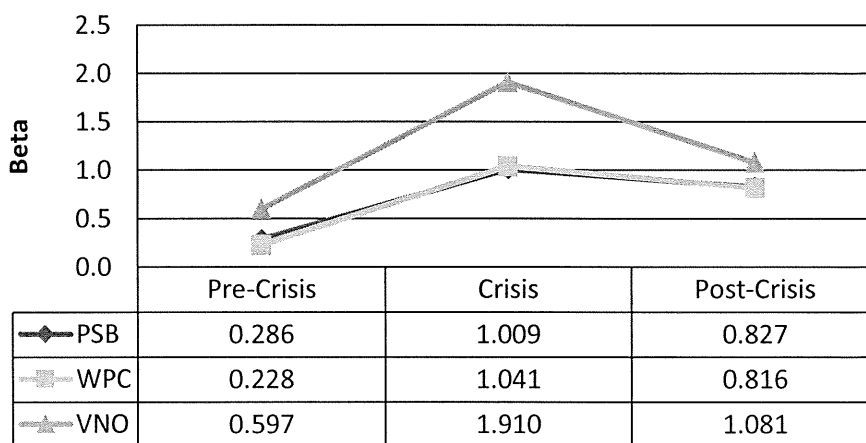


As discussed, there is an increase in the beta for each investment vehicle from the pre-crisis to crisis period; however, the equity asset class, depicted in Chart 8, reveals some further insight. Specifically, the beta trend of EOG is an upward slope across the 12 year time horizon, which is interesting given the subsequent decline of AAPL and COST from the crisis to post-crisis period. In turn, this trend supports the notion that there are additional market forces that systematically impact a particular firm and cause an investment to more or less volatile than the overall market. For example, EOG, AAPL, and COST are all exposed to the same economic and financial market risks during each time frame over the 12 year time horizon; however, EOG is exposed to additional market forces that cause the security price to be more volatile than the overall market. Specifically, EOG’s exposure to political and regulatory risks (e.g. environmental legislation), price risk (fluctuations in the price of natural gas and oil), geological risks (e.g. drilling and mining permits), and supply and demand risks are centric to the oil and gas landscape that are not present among other securities such as AAPL and COST. In turn, an investor must be aware of additional market forces that contribute to a security’s function of beta and extend behind financial and economic market risk. Moreover, it is important to understand each industry within the equity asset class and the reasons each security may be more or less volatile than the overall market. This analytical process greatly assists an investor in the diversification process and enables an investor to understand how the use of different asset classes can mitigate systematic risk and limit the change in a portfolio’s value.

Furthermore, the trend of each equity stock as well as each REIT stock is important to analyze because it provides a basis for understanding the reaction of securities within the REIT and equity asset class. Upon reviewing Charts 8 and 9, the increase in beta is more pronounced among REIT stocks than equity stocks because the volatility of the REIT stocks was directly tied to the volatility of the housing market. During the pre-crisis period the housing market wasn’t the primary indicator for determining the direction of the overall market; however, once the

housing market problems became more apparent the housing market, in turn, began to dedicate the direction of the overall market. Therefore, the betas of PSB, WPC, and VNO increased to the point that they were equally as volatile as the market. VNO, however, became more volatile than the market due to additional market forces that increased its volatility and level of price uncertainty. In contrast to the REIT stocks, AAPL and COST maintained relatively consistent betas during the pre-crisis and crisis periods because they were not exposed to the same market risks as the REIT stocks. In turn, the disparity in the reaction of each asset class's beta to varying market forces provide additional support to the thesis that diversification can minimize investor risk.

**Chart 9: Betas for REIT Stocks,
Jan 2002 - Nov 2014**



Despite different beta trends between the equity and REIT securities, the trends from the crisis to post-crisis period are very similar. Since the business cycle is moving from the contractionary phase to the trough and expansionary phases, the volatility in security prices declined due to the increasing health and stability of organizations. Moreover, the risk and return profiles of each REIT and equity security become more stable from the crisis period to post-crisis period, as seen when comparing charts 1 and 2 to charts 8 and 9.

Furthermore, similar to standard deviation, an increase in beta subsequently increases the risk associated with the volatile in security prices. Therefore, if the overall market is highly volatile and the beta of a security is 1.0 such as the betas during the crisis period shown in table 7, the returns of the security will follow the market. So, as the betas of each equity and REIT stock approached 1.0 during the crisis period, the returns moved in the same direction as the market (i.e. downward); however, as the market began to recover the betas of each equity and REIT stock decreased and the returns increased. Therefore, the beta of security is directly associated with the returns and price of the security, and the market forces driving the betas and returns of each security will be different among asset classes. In particular, the factors creating the function of beta for REIT stocks are different, to some degree, than the factors creating the function of beta for equity stocks. As a result, the concept of diversification serves a critical role in the investment strategy and asset allocation decisions of an investor, especially when considering whether to invest in other asset classes such as REITs.

Portfolio Analysis

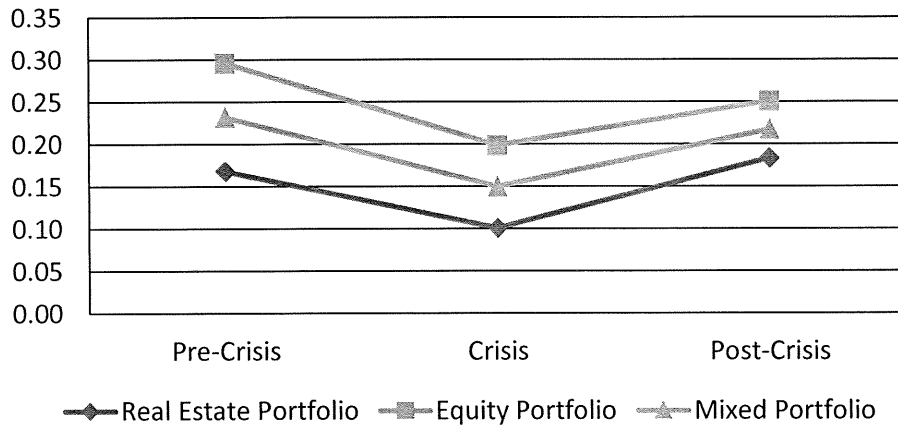
Up to this point, the discussion surrounding equity and REIT stocks has been focused on each individual security's average annual returns, standard deviations, correlations, and betas; however, this final section of the analysis focuses on the characteristics of equity and REIT stocks from a portfolio, or grouping, perspective. In order to understand the diversification impacts of a REIT and the real estate asset class, it's important to observe how REITs interact collectively within a portfolio, how REITs interact with other asset classes such as equities in a portfolio, and how REITs, as a collective group, compare to equities as a collective group. As a result, tables 8 and 9 provide an assessment of the average annual returns and betas for an equally weighted portfolio of REIT stocks (WPC, PSB, and VNO), an equally weighted portfolio of equity stocks (AAPL, COST, and EOG), and an equally weighted portfolio of REIT and equity stocks (WPC, PSB, VNO, AAPL, COST, and EOG).

**Table 8: Average Annual Portfolio Returns
Based on Equal Weighting, Jan 2002 – Nov 2014**

Portfolio	Pre-Crisis	Crisis	Post-Crisis	Overall
Real Estate Portfolio	16.77%	10.09%	18.33%	15.33%
Equity Portfolio	29.60%	19.84%	25.10%	25.64%
Mixed Portfolio	23.18%	14.96%	21.71%	20.49%

As shown in table 8, the returns are provided during the pre-crisis, crisis, and post-crisis time periods. Based on an analysis of the returns across each time horizon, the Real Estate Portfolio, which consists of REIT stocks, provides lower average annual returns during each period as compared to the Equity Portfolio, which provides significantly higher average annual returns. Over the 12 year time horizon, the Equity Portfolio provides approximately 10% more in average annual returns than the Real Estate Portfolio, as shown in table 8. The Real Estate Portfolio, however, exceeds the average annual return on the market, as shown in table 1, by approximately 10%. Interestingly, when the equity stocks are added to the Real Estate Portfolio to create the Mixed Portfolio, the Mixed Portfolio achieves average annual returns directly in between the Real Estate Portfolio and the Equity Portfolio. For example, the average annual return of the Mixed Portfolio in the pre-crisis period was 23.18% whereas the returns for the Real Estate Portfolio were 16.77% and the returns for the Equity Portfolio were 29.60%. Furthermore, the total average annual return for the Mixed Portfolio over the 12 year time horizon was 20.49%, which is almost exactly 5% above the Real Estate Portfolio and 5% below the Equity Portfolio (a visual representation of the data is provided in chart 10).

Chart 10: Average Annual Portfolio Returns, Jan 2002 - Nov 2014



Therefore, to understand the movement in average annual returns among the Real Estate Portfolio, Equity Portfolio, and Mixed Portfolio the betas of each portfolio are used to provide further insight. As shown in table 9, the beta of the Real Estate Portfolio during the pre-crisis period is lower than the Equity Portfolio, which directly correlates with the average annual returns shown in table 8. During the pre-crisis period, the average annual return of the Real Estate Portfolio was less than the return of the Equity Portfolio. Consequently, the beta and average annual return support the notion that investors holding investments with high levels of volatility demand returns that will compensate them for assuming additional risk. The crisis and post-crisis periods further support this notion because the Real Estate Portfolio possesses a higher beta than the Equity Portfolio. However, it is important to note that increasing measures of volatility don't always equate to increasing returns. High volatility and risk can lead to increasing returns because investors expect to be compensated for assuming risk, but investors assuming increasing levels of risk and volatility must be aware of the possibility of incurring losses. In this particular example, higher volatility and risk led to greater losses and smaller gains for the Real Estate Portfolio during the crisis and post-crisis period than the Equity Portfolio. Therefore, the greater the risk and volatility of an investment, the greater the potential for varying returns, which can be significant gains or momentous losses.

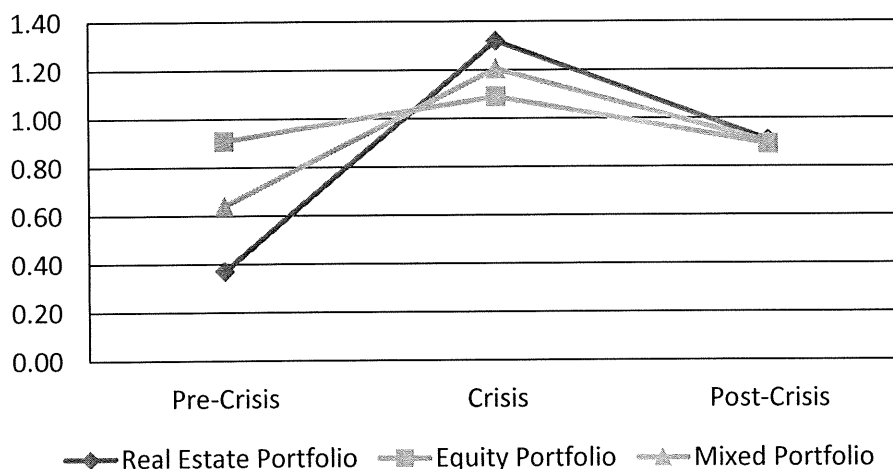
Table 9: Portfolio Betas Based on Equal Weighting, Jan 2002 – Nov 2014

Portfolio	Pre-Crisis	Crisis	Post-Crisis	Total
Real Estate Portfolio	0.3703	1.3200	0.9080	0.8972
Equity Portfolio	0.9089	1.0896	0.8928	0.9527
Mixed Portfolio	0.6396	1.2048	0.9004	0.9250

Conversely, the Mixed Portfolio demonstrates the benefit and impact of diversification, and reveals the differences between an all-equity stock or all-REIT stock portfolio. Investing in two different asset classes enabled the Mixed Portfolio to mitigate unsystematic risk and neutralize negative performances of a specific company or trust. As shown in table 9 and displayed in Chart 11, the Mixed Portfolio achieved a portfolio beta that is slightly higher than

the portfolio beta of the Real Estate Portfolio and slightly lower than the Equity Portfolio, which is similar to the average annual return previously mentioned. Therefore, the risk-return profile of the portfolio shifts to a position that enables an investor to minimize volatility and achieve relatively consistent returns. Upon observing tables 8 and 9, the concept of diversification becomes apparent during the crisis period. The Mixed Portfolio limits the volatility impact on the investor and creates a smoothing effect. As a result, the Mixed Portfolio yields a more desirable risk-return profile for an investor seeking to invest in real estate by combining asset classes.

Chart 11: Portfolio Betas, Jan 2002 - Nov 2014



Treynor Ratio

In order to further analyze each portfolio, the Treynor Ratio, which is an investment performance measure used to assess the returns earned on risk that exceeds the risk-free rate, was calculated for each portfolio. The Treynor Ratio, also referred to as the “reward-to-volatility” ratio, was calculated by subtracting the average annual return on each portfolio by the average annual return of the three month treasury bill (T-bill) rate, and then dividing the numerator (portfolio average annual return minus risk-free rate) by the portfolio beta (Investopedia). The average annual return of the three month T-bill rate was calculated using the same method as the average annual return; however, the process for annualizing the T-bill rate was different because the time frame for the returns (monthly) is different from the T-bill rate (three months).

Additionally, the Treynor Ratios were calculated for the pre-crisis, crisis, and post-crisis periods. In turn, the average annual T-bill rates used for the Treynor Ratio were 2.60% for the pre-crisis period, 1.58% for the crisis period, and 0.07% for the post-crisis period. Chart 12 provides a visual representation of the T-bill rates used for each period and shows the trend of the T-bill rates across time. As depicted in the chart, the trend of the T-Bill rate is downward sloping, which is due to quantitative easing implemented by the Federal Reserve to facilitate expansionary monetary policy. The actual trend progression of the T-bill rate is shown in Chart 13, which displays a rising T-bill rate from 2002 to 2007. Rising interest rates were one of the many catalysts driving the housing crisis from 2007-2009 because homeowners were acquiring adjustable rate mortgages, which led to increasing monthly obligations that individuals were

unable to satisfy. As a result, a vast number of homeowners defaulted on their payments and homes began to foreclose. The subsequent foreclosures and excessive leverage led to the decline in interest rates and eventually a collapse of the financial markets. This interest rate trend not only provides insight regarding the issues surrounding the housing crisis, but it provides insight into the Treynor Ratio and the calculation of the numerator.

Chart 12: Three Month T-Bill Rates for Pre-Crisis, Crisis, & Crisis Time Horizons

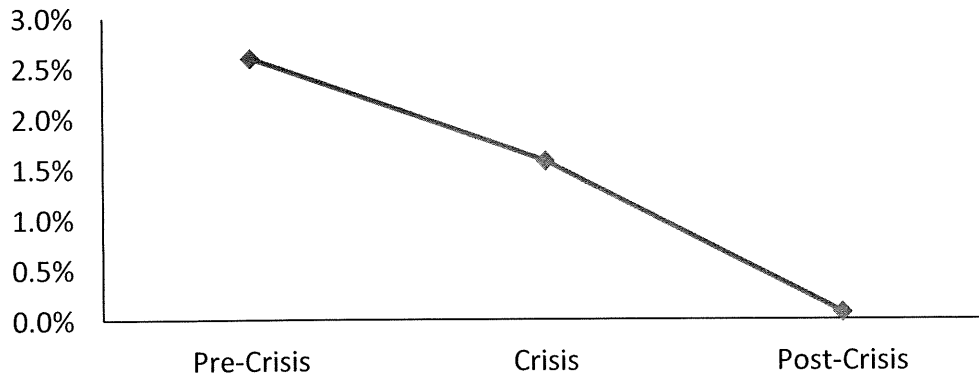
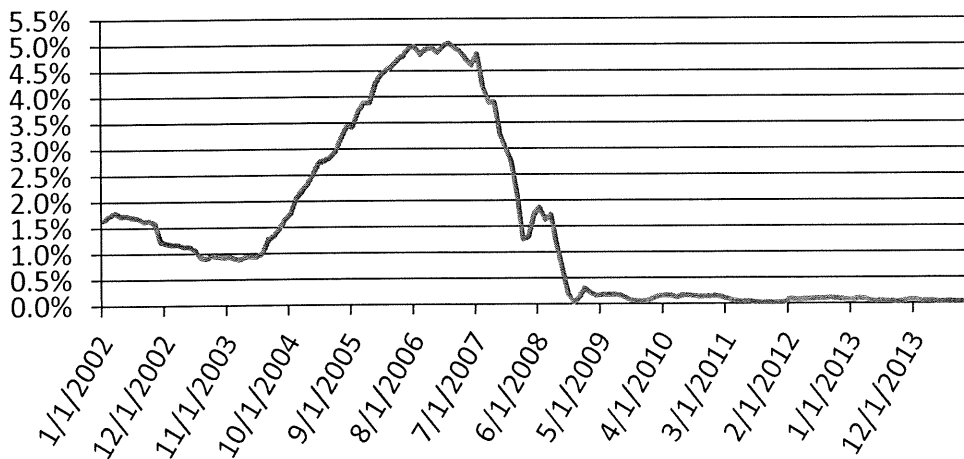


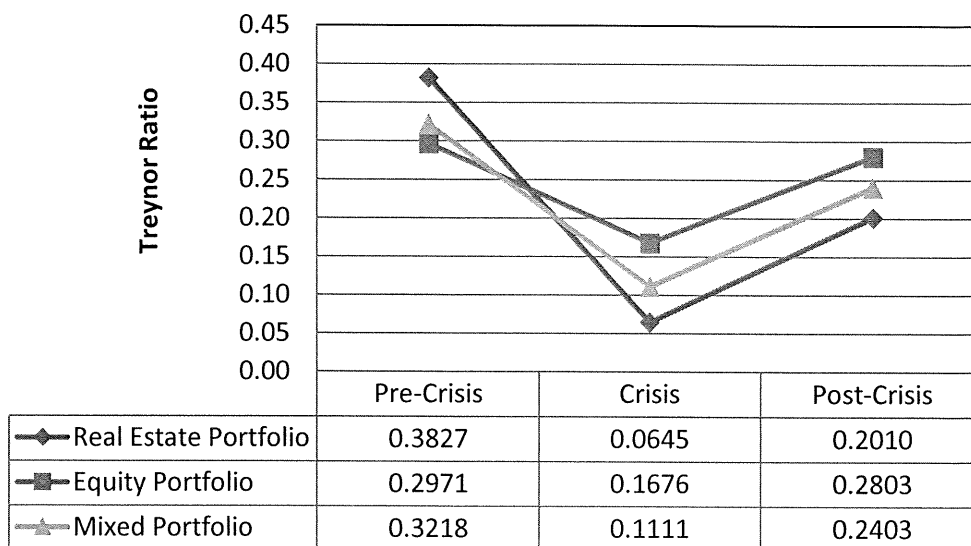
Chart 13: Three Month T-Bill Rates, Jan 2002-Nov 2014



The Treynor Ratios, as shown in chart 14, are organized in a similar manner as the portfolio betas and returns. The Real Estate Portfolio has the lowest Treynor Ratio over the 12 year time horizon, .1552, the Equity Portfolio has the highest Treynor Ratio, .2543, and the Mixed Portfolio is directly in the middle with a Treynor Ratio of .2062. Upon analyzing each specific time period, the results are relatively consistent; however, the Real Estate Portfolio and Mixed Portfolio have a higher Treynor Ratio during the pre-crisis period than the Equity Portfolio. Conversely, both the Mixed Portfolio and the Real Estate Portfolio experience declines in Treynor Ratio from the pre-crisis to post-crisis time period, but the Equity Portfolio's

Treynor Ratio remains relatively consistent. The reason the Equity Portfolio doesn't experience similar affects as the Mixed Portfolio or Real Estate Portfolio is the absence of REITs. The recovery process for companies emerging from the crisis was quicker than the real estate market.

Chart 14: Treynor Ratios, Jan 2002 - Nov 2014



Therefore, portfolios holding REITs may have taken longer to return to a status that is equal to or greater than the status from the pre-crisis time period. From a diversification standpoint, the Mixed Portfolio reveals that combining asset classes further supports a smoothing effect and provides investors with the ability to obtain exposure to a potentially risky asset class while minimizing the risk of the asset class. Furthermore, the Treynor Ratios demonstrate the performance potential of a portfolio invested in multiple asset classes and show the levels of returns an investor can obtain on a risk-adjusted basis.

Individual Securities and Portfolios

In addition to the Treynor Ratio, a comparative analysis between each individual security and portfolio explains the significant benefits of diversification. Table 10 and 11 show the average annual returns and betas for each stock and portfolio. Based on an assessment of each equity stock in comparison to the Equity Portfolio, the Equity Portfolio provides a comparable risk-return profile to EOG; however, the returns and betas for the Equity Portfolio are smoother than the returns and betas for EOG. Specifically, the betas from the pre-crisis to crisis period remain relatively consistent for the Equity Portfolio (.909 vs. .893) whereas the betas for EOG increase from the pre-crisis period to the crisis period (.523 vs. 1.269). In addition, the returns of the Equity Portfolio decrease from 29.60% to 25.10% whereas EOG's returns decrease from 30.22% to 20.55%. The returns and betas for AAPL across each time period exceed the Equity Portfolio; however, AAPL is exposed to greater volatility and risk than the Equity Portfolio. Similarly, COST has lower returns than the Equity Portfolio across each time frame; however, COST has lower volatility and risk. In turn, investors who invest in a single stock are exposed to the risk-return profile of that specific stock. However, investors who invest

in a portfolio or fund are exposed to the risk-return profile of multiples securities because the risks and returns are spread across multiple stocks so the negative performance of any stock within the portfolio is neutralized or minimized by holding other securities. As a result, diversification greatly benefits investors because it limits exposure to volatility and unsystematic risk.

**Table 10: of Stock & Portfolio Average Annual Returns,
Jan 2002 – Nov 2014**

Portfolio/Stock	Pre-Crisis	Crisis	Post-Crisis	Overall
PSB	14.05%	11.28%	13.73%	13.05%
WPC	12.63%	10.04%	25.02%	16.91%
VNO	23.63%	8.95%	16.22%	16.05%
AAPL	50.96%	34.47%	33.52%	40.21%
EOG	30.22%	18.91%	20.55%	24.66%
COST	7.62%	6.14%	21.22%	12.05%
S&P 500	5.34%	-5.36%	13.94%	5.85%
Real Estate Portfolio	16.77%	10.09%	18.33%	15.33%
Equity Portfolio	29.60%	19.84%	25.10%	25.64%
Mixed Portfolio	23.18%	14.96%	21.71%	20.49%

**Table 11: Stock & Portfolio Betas,
Jan 2002 – Nov 2014**

Portfolio	Pre-Crisis	Crisis	Post-Crisis	Total
PSB	0.286	1.009	0.827	0.721
WPC	0.228	1.041	0.816	0.728
VNO	0.597	1.910	1.081	1.243
AAPL	1.468	1.496	0.897	1.261
EOG	0.523	0.948	1.269	0.896
COST	0.736	0.825	0.513	0.702
S&P 500	1.000	1.000	1.000	1.000
Real Estate Portfolio	0.370	1.320	0.908	0.897
Equity Portfolio	0.909	1.090	0.893	0.953
Mixed Portfolio	0.640	1.205	0.900	0.925

Upon analyzing the REIT stocks in comparison to the Real Estate Portfolio, a similar conclusion from analyzing the Equity Portfolio is also reached. Over the 12 year time horizon, PSB has a lower beta than the Real Estate Portfolio (.721 vs. .897); however, the Real Estate Portfolio has a higher return (15.33% vs. 13.05%). Conversely, the Real Estate Portfolio has a lower beta than VNO (.897 vs. 1.243), but VNO has a higher return than the Real Estate Portfolio (15.33% vs. 16.05%). The only stock that achieves a higher return and lower beta than the Real Estate Portfolio is WPC, but the returns of the Real Estate Portfolio are smoother than WPC from the pre-crisis period to the post-crisis period (REP: 16.77% to 18.33%; WPC: 12.63%

to 25.02%). Therefore, the Real Estate Portfolio enables investors to gain exposure to different REITs without being directly exposed to the risk of each security. Moreover, the element of diversification enables an investor to obtain smooth, stable returns across fluctuating market conditions, as shown in table 10 and 11 from the pre-crisis to post-crisis period, while minimizing volatility and risk.

The last portfolio, the Mixed Portfolio, further demonstrates the benefits of diversification in comparison to individual securities and provides additional support for the use of different asset classes. In comparison to the individual REIT and equity securities, the Mixed Portfolio has the third highest average annual return (20.49%) over the 12 year time horizon and the portfolio's beta is below the mean of the REIT and equity betas (.897 vs. .925) and is considered to be in the middle range of betas (median is .896). The two securities with higher average annual returns are AAPL (40.21%) and EOG (24.66%) and the securities with lower betas are WPC (.728), PSB (.721), and COST (.701). EOG is considered to possess the same beta and volatility as the Mixed Portfolio; therefore, no differentiation in beta is mentioned. From a time period perspective, the Mixed Portfolio's average annual return changes by less than 2% from the pre-crisis to post-crisis period whereas the return of the REIT and equity securities change by more than 7% from the pre-crisis to post-crisis period except for PSB, which changes by less than 1%. The Mixed Portfolio also provides greater return stability during the crisis period in comparison to its beta. AAPL and VNO have betas above one and their returns declined by approximately 15% during the crisis period whereas the Mixed Portfolio declined by less than 10%, which was also better than the S&P 500 Index and EOG (both with betas below the Mixed Portfolio). Furthermore, the Mixed Portfolio highlights the shared attributes of both the REIT and equity stocks, which makes the investment vehicle attractive to investors from a diversification standpoint as well as a risk-return standpoint.

Conclusion

The desire for investors to minimize risks and maximize returns is becoming increasingly important for individuals and institutions, and it is also becoming more challenging. This paper provided data to support the benefits of two key concepts, 1) diversification and 2) the use of multiple asset classes, namely REITs. An analysis of the average annual returns, standard deviations, betas, and correlations of equity and REIT securities found that each asset class produces different risk-return profiles and reacts to market forces differently. Moreover, an analysis of these measures also found that specific asset classes, specifically REITs and equities, react similarly to general market forces. As a result, there is substantial benefit that an investor can receive from diversifying via investing in REITs and combining real estate with equity stocks. The characteristics and risks related to REITs are unique to the real estate asset class and provide an investor with an ability to reduce exposure to other asset classes by investing in real estate and minimize total investment risk. Furthermore, the analysis discussed in this paper found that investors who combined equities with REITs were able to neutralize unsystematic risks and negative performances experienced over the last 12 years, particularly during the housing crisis.

In addition to different asset classes, individual securities and portfolios also present investors with unique alternatives to approaching the investment decision making process. This paper found that investing in an individual equity or REIT security exposes an investor to the

total risk and return associated with that security. As a result, the potential volatility, return instability, risk, and exposure to negative performance are greater for investors investing in an individual security as opposed to a portfolio of securities. Therefore, a portfolio provides an investor with diversification benefits such as proper asset allocation, reduction in the over concentration of an asset, risk reduction, and return maximization that is not found when investing in a particular security. Investors should proactively seek to obtain diversification by investing in multiple securities as well as various asset classes in order to receive the optimal and desirable risk and return.

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