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Leadership Matters: *Crafting a Smart Beta Portfolio with a Founder-CEO Twist*

JOEL M. SHULMAN

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Joel M. Shulman

Joel M. Shulman
is a professor of entrepreneurship at Babson College and managing director at EntrepreneurShares, LLC in Boston, MA.
shulman@babson.edu

In recent years, considerable attention has flocked to smart beta strategies with investment managers applying reweighting schemes to peer benchmarks.[1] In essence, managers identify perceived flaws within an existing benchmark and craft a makeover solution offering a different twist with hopes of capitalizing on embedded opportunities. Although billed as passive plays, these strategies comprise an active component cloaked in the inner workings of quant redesigns.[2] Savvy managers develop smart portfolios by selecting factors from a plethora of options, including market capitalization, volatility, and price-to-earnings ratios, (P/E) among others. Management attributes, however, despite being important criteria for active fund managers in selecting stocks, rarely appear as an exchange-traded fund (ETF) or smart beta option.[3] Although the absence or rarity of a management-based ETF does not, in itself, imply an investment dilemma demanding a solution, it does raise the broader, simpler question of why leadership does not matter when running a large, publicly traded company.[4] In this article, we introduce a proxy factor for quality of management by creating and rigorously testing a founder-CEO index relative to a comparative benchmark that includes many of the same holdings.[5] The spirit behind this selection stems from developing academic research, emerging fund managers who specialize in this expertise, and the investment logic supporting the hypothesis that if leadership does indeed matter, it would most likely occur with a founder CEO, who has a greater likelihood of control, economic and personal incentives, ability to exert vision on governance issues (stewardship) and an extended (unimpeded) job tenure to see his or her vision through to completion.[6] Following the logic further, we note that if an index of founder CEOs provide superior risk–return benefits relative to a peer benchmark, a smart beta solution develops from the opportunity to overweight those companies within the benchmark. The overall result would then yield comparable risk characteristics (to those of the benchmark) with superior risk-adjusted returns.[7] We conclude that although this approach does not work in all time periods or across all market conditions, it appears to be effective in economic environments favoring growth-oriented stocks and, in particular, specific investment sectors.[8]

MAKING A CASE FOR THE FOUNDER-CEO FACTOR

Smart beta approaches attempt to beat market capitalization-weighted benchmarks through the application of differing weighting methodologies that accentuate factors such as momentum, size, dividends,

volatility, or value. Smart beta advocates often employ historical back tests demonstrating advantages over a specific period of time, promoting logical arguments as justification.[9]

In this article, we utilize a founder-CEO factor as an enhancement to a U.S. large-cap growth index. We apply this variable coinciding with developing academic and anecdotal evidence, along with emerging investment strategies, purporting benefits of investing alongside founder CEOs.[10] Legendary founder CEOs, such as Steve Jobs, Sam Walton, and Jeff Bezos, built extraordinary organizations that continue to generate exceptional personal and stakeholder wealth.[11] In their companies' early formative years, these founder CEOs were known to eschew corporate bureaucracy, subscribe to a vision consisting of long-term leadership, cultivate organic company growth, and align executive compensation. Founder CEOs often assemble tight management teams with manageable debt levels and ensure that key expansion projects are held within reach. As stewards of the firm, founder CEOs appear driven by both economic and noneconomic incentives. Their entrepreneurial culture keeps costs lean, enabling margins to expand, and retains key people. We presume that these unique governance attributes might contribute to better economic performance for the organization and superior stock results for shareholders.

Academic arguments favoring a founder-CEO grouping attribute success to their long-term orientation, longer tenure, higher ownership, younger firm age, higher relative expenditures on capital expenditures, and larger relative investments in research and development.[12] Founder CEOs may also be more likely to view the company as their life's achievement, providing additional noneconomic motivation to help drive the organization to succeed.[13] Furthermore, founder-CEO firms might be more productive compared to professional counterparts due to reduced agency costs, continuity with leadership, greater reliance on founder reputation, and higher degree of firm-specific skills compared to non–founder CEOs.[14]

Importantly, this research makes a distinction between the broader term "entrepreneur" and the specific factor in this research, "founder CEO."[15] There are likely many more factors involved in being labeled an entrepreneur than simply the term founder CEO.[16] Moreover, it would be an overstatement to presume that all founder CEOs provide an entrepreneurial outlook or to assume that all entrepreneurs are founder CEOs. Many cases exist of well-recognized entrepreneurs who are not founder CEOs or of founder CEOs who are not entrepreneurs.[17]

Founder CEOs who overcome early obstacles and persist after IPO often reward shareholders with strong stock returns.[18] We note the academic evidence that describes the benefits of investing in founder CEOs over non–founder CEOs and provide a carefully constructed methodology to implement this trading rule.[19] The model factor that we employ is based, in part, on these publications and the compelling evidence that suggests this factor may be beneficial to investors over an extended time period.[20]

We incorporate our founder-CEO factor into a smart beta strategy using one of two basic approaches: We either 1) start with a U.S. large-cap growth index (benchmark index) and overweight the founder-CEO constituents or 2) simply buy a benchmark index or benchmark ETF and buy the desired founder-CEO index or individual securities within the basket of founder CEOs.[21] Given the risk–return exposure the investment manager desires, he or she can calibrate the overweighting levels in the benchmark index basket or relative amount of weighting in the benchmark index/ETF versus the founder-CEO index.[22]

DOES SMART BETA WORK WITH FOUNDER CEOs?

Smart beta enthusiasts hope to offer better risk-adjusted returns than standard indexes by employing a passive investment strategy that targets rewarded risk premiums through alternative weighting schemes.[23] In our case, we attempt to enhance the returns of a U.S. large-cap growth index by targeting two combined management factors that we believe can enhance investment performance: company founders who are also CEOs.[24]

The effectiveness of a smart beta index with a founder-CEO factor hinges on two basic criteria: 1) the ability to correctly identify founder-CEO companies and 2) the likelihood that founder-CEO tendencies help improve shareholder performance. If the first criterion is difficult to detect on a consistent, reliable basis and/or the second factor becomes insignificant, then the exercise of creating a smart beta index with

founder CEOs becomes meaningless. We believe in the possibility of both.[25]

Consequently, our mission is to evaluate whether a U.S. large-cap growth ETF/index can generate enhanced performance with a modification to weights in company securities that are deemed to fall into the founder-CEO category.

We propose an approach that we believe correctly identifies founder-CEO companies on a consistent basis and provides compelling results with promising potential. The model appears to work well in many market conditions but may fail significantly in others. Overall, the trading rule seems to be successful much of the time and, we believe, becomes much more likely to hold true over an extended period of time.[26]

IDENTIFICATION OF FOUNDER CEOs

Discovering founder CEOs requires considerably more effort than a simple word search due to database inconsistencies and inaccuracies.[27] We begin our quest for founder CEOs by using data from Bloomberg, Capital IQ, SP ExecuComp, and SEC company disclosures.[28] We start our process with the S&P 500 Index and then expand to the Russell 1000 Growth Index as our project develops. We observe that because the data sources do not all correspond with similar responses, we need to follow up each potential entry with a more detailed, company-specific examination. Many companies do not identify founders within their company biography or organizational title section, thus negating any opportunity to effectively screen or search based on this simple criterion. Furthermore, many companies have been delisted over the years because of mergers/acquisitions, bankruptcies, management buyouts, or other reasons. Consequently, to correctly compile a list of the top 30 market capitalization firms (rebalanced quarterly) without survivorship bias, selection bias, or data omission bias, we need to initiate a search on every single publicly traded company prospectus from the date of index inception and identify each and every founder, year by year, with a consistent definition.[29] This is a very tedious process that requires extensive research time to ensure accuracy. Given our desire to create an index with an inception date of 2006, including the top 30 market capitalization firms (rebalanced quarterly), we ultimately examine 1,507 company prospectuses, including 106 delisted firms.[30] The descriptive statistics and analytics of this grouping relative to a comparable U.S. large-cap growth benchmark are shown later.

EXHIBIT 1
Descriptive Statistics—Founder CEO versus Vanguard Growth

Categories	Founder CEO	Vanguard Growth
Market Cap	$83.1 billion	$193.2 billion
Mean (Median)	($14.4 billion)	($17.2 billion)
Dividend Yield	0.59%	1.29%
Price to Earnings Ratio (P/E)	38.72	27.96
Total Debt to Common Equity	94.08%	90.10%
Sales Growth (5 year)	14.54%	10.20%
R&D to Sales	11.79%	8.15%
Consumer Discretionary	28.40%	14.95%
Financials	16.39%	8.32%
Health Care	9.78%	12.54%
IT	19.54%	29.72%
Real Estate	4.76%	2.59%

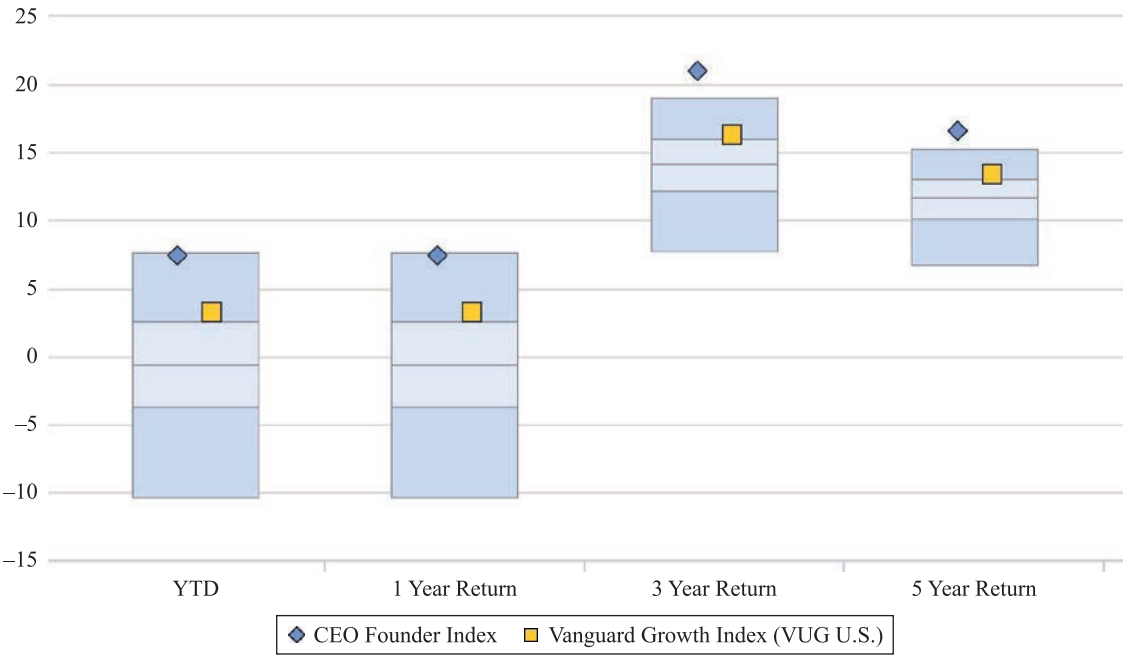
Source: Bloomberg.

Founder-CEO Descriptive Statistics

Exhibit 1 illustrates some of the descriptive statistics for the founder-CEO index along with comparisons for a U.S. large-cap growth index/ETF.[31] We select the Vanguard Growth Index (ticker: VUG) because it provides the best fit to our founder-CEO index among U.S. large-cap growth indexes/ETFs based on overall characteristics (e.g., highest correlation, composition).[32] We note the founder-CEO index (relative to benchmark) has (among other differences) a lower dividend yield (0.59% for founder-CEO versus 1.29% for the benchmark), higher P/E ratio (38.72% for founder-CEO versus 27.96%), significantly higher five-year sales growth rate (14.54% versus 10.20%), and higher R&D to sales (11.79% versus 8.15%). Moreover, the founder-CEO index represents companies that have a higher concentration in the Consumer Discretionary sector (28.40% versus 14.95% for benchmark), higher weight in Financials (16.39% versus 8.32%), lower weight in Health Care (9.78% versus 12.54%), lower weight in Information Technology (IT; 19.54% versus 29.72%), and higher weight in Real Estate (4.76% versus 2.59%).[33]

EXHIBIT 2

Summary of Annualized Returns, Year-End December 2006 through December 2015



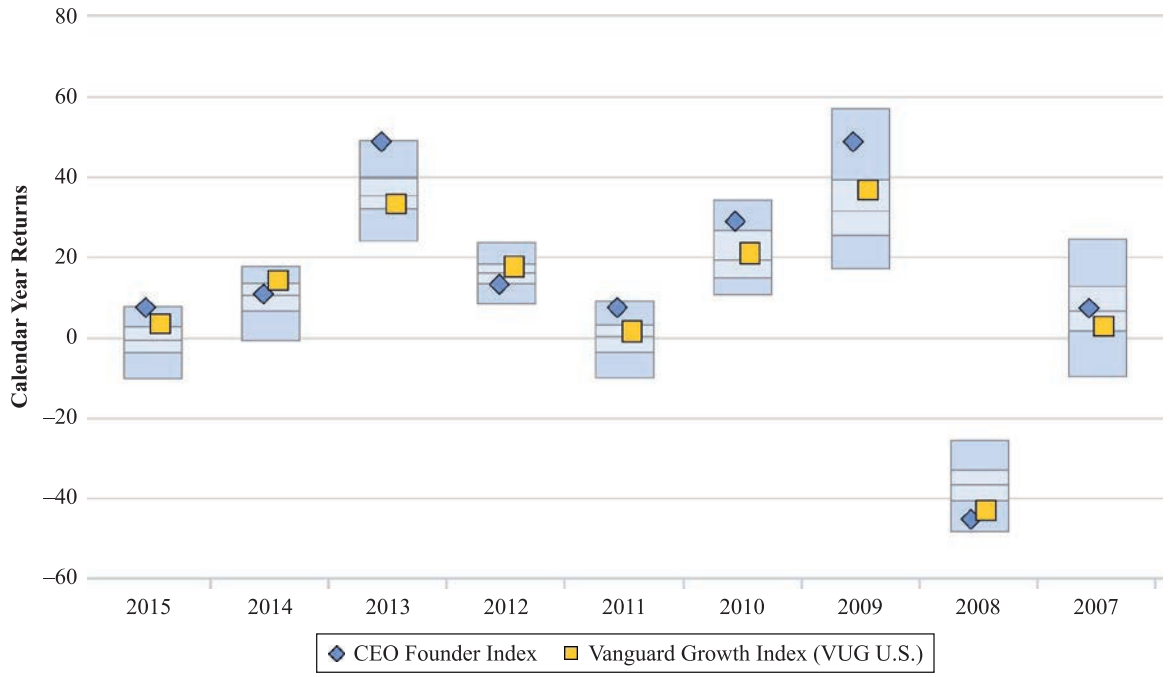
Source: eVestment, all U.S. equity universe.

The founder-CEO index demonstrates a clear advantage over the VUG constituents on factors such as sales growth and R&D. Annualized five-year sales growth is 33% higher among founder CEOs, and the R&D-to-sales ratio is +44% higher. By contrast, founder-CEOs hold a significantly lighter weight in several key sectors during our time period, including IT (19.54% versus 29.72%).[34] However, given the concentrated nature of the founder-CEO index (30 holdings, rebalanced quarterly), we note the potential for significant sector variation on a year-to-year basis.[35] We recognize that significant differences in sector weights can change the overall profile and total returns significantly. However, we find that regardless of sector weights in the index at any point in time, the performance differential (rewarding the founder-CEO index) tends to favor three sectors (i.e., IT, Health Care and Consumer Discretionary).[36] Moreover, the founder-CEO index tends to underweight Energy, Industrials, and Consumer Staples (where this index tends to underperform or hold relatively light weights). By comparison, most U.S. large-cap growth indexes also overweight the same sectors and, in fact, may hold higher weights. A few descriptive statistics are shown in Exhibit 1 (as of December 31, 2015).

HOW DID THEY PERFORM? RETURN SUMMARY

Exhibit 2 provides a summary of annualized returns comparing the founder-CEO index to the VUG for the period of December 2006 through December 2015.[37] Of the three distinct periods shown, the founder-CEO index outperforms the comparative benchmarks in all three one-year, three-year, and five-year periods.[38] Moreover, during the five-year period of January 2011 through December 2015, the annualized return of 16.58% for founder-CEOs ranks among the top one percentile on the eVestment database of 3,287 comparison funds within the All U.S. Equity Universe.[39] This return is well above the norm among all U.S. equity funds and 3.16% above the 13.42% annualized return for the benchmark fund.[40] During the three-year period (2013–2015), the founder-CEO index provides a 20.98% annualized return versus the U.S. large-cap benchmark return of 16.30%. This

EXHIBIT 3
Summary of Annual Returns



Source: eVestment, all U.S. equity universe.

three-year return places the founder-CEOs in the top two percentile. During the one-year period (2015) the founder-CEO index ranks among the top five percentile of all U.S. equity funds.

The calendar year returns (Exhibit 3) provide an overview of the annualized returns of the founder-CEO index relative to an eVestment all U.S. equity universe of 3,799+ funds as well as the U.S. large-cap fund benchmark.[41] The 30-constituent founder-CEO index generally performs in the top one-half of all funds in the database (seven out of nine years shown), although it fell below average in one year and well below average in another. The recessionary year of 2008, in particular, represents a difficult period for the founder-CEO index. The index lost 45.27% (90th percentile among all U.S. equity funds) in 2008 and fell at least 5% to 10% below average for most U.S. equity funds and –2.17% below the U.S. large-cap VUG benchmark (–45.27 versus –43.1%). In 2012, the founder-CEO index generates 13.23% (77th percentile among 3,991 all U.S. Equity funds in eVestment database), which lies approximately 1%–2% below average in performance for all U.S. equity funds but 4.36% below the U.S. large-cap benchmark (VUG) of 17.59%. In contrast, the founder-CEO index provides relative strength against most other U.S. equity funds in years such as 2013, when it earns 48.77% (top five percentile among 3,925 U.S. equity funds); 2009, when it generates 48.74% (top 10 percentile among 4,331 all U.S. equity funds); 2010, when it produces 28.89% (top 15 percentile); and 2015, when it returns 7.42% (top five percentile among 3,799 all U.S. equity funds).[42] During the strong years for the founder-CEO index—2015, 2013, 2011, 2010, and 2009—the index outperforms the U.S. large-cap growth benchmark (VUG) by 4.16%, (7.42% – 3.26%), 15.45% (48.77% – 33.32%), 5.9% (7.39% – 1.49%), 7.94% (28.89% – 20.95%), and 11.89% (48.74% – 36.85%), respectively.

The annual returns shown in Exhibit 3 demonstrate the outperformance of the founder-CEO index for most years of our study, but striking underperformance during the critical recessionary year of 2008. Overall, the strong performance of the founder-CEO index, shown in Exhibit 2 on an absolute and relative basis, remains consistent with the year-by-year returns we observe in Exhibit 3.

EXHIBIT 4

Summary of Return Information, December 2006 through December 2015

Risk Analysis

Statistic	CEO Founder Index	Vanguard: Vanguard Growth Index (VUG U.S.)
1 Year Return	7.42%	3.26%
3 Year Return	20.98%	16.30%
5 Year Return	16.58%	13.42%
Cumulative Return	142.22%	81.48%
Standard Deviation	19.72%	17.31%
Sharpe Ratio (Citi 3 Mo. T-Bill)	0.48	0.35
Returns	10.33%	6.85%
Num of Negative Periods	43	44
Num of Positive Periods	65	64

Source: eVestment.

Exhibit 4 includes some additional summary return information for the founder-CEO index relative to the U.S. large-cap VUG benchmark. Consistent with the graph in Exhibit 2, the founder-CEO index beats the VUG benchmark for the one-year, three-year, and five-year periods. Furthermore, Exhibit 4 shows that the founder-CEO index dominates the comparative benchmark for total performance since the inception of the index at the end of December 2006. The cumulative return for the founder-CEO index is 142.22% through December 2015, which is well ahead of the VUG return of 81.48%. Moreover, the average annualized returns over the entire period ranging from December 2006 through December 2015 is 3.48% higher (10.33% versus 6.85%, respectively).[43]

Examining the Distribution of Returns

Exhibit 5 shows how the founder-CEO index has a greater likelihood of monthly returns at both ends of the distribution spectrum. Both extremes (e.g., greater than 6% monthly return or less than −6% monthly return) are more likely with the founder-CEO index than with the VUG. Out of the 108 monthly periods in the year-end December 2006 through December 2015 time period, the founder-CEO index provides 19 periods (17.6%) with monthly returns of 6% or more.[44] This compares with only 11 periods (10.2%) of monthly returns of 6% or more for the comparative benchmark. At the other end, the founder-CEO index has 13 periods of −6% or less (out of 108 months), which is greater than the 11 periods of −6% or less for the VUG benchmark. Furthermore, extending the monthly distribution analysis to monthly returns exceeding +4%, we see that the founder-CEO index accomplishes this feat 30.5% of the time (33 out of 108 periods) compared to the VUG, which does so 21.3% of the time (23 out of 108 periods).[45] The 30-stock founder-CEO index provides a greater likelihood (compared to a U.S. large-cap growth benchmark) of generating very strong monthly returns but may be more likely to generate strong negative returns. Overall, this more extreme behavior contributes to a higher standard deviation of returns compared to the benchmark.[46] We observe from the distribution table of returns that situations in which monthly returns reside in the middle range (+4% to −2%) occur more frequently with the VUG rather than with the founder-CEO index.[47]

Cumulative Returns and Peer Analysis

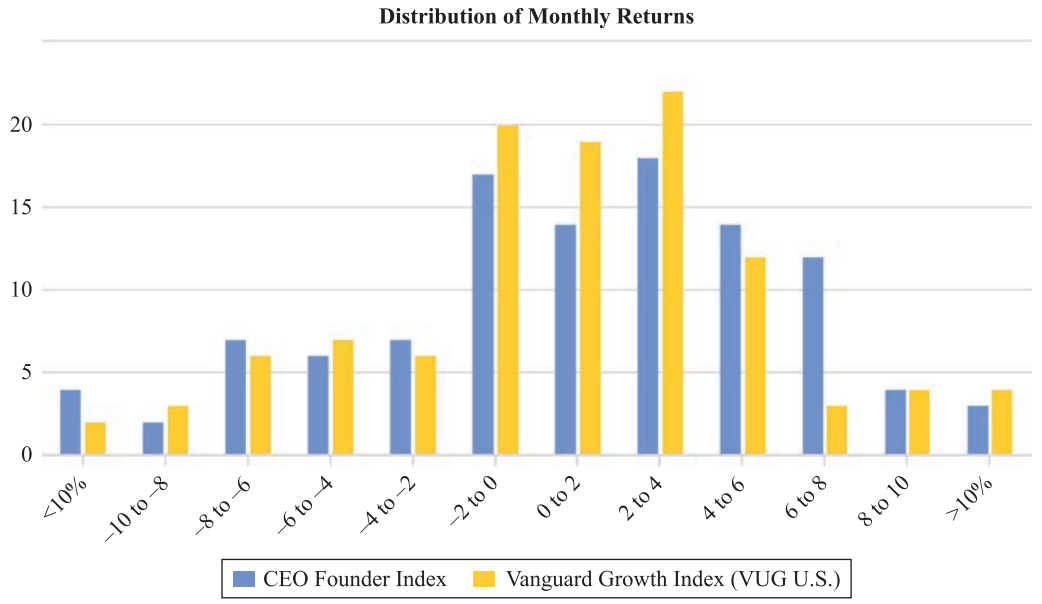
Exhibit 6 shows the cumulative returns and growth of a $1,000 investment from index inception. As the exhibit demonstrates, the founder-CEO index grows a $1,000 investment more than 142% in nine years to the level of $2,422. The VUG, on the other hand, appreciates the same investment by 81.5% to $1,815. The line representing the founder-CEO index provides a compelling pictorial that illustrates a clear advantage over the U.S. large-cap growth benchmark.

Exhibit 7 provides peer comparisons with the founder-CEO index. The founder-CEO index provides an annual excess return of 3.48% over the VUG. Compared with 2,679 all U.S. equity funds in the eVestment database, the founder-CEO index ranks in the top six percentile. In terms of total returns, the founder-CEO generates 10.33% (top six percentile) during the period ranging from December 31, 2006 through December 31, 2015 (VUG total return for the same period was 6.85%) with a corresponding risk-adjusted alpha of 3.35% over the VUG (top 10 percentile). The IR is 0.45 (top five percentile) for the founder-CEO index, and the Sharpe ratio (SR) is 0.48 (top 15 percentile).[48]

Exhibit 8 provides specific monthly returns for the founder-CEO index. A review of this exhibit illustrates the variability in returns for each month between year-end December 2006 through December 2015. Even in

EXHIBIT 5

Distribution of Monthly Returns, December 2006 through December 2015



Source: eVestment.

EXHIBIT 6

Cumulative Returns, December 2006 through December 2015

Source: eVestment.

Exhibit 7

Peer Analysis, December 2006 through December 2015

Source: eVestment, all U.S. equity universe.

Exhibit 8

Monthly Returns

Historical Performance—Monthly Returns

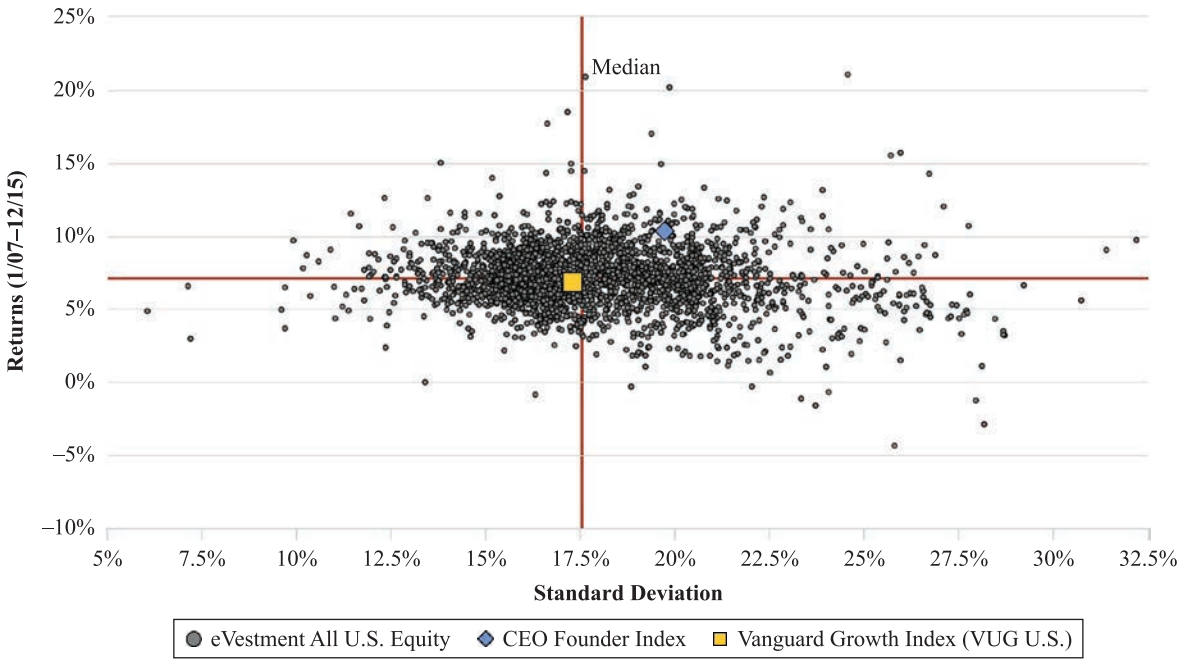
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
2015	0.62%	5.99%	–1.36%	0.13%	1.93%	–0.75%	4.00%	–6.99%	–3.27%	8.15%	1.64%	–1.98%	7.42%
2014	–0.83%	6.64%	–4.21%	–3.39%	4.51%	2.96%	–1.11%	5.52%	–1.98%	1.46%	3.12%	–1.69%	10.80%
2013	7.58%	–0.26%	2.55%	3.97%	2.32%	–1.54%	8.77%	–0.17%	7.44%	5.03%	2.49%	2.77%	48.77%
2012	5.65%	7.08%	4.10%	–2.52%	–7.21%	1.60%	–2.04%	2.58%	1.61%	–2.40%	3.95%	1.01%	13.23%
2011	3.38%	5.24%	1.54%	3.90%	1.35%	–1.28%	0.85%	–4.85%	–6.85%	8.10%	–2.20%	–1.03%	7.39%
2010	–6.68%	7.96%	6.00%	4.04%	–4.50%	–7.69%	5.80%	–3.79%	12.13%	5.87%	3.31%	5.42%	28.89%
2009	–9.11%	–8.70%	11.67%	14.39%	2.20%	2.19%	7.35%	5.97%	7.09%	–4.52%	6.09%	8.88%	48.74%
2008	–7.82%	–4.06%	0.51%	6.19%	6.11%	–10.45%	–5.91%	3.15%	–11.75%	–20.24%	–15.74%	6.01%	–45.27%
2007	1.49%	–1.04%	–0.83%	5.05%	3.58%	–0.39%	–1.97%	1.80%	5.22%	3.05%	–6.90%	–1.41%	7.23%

Source: eVestment.

very strong years in which the founder-CEO index provides exceptional returns, such as 2009 and 2013, the index still experiences three months of negative returns. In contrast, calendar years with an extremely challenging economy, such as 2008, generate negative returns for 7 months out of 12. Investors should recognize that this strategy, not unlike other concentrated equity strategies, may be subject to market volatility.

Exhibit 9 provides a scatterplot of the risk–return of the founder-CEO index, VUG, and 2,679 other U.S. equity strategies in the eVestment database. The scatterplot applies annualized returns on the *y*-axis given the

EXHIBIT 9
Scatterplot Returns



Source: eVestment, all U.S. equity universe.

associated standard deviation of returns on the *x*-axis. The VUG is situated very close to the median intersects. Interestingly, the founder-CEO in the upper right quadrant suggests that, within the eVestment database of 2,679 U.S. equity investment strategies, relatively few strategies offer a similar risk–return pattern. Most of the strategies in the database contain less risk, and only a handful of the strategies offer more return. The founder-CEO index appears to offer an attractive risk–return trade-off for those investors willing to assume above-average risk.[49]

Risk Analytics: How Did the Founder-CEO Index Perform?

Exhibit 10 provides the risk analytics for the founder-CEO index relative to the VUG. The benchmark provides a relatively high correlation (0.92) to the founder-CEO index. The beta for the founder-CEO index is above average risk (1.05), which corresponds with the higher standard deviation (19.72%). The above-average up capture (118.05%) and down capture (102.03%) ratios associated with the founder-CEO index appear consistent with the return distribution chart that illustrates how returns for the founder-CEO index are more skewed to either a strong positive or negative distribution tail. We note that the higher up capture (e.g., 118.05%) over the downcapture (102.03%) provides an upward bias and appears consistent with a positive risk-adjusted alpha for the founder-CEO index (3.35%) over the VUG.[50] Clearly, the overall benefits of more frequent positive periods (corresponding with strong returns as shown in Exhibit 8) more than offset the above-average negative returns during this period of study.[51]

PERFORMANCE ATTRIBUTION

Where Are Returns Generated? Asset Allocation or Security Selection?

The founder-CEO index provides performance of 142.27% during the time period of year-end 2006 through year-end 2015, compared to 81.48% for the U.S. large-cap (VUG) benchmark. Excess return is 60.79%. As we see in Exhibit 11, the performance

EXHIBIT 10
Risk Analytics

Performance Statistics—All Market

Benchmark	Corr (R)	Alpha	Beta	Tracking Err	Excess Rtn	Info Ratio	Returns	Bench Rtn	Bet Avg	Std Dev	Bench Std Dev	Up Mkt Capture	Down Mkt Capture	Beta *T*-Stat
Vanguard: Growth Index (VUG U.S.)	0.92	3.35%	1.05	7.77%	3.48%	0.45	10.33%	6.85%	0.60	19.72%	17.31%	118.05%	102.03%	24.17

Source: eVestment.

attribution of the founder-CEO index is concentrated in three primary sectors: IT, Health Care, and Consumer Discretionary. The IT sector generates 233.79% return (compared to 120.14% for the VUG benchmark), the Health Care sector produces 587.37% return (versus 159.34% for the benchmark), and Consumer Discretionary provides 249.20% (versus 139.31% for VUG). Performance attribution represents a combination of security selection and asset allocation. As Exhibit 11 shows, of the 60.79% excess return, the vast majority (56.35% of 60.79%) corresponds to security selection. Only 4.43% corresponds to asset allocation. Notably, the founder-CEO index would have performed better if sector weights in the strong-performing Health Care and IT sectors matched the benchmark sector weights.[52] Continuing with the performance attribution analysis, Exhibit 11 illustrates how the founder-CEO index does not gain excess returns from sectors such as Industrials, Real Estate, Consumer Staples, Energy, Materials, and Utilities.

We note that most of the weight of the index resides in three to four sectors (Consumer Discretionary, IT, Health Care, and Financials).

Can Traditional Factor Models Explain Excess Returns?

When evaluating the performance of the founder-CEO index, we surmise that in addition to the market model, there are likely other factors that might be able to explain the 60%+ excess return. Because our founder-CEO index has a strong bias toward three sectors (IT, Health Care, and Consumer Discretionary), a strong orientation toward growth, and a monthly return distribution that suggests momentum might be a consideration, we decide to first test for these factors. We first analyze our data against well-known factors to assess whether or not the founder-CEO factor might be redundant, or possibly better represented by some other factor.[53]

Exhibit 12 shows the total active return of our founder-CEO index (blue line) versus the Fama–French three-factor model that examines market, value, and size.[54] As we can see from the Fama–French three-factor model, there is a significant gap between the blue line and all of the other lines. U.S. value represents −6.53%, U.S. market provides −0.36%, and among the three factors shown, U.S. size provides the dominant effect of 20.43%. This means out of the total active return (60.79%), the Fama–French model accounts for only 13.54%. Based on this analysis, it is unclear if any other factors, regardless of founder CEO, might be influential.

We next decide to use another popular factor model (Carhart) that builds upon the Fama–French three-factor model by introducing the momentum factor. The Carhart model is shown in Exhibit 13. The Carhart model includes the same factors as before, but it still resides well below the blue line of total active return. U.S. value represents −6.53%, U.S. market −0.36%, U.S. size 20.43%, and the new momentum factor adds 2.17%. The momentum factor of 2.17% provides an improvement from the prior model, although it still leaves much of the total active return without explanation. Total active return of the founder-CEO index is 60.79%, and the Carhart model accounts for 15.71% of that amount, leaving a balance of 45.08% without explanation.[55]

We next decide to examine a more exhaustive factor model (on Bloomberg) that incorporates virtually every known factor into the analysis. The results may be surprising to many academics and seasoned professional investors and might very well be a major empirical finding in the academic literature.[56]

EXHIBIT 11
Performance Attribution

Name	Avg % Wgt			CTR			Tot Rtn			Tot Attr	Alloc	Selec
	Port 1	Bmrk	+/-	Port	Bmrk	+/-	Port	Bmrk	+/-			
CEOF	100.00	100.00	0.00	142.27	81.48	60.79	142.27	81.48	60.79	60.79	4.43	56.35
Consumer Discretionary	28.40	14.95	13.45	53.69	24.18	29.51	249.20	139.31	109.89	27.92	11.68	16.24
Information Technology	19.54	29.72	-10.18	43.71	34.77	8.94	233.79	120.14	113.65	17.35	-4.71	22.06
Financials	16.39	8.32	8.07	16.83	-10.68	27.51	75.08	-44.66	119.74	26.71	-7.08	33.79
Health Care	9.78	12.54	-2.76	34.35	13.68	20.67	587.37	159.34	428.03	6.86	-6.31	13.16
Industrials	6.60	9.29	-2.69	4.35	5.20	-0.85	28.89	52.88	-24.00	0.25	2.56	-2.32
Real Estate	4.76	2.59	2.17	-3.88	3.67	-7.55	-44.39	94.09	-138.48	-9.63	-0.66	-8.98
Stocks	4.59	3.48	1.12	-10.98	-0.49	-10.49	-42.63	231.66	-274.28	-13.56	1.40	-14.96
Consumer Staples	4.56	10.69	-6.13	4.42	10.19	-5.77	29.99	115.15	-85.16	-3.40	-2.05	-1.34
Energy	3.81	5.60	-1.79	-3.44	-1.27	-2.17	-59.65	-4.80	-54.84	5.64	10.81	-5.17
Materials	1.57	2.56	-0.98	3.21	2.26	0.95	51.27	106.56	-55.29	2.87	-1.00	3.87
Bonds	0.00	0.00	0.00		0.00	0.00		0.25	-0.25	0.01	0.01	0.00
Cash	0.00	0.05	-0.05		0.00	0.00		0.00	0.00	-0.48	-0.48	0.00
Telecommunication Services	0.00	0.04	-0.04		0.05	-0.05		22.61	-22.61	-0.01	-0.01	0.00
Utilities	0.00	0.17	-0.17		-0.08	0.08		-26.17	26.17	0.27	0.27	0.00

EXHIBIT 12
Fama–French Three-Factor Model

Source: Bloomberg.

The Founder-CEO Factor—Is It Real?

In an attempt to be exhaustive in the search for other explanatory factors in assessing the 60.79% excess returns, we utilize the Bloomberg factor model to include virtually every style, sector, country, currency, time-weighted, and other factors available. In addition to the Fama–French three factors and momentum (from the Carhart model), we encompass many others. In final form, the complete analysis we report includes 30 factors: total active return, factor return (summary), selection effect (attributed to founder-CEO model), equity return (summary), country, U.S. market, industry (summary), Consumer Discretionary, Consumer Staples, Energy, Financials, Health Care, Industrials, Materials, Utilities, Communication, Technology, style (summary), dividend yield, earnings variable, growth, leverage, momentum, profit, size, trade activity, value, volatility, currency, and time return.[57] Most of the factors have modest influence. We show the results in Exhibit 14.

In our analysis, we evaluate factors contributing to the total active return during the period: December 29,

Exhibit 13

Factor Analysis: Carhart Model

Source: Bloomberg.

Exhibit 14

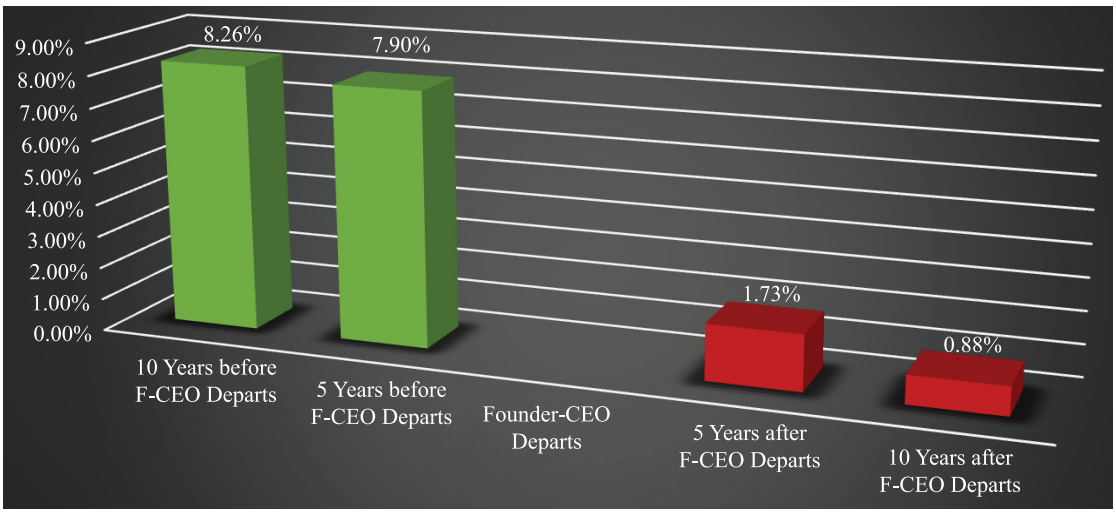
Complete Factor Analysis: 30 Factors Including Founder-CEO index

Source: Bloomberg.

2006 through December 31, 2015. The complete period demonstrates very strong capital market appreciation, although clearly parts of this economic cycle (November 2007–March 2009) experience strong market decline. As Exhibit 14 makes clear, during the nine-year period of December 29, 2006 through December 31, 2015, the founder-CEO index (shown by the green line) outperforms the VUG benchmark by 60.79%. The selection effect or founder-CEO index is, by far, the dominant factor. No factor among the other 29 comes close. Of the 60.79% total active return (shown by the blue line), the selection effect (founder-CEO index) helps explain 59.32%. The remaining balance of 1.47% astonishingly represents *all* of the remaining factors combined.

Exhibit 15

Before and after Founder CEO Departs, Average Annualized Excess Return



Other significant factors include U.S. size (20.43%), Consumer Staples (−8.07%), Consumer Discretion (8.85%), U.S. value (−6.53%), volatility (−5.95%), and leverage (−5.49%).[58] These results are very compelling and, to many investors and academics, will likely be very surprising. We surmise from this analysis that the founder-CEO factor is not only a significant factor to consider for inclusion but, during our time period of study, is the most significant factor for evaluating the excess return. Although this analysis cannot address prior time periods, or necessarily predict the benefits for future time periods, we believe it would be prudent for academic scholars to, at minimum, include the founder-CEO factor for analysis in future studies.[59]

Does a Founder-CEO Make a Difference? How Do Companies Perform after Departure?

A seemingly obvious question to this research is the effect had on a company after a founder-CEO departs from his or her firm.[60] Exhibit 15 provides an assessment for 5-year and 10-year periods before and after departure. In total, we have 129 companies with 5-year performance and 38 companies with 10-year performance. The results for both periods are very similar and significant. In the 5 or 10 years prior to departure, the founder-CEO company produces an annualized excess return (over market benchmark) of approximately 8% (7.90% for the 5-year period and 8.26% for the 10-year period). By contrast, once the founder CEO leaves, the annualized excess return drops to 1.73% and 0.88% for the 5-year and 10-year periods, respectively. Notably, in the latter case, more than one-half of the five-year excess return (after CEO leaves) can be attributed to a single outlier situation. The differential between the period including the founder CEO and the period without the founder CEO is approximately 7% per year (excess return).[61] These results are striking and provide further support that a founder CEO makes an important difference.

Building the Smart Beta Portfolio, One CEO-Founder Index Factor at a Time

There are essentially two different paths that a fund manager might pursue in building a U.S. large-cap smart beta portfolio with the founder-CEO index:

1. Buy the founder-CEO index and replace part (or all) of a U.S. large-cap benchmark index or ETF. The fund manager can create a smart beta portfolio by increasing the weights of founder CEOs that are likely present in an existing index or ETF basket.
2. Build a portfolio starting with the founder-CEO index and add securities to help complete sectors that are underrepresented by the founder-CEO index.

The first path is very simple. The fund manager simply needs to purchase one or two indexes. If the fund manager only buys the founder-CEO index, the portfolio will experience greater volatility relative to a more comprehensive set of holdings such as the S&P 500 Index, VUG, or Russell 1000 Growth Index (owing to 30 stocks versus 500 or 1000) but will likely generate greater returns over a longer time period relative to the benchmarks. The second approach in developing a smart beta portfolio requires the fund manager to initiate the portfolio with the founder-CEO index, assess the relative sector weightings, and then fill the sector shortfall with other securities to match the benchmark index.

If the investor actually holds all of the securities in the S&P 500 or Russell 1000 Growth Index, the fund manager can overweight the 30 securities in the founder-CEO index and reduce all of the other securities in the index on a pro rata basis.[62] Because the founder-CEO index is an equal-weighted index, the active share for each security in the final portfolio will likely be higher than the original benchmark, although it will vary depending on the market cap of each security.[63] Given the 30-stock equal-weighted composition of the founder-CEO index, the composition of the index relative to the VUG or other more popular U.S. large growth indexes, such as the S&P 500 Growth Index or Russell 1000 Growth Index, may vary.[64] Notably, the similarity in the sector composition of the founder-CEO index relative to the VUG, S&P 500 Growth Index, or Russell 1000 Growth Index should not appreciably alter the sector exposure. The sector weights of the founder-CEO index relative to the S&P 500 Index (not S&P 500 Growth) will create a larger deviation owing to differences in growth orientation.[65] The final weights of each security in the portfolio will hinge on the level of risk–return the fund manager desires.[66]

PORTFOLIO RECOMMENDATIONS

In situations in which a fund manager has significant AUM, including U.S. large-cap growth exposure, it may be prudent to dedicate a portion of a U.S. large-cap growth equity allocation to a passively managed founder-CEO index. The risk characteristics are clearly identified and can be monitored in an ongoing manner with relatively straightforward parameters. As this article demonstrates, when market conditions favor growth or market appreciation, the founder-CEO index tends to outperform its U.S. large-cap growth benchmark. Moreover, the founder-CEO index outperforms peer benchmarks and other U.S. equity funds by a wide margin over the nine-year analysis, encompassing both very strong and negative market conditions. In some years of the analysis, the founder-CEO index performs in spectacular fashion. However, to be clear, the founder-CEO index also performs very poorly in some years. Fortunately, the ratio of bad-to-good performance is not symmetrical: Strong performance occurs more frequently relative to weak performance. Most key analytics, including excess returns, risk-adjusted returns, risk-adjusted alpha, IR, SR, and up capture, suggest that the founder-CEO index has compelling data to support a decision to include it in a portfolio basket.[67]

SUMMARY

The case for the smart beta portfolio implementing a founder-CEO index appears extremely compelling. Founder-CEO companies, during our study period, produce stronger performance than companies without founder CEOs. Factor analysis of our data provides further support. Results suggest that a U.S. large-cap growth fund that shifts larger weights to companies led by founder CEOs can enhance risk-adjusted portfolio performance over an extended period of time. The overall portfolio will likely see an increase in standard deviation of returns along with an increase in down capture. However, the corresponding increase in excess returns, risk-adjusted alpha, IR, SR, and up capture should more than compensate for the incremental risk exposure.

As our analysis shows, there are periods of time when market factors go against the founder-CEO strategy and result in portfolio underperformance. If such an event occurs, then alpha generation will be lost, although typically only for a brief duration.

The founder-CEO index has recently become available in the marketplace, although this is the first study to document the actual index.[68] Managers can simply craft a founder CEO SMA strategy around the founder-CEO index and complement the holdings with a separate U.S. large-cap index in the corresponding benchmark (e.g., S&P 500, S&P 500 Growth, Vanguard Large Cap Growth, or Russell 1000 Growth). Alternatively, fund managers who chose to research and create their own index can glean SEC disclosure documents

and build their own founder-CEO set of holdings and invest alongside existing U.S. large-cap holdings. In either situation, the intent and implementation should be the same: Fund managers weight companies run by founder CEOs in a more concentrated manner (than currently applied) and assume risk exposures associated with this decision.[69]

Incorporating a founder-CEO index overweight in a U.S. large-cap growth portfolio utilizes a logical argument coupled with strong analytical support. We provide powerful evidence that leadership matters: U.S. large-cap growth companies run by founder CEOs (during our period of study) yield superior performance while the founder CEO is in control, and the excess performance cannot be easily justified by other well-known style or sector factors. But buyers beware. Investors who follow a smart beta portfolio employing higher weights to founder CEO–run companies should not expect better performance every year. Our analysis reveals that return patterns vary greatly and may be subject to periodic disappointment. However, for investors willing to embrace a modest increase in risk and hold their strategy for an extended period of time, our results demonstrate that the incremental risk may well be worth it.

ENDNOTES

[1]Jacobs and Levy [2014] recognized that smart beta strategies are swiftly gaining market share and cited a September 6, 2013 *Financial Times* article, "Smart Beta Bandwagon Triggers Alarm," which notes that some industry experts believe smart beta might reach $6 trillion within the next few years (Marriage [2013]). They also identified experts who believe smart beta is a fad, with investors simply following a "label because it is fashionable." "Smart Beta Bandwagon Gathers Pace," a follow-up article by *Financial Times* a few months later, on April 29, 2014, references a Russell Investment survey that indicated as of that time, 32% of the 131 largest pension funds, endowments, and foundations had invested in smart beta. Whether smart beta is a fleeting fad or long-term industry trend is not yet clear, although the holdings continue to rise.

[2]For example, Jacobs and Levy [2014] noted that the decision not to hold the capitalization-weighted market portfolio is an active decision in itself. Furthermore, they maintained that smart beta strategies require additional active decisions made at the outset, such as specific factor(s) to target, weighting method, and so on.

[3]Investment expert Warren Buffett (among others) expends considerable energy in assessing the quality of management. He places great importance on the company management's concerns for shareholders and seeks behaviors that align with stakeholder interests. Despite the popularity of a company management focus among active fund managers, few passive ETFs focus on management criteria, and it appears even fewer, if any, address smart beta solutions. Solactiv and EntrepreneurShares are two firms that have a management-based, or founder-CEO, index. Global X has issued a founder-CEO ETF, and EntrepreneurShares has a series of entrepreneur mutual funds, separately managed accounts (SMAs), and ETFs. BlackRock (iShares), one of the market leaders in smart beta methodologies, has 43 smart beta strategies with approximately $70 billion in assets under management (AUM) but, to date, no management-based ETF.

[4]Leadership matters, or at least theoretically should matter. Logic aside, the notion that quality leadership traits can be appropriately measured and correctly valued for the proper time period may be a separate issue. We recognize that CEOs may not always receive the credit (or blame) for the company performance that is reported during their stay in office. Problems or solutions generated by a predecessor or changing market conditions beyond the control of the CEO often result in performance that is also beyond the control of the CEO. Moreover, the short duration of most CEOs of publicly traded companies (3–5 years) suggests that this exercise (allocating blame or credit) for performance while in office may be moot. We note that founder CEOs, unlike professional CEOs who are not the creator of the company, have (traditionally) a much longer duration in their position (7–10 years). The length of time differential for a founder CEO (compared to a professional CEO) is about double the norm. Moreover, we will later provide some evidence of market-adjusted returns before and after the founder CEO spends time in office. In short, we attempt to stake the argument that 1) proper leadership matters and 2) founder CEOs may provide evidence of good leadership.

[5]Fama and French [1993] created a framework to address factor-based smart beta strategies. In their article, they were able to demonstrate how certain factors, such as market capitalization and book to market equity, enabled investors to generate returns higher than predicted by the capital asset pricing model. They proposed a three-factor model that suggested market, size, and value help to explain much of the returns for a portfolio. Later, Fama and French expanded their three-factor model to a five-factor model that also included earnings and investment (increase in book equity). Carhart [1997] attempted to improve upon the Fama–French three-factor model by adding a momentum factor (creating a four-factor model). In this article, we explore the Fama–French factors as well as the incremental momentum factor by Carhart. For completeness, we also add at least 20 other factors provided by Bloomberg to examine potential factor

exclusions or omissions. Our motivation has been to identify as many unique, relevant factors as possible. Earlier academic reviews surmised that what we deemed to be an entrepreneur factor was likely already encompassed in factors such as growth, momentum, earnings, or some other well-explored category. We find that one entrepreneur factor that we proxy as a founder-CEO factor dominates the explanatory analysis by far over the period from December 2006 through December 2015. We recognize that there may be other entrepreneur factors that can help explain excess returns, although we leave it to future research scholars to consider additional related characteristics. Notably, the founder-CEO factor seems to provide unique value, although a reason does not yet appear obvious. We surmise that characteristics embedded in this factor may help clarify this conundrum. For example, founder CEOs may assemble a unique governance or incentive structure that generates returns that exceed expectations (Leland and Pyle [1977]). Board composition; hiring practices; growth financing/trajectory; employee compensation/ownership; share classes/voting rights; selling, general, and administrative expenses; management attributes; and so on may all share some systematic commonalities with founder CEOs. Theoretically, any implied benefits or pricing anomaly should be priced away over time. However, it is possible that a series of complex factors underlie or are encompassed within founder CEOs that generate unusual or difficult-to-predict surprises (e.g., earnings, growth, productivity) that have not yet been discovered.

[6]Citations later in this article discuss the merits of founder-CEO research. The evidence will make clear that founder CEOs have almost double the average duration in their jobs (as CEO), higher ownership levels, higher research and development (R&D) investments, better results with mergers and acquisitions (M&A), and stronger revenue growth while in office. Moreover, as our study shows, periods before and after the tenure of founder CEOs demonstrate a significant difference in relative risk-adjusted stock returns. While governance differences appear to be central to this research, the exact reasons for continued outperformance in the stock market are not clear at this time (although likely stemming from the list just given). Theoretically, investors in the marketplace would observe this anomaly and price it away immediately. However, the results of our study show that returns are not symmetrical among constituents in the founder-CEO basket. Like any other portfolio, results can be skewed by significant winners and/or losers. Performance distribution results (shown later) indicate significant difference between founder CEOs and the benchmark. We surmise that founder CEOs have inherent governance traits that allow the possibility for exceeding market expectations year after year. Anecdotal cases such as Apple, Netflix, Amazon, Google, and Facebook (among others) appear representative of this conclusion.

[7]We recognize that the outperformance could be attributed to other factors or market conditions and, later in the article, examine performance attribution across varying sectors and time periods. Moreover, in selecting a market benchmark, we first regress the return stream against a few market benchmarks holding comparable security populations (e.g., growth, large cap) and then select the benchmark with the highest correlation for comparative purposes. Moreover, in determining any potential advantage to our security selection, we adjust for a number of factors, including size, style, momentum, liquidity, yield, quality, volatility, and profitability. We note that other methodologies that disentangle stock returns, such as by Jacobs and Levy [1988], might yield different results. We show later in Exhibits 4 and 10 that the risk associated with the founder-CEO index does not vary appreciably from a comparable benchmark.

[8]By definition, a risk variable will not consistently provide returns in each and every period. As we show in the results section, results favor traditionally entrepreneurial growth sectors, such as Information Technology, Health Care, and Consumer Discretionary. Most stock holdings in this article represent these sectors. By contrast, relatively few companies reside in the Utility, Telecommunication, and Materials sectors.

[9]Jacobs and Levy [2014] differentiated between smart beta and smart alpha and discussed the potential for overcrowding among smart beta strategies due to their simplicity and transparency.

[10]Clearly, not all of the evidence is positive, although the preponderance of academic literature provides encouraging results. Early research on founder CEOs by Johnson et al. [1985] showed a positive stock price reaction following the abrupt death of a corporate founder. Morck, Shleifer, and Vishny [1988] found a negative effect associated with founders and market valuation (principally among older firms). Research by Fahlenbrach [2009]; Palia, Abraham, and Chia-Jane [2008]; Villalonga and Amit [2006]; Adams, Almeida, and Ferreira [2009]; and Shulman [2010] has showed a positive effect of founder CEOs and investment performance. Evidence from the more recent, comprehensive studies provides the motivation for our smart beta analysis.

[11]As we will see later, the returns to shareholders decline sharply after the founder CEO departs the organization. The effect is especially distinct in the period 5–10 years before the founder CEO retires/departs.

[12]Fahlenbrach [2009] conducted a study of 2,327 large U.S. publicly traded companies over the period 1992–2002 and found significant differences between founder-CEO companies and successor-run companies. In particular, he identified differences in R&D, M&A, capital expenditure debt/assets, age, ownership, and stock performance. As we show later in the descriptive statistics section, R&D as a

percentage of sales is higher for founder CEOs than the peer benchmark.

[13]Wasserman [2003] discussed how founder CEOs are different from professional CEOs. He noted that professional CEOs are older, have more years of prior work experience, are paid higher salaries, own significantly less of the company's equity, and have less control. Dobrev and Barnett [2005] also described the identity of organizational founders as being closely aligned to their organization. In addition, O'Reilly and Chatman [1986] discussed the psychological bonds that link individuals to their organizations.

[14]Gao and Jain [2011] provided an excellent overview of the theoretical development and hypotheses regarding why founder-CEO firms are likely to be more productive compared to non–founder-CEO firms. Fama and Jensen [1983], Nelson [2003], and Wasserman [2003] suggested that agency costs are lower in founder-run companies (implying founder-led companies are antiagency cost). Aldrich [1979] and Fischer et al. [2004] discussed the importance of a founder CEO during the transition to a public company. Basu, Dimitrova, and Paeglis [2009] noted that a newly public firm generally does not have its own reputation, so it needs to rely more heavily on its founder to gain investor attention. Finally, Gao and Jain [2011] argued that founder CEOs are characterized by a higher need for achievement, stronger psychological attachment to their company, tighter economic ties, larger ownership stakes, longer investment horizon, and higher degree of firm-specific skills. These attributes contribute to the founder CEO's overall willingness and desire to pursue long-term strategies at the expense of short-term results, with corresponding improvement in post–initial public offering (IPO) performance. However, there is a counterbalance effect in play. Dobrev and Barnett [2005] discussed the increased likelihood of founder CEOs leaving an organization as it grows larger and matures and their comparative skill set diminishes in value as the firm matures. In contrast, they found the opposite effect with professional CEOs.

[15]We define *founder* as the key individual or individuals who are/were with the company at inception or pre-revenue. In many cases, there are discrepancies among databases such as Bloomberg, Capital IQ, and company websites. We searched each company in the Russell 1000 database from the beginning of our time period to ensure that each founder held these characteristics. Individuals who transferred from an existing company with a spinoff are not labeled as founders. Notably, individuals who take over an existing enterprise and then recast history by labeling themselves as founders, such as the characterization of Ray Croc in the film "Founders" would not be labeled a founder in our study. We recognize individuals such as Ray Croc as worthy entrepreneurs, but we do not include these individuals in our founder-CEO study. Other research, such as that by Shulman [2010], has provided an investment model of 15 entrepreneurial characteristics and built an index of this grouping. In the identification of entrepreneurs, the founder-CEO variable is included along with a broader set of individuals in addition to founder CEOs. This research might include individuals such as Ray Croc or people who display unique characteristics resulting in substantial growth and vision but who did not participate at company inception.

[16]For example, entrepreneurs may have a different board composition, ownership structure, compensation arrangement, capital structure, growth orientation, R&D perspective, and long-term vision (among other differences) compared to non-entrepreneurs.

[17]Shulman and Noyes [2012] discuss the differences between a founder and an entrepreneur. For example, Angelo Mozillo, the founder CEO of Countrywide, was widely viewed as a self-serving inside trader who helped contribute to the 2008 mortgage crisis (he paid a $67.5 million fine to the Securities and Exchange Commission [SEC]). Mr. Mozillo does not have the same business traits as well-known entrepreneurs such as Howard Schultz (Starbucks) and Elon Musk (Tesla). These two successful individuals came in to their organizations early, were visionaries who created wealth for themselves and others, but were not founders. Moreover, Warren Buffet (Berkshire Hathaway) is another unique example of an extremely successful entrepreneur (who was not a founder) who successfully grew an established organization into something more substantive.

[18]We provide detailed analytics later in this article showing how a portfolio of the 30 largest market cap U.S. founder-CEO public companies (rebalanced quarterly), dating from June 2005 through September 2016, significantly outperform a peer group of 632 U.S. large-cap fund strategies provided on the eVestment data basis. The analytics show that the founder-CEO group are among the top 1% of all U.S. large-cap strategies during this time period, based on total returns and excess returns. As our analysis will reveal, the results are not consistent for each time period and vary considerably depending on the industry sector.

[19]Gao and Jain [2011] and Fahlenbrach [2009], among others, provided evidence that shareholders of publicly traded founder CEOs perform better than professional CEOs. Gao and Jain examined the five-year post-IPO performance of 1,963 IPOs from 1997–2000. They found that high-tech companies run by founder CEOs were more likely to outperform professional CEOs (especially when venture capitalists were not involved). Companies in low-technology areas did not outperform during this time period. Fahlenbrach showed that founder-CEO firms outperformed professional-CEO firms by 8% per year and suggested that long-term investments in R&D, capital expenditure, and other initiatives were largely responsible.

[20]In addition to the academic literature, we note that some investment firms, such as EntrepreneurShares, LLC, make their investment methodology an approach to investing in what they deem to be publicly traded entrepreneurial companies. A few of the factors that they cite could be, in part, attributed to the founder-CEO variable.

[21]A founder-CEO index has recently been launched (ticker: CEOFTR). It is compiled and distributed by Thompson-Reuters (in real time) and is available on Bloomberg and Yahoo Finance, among other sites. The historical record of this index corresponds to the time period of June 2005 to the present.

[22]The notion of a two-asset portfolio composed of an underlying basket of securities with specified risk–return attributes becomes a very elegant solution for investment managers and consultants. In this scenario, a CIO could choose to incorporate a founder-CEO index to enhance the returns of an underlying S&P 500 basket and set the tracking error of the overall portfolio to fall within a predetermined set of parameters. Should the CIO decide to incorporate a tactical approach, he or she could reduce the founder-CEO index when market conditions do not favor a growth-oriented sector–heavy (Tech/Healthcare/Consumer Discretionary) bias. This would also be an example of a core satellite approach.

[23]This concept is discussed at length in the publication by Winther and Steenstrup [2016].

[24]We suggest two indexes, S&P 500 and Russell 1000 Growth; the former is a well-known benchmark for U.S. large-cap securities, and the latter may have a stronger correlation to the underlying founder-CEO index. As we will show later in the article, the strong growth orientation to the founder-CEO index provides a potentially better match with the Russell 1000 Growth Index. Consequently, for purposes of thoroughness, we choose to use both.

[25]The ability to correctly identify founder CEOs is not as simple as it may initially appear. Some of the leading databases, such as Bloomberg and Capital IQ, frequently offer inconsistent characterizations of individuals. Moreover, due to the manner in which historical data are stored, an individual frequently is only listed while in a current management position. Consequently, uncovering original founders is a painstaking task requiring a long, arduous process of researching each and every company. In uncovering founder CEOs, we note the possibility of Type I (false positive) and Type II (false negative) errors. The following discussion is relevant in our discovery of founder CEOs:

- Type I error: An executive is incorrectly listed as a founder (in Bloomberg, Capital IQ, or other database sources). In the case of TJX Companies, Inc., Ben Cammarata is listed as founder in Bloomberg. However, according to the TJX Companies website, "The TJX Companies, Inc. traces its history back to 1919 when brothers Max and Morris Feldberg founded the New England Trading Company in Boston, MA. The Company started as a ladies' hosiery business and grew into a chain of women's apparel stores. The business evolved into a discount department store chain; in the mid-1950s, the Feldberg family rebranded it as Zayre Corporation." Despite Cammarata's great involvement in Zayre's mid-1970s restructuring, which resulted in the TJX Companies, the company's history extends long before Cammarata's time. Common reasons for Type I error include spinoffs, merger/acquisitions, restructures, and rebranding. Type I errors are more common than Type II errors. The most common explanations are usually a result of either complex corporate restructures/rebranding with limited or vague information. Some examples are divisional spinoffs that incorrectly list the executive involved in the spinoff as the founder of the new company; however, it is important to note that although an executive of this nature is not defined as a founder, this does not mean that they are not a great entrepreneur with admirable skill and leadership.
- Type II error: An executive is incorrectly not listed as a founder (in Bloomberg, CapIQ, other database sources). In the case of Apartment Investment & Management Co. (Aimco), Terry Considine is incorrectly not identified as founder in Bloomberg and CapIQ. However, on Aimco's website, the company timeline begins in 1975 when Terry Considine formed the Considine Company. Through a series of name changes, acquisitions, and mergers, the former company transformed into Aimco. Terry Considine had been the key visionary behind the company's evolution and, as a result, falls under the definition of a founder (in this article and the founder-CEO index). Common reasons for Type II error include limited or vague information on a company, a complex company timeline, bankrupt/delisted companies, and mergers/acquisitions. Type II errors are more difficult to find compared to Type I errors; however, discovering and correcting Type II errors is a critical component when constructing the

founder-CEO index because neglecting Type II errors could result in survivorship bias.

[26]By way of example, on December 2, 2016, the *Wall Street Journal* listed top-performing mutual funds, year to date, in its "Category Kings" section and included a U.S. large-cap mutual fund by EntrepreneurShares that performed in the top five among 698 similar strategies. The identified fund employs a smart beta strategy with a founder-CEO overlay that is very similar to the one described in this article.

[27]The author has encountered numerous anecdotal situations in which other scholars and investment professionals who researched founder CEOs employed a flawed methodology based only on convenient word searches to uncover company founder CEOs. Such an approach will inevitably lead to a variety of Type I and Type II errors in developing the proper database and associated investment characteristics.

[28]We start with the listing of publicly traded securities within the Russell 1000 Growth Index and initiate the search process at the beginning of our research period. We use the Russell 1000 Growth Index as a starting point because we are interested in a broad-based index with many constituents that have a growth orientation (consistent with our population). We recognize that many companies eventually may not meet the rules for our test (30 largest market cap entrepreneurial companies) but choose to begin with a large starting point of eligible securities. In searching through our databases, we note that the term "founder" does not appear in many databases or is applied inconsistently across years within the same database. Moreover, many founders are never identified as such within any database. We initially began our search within Capital IQ for founder CEOs but discovered that many founders disappear in searches for historical periods (titles only apply to current position). Moreover, titles associated with founders in Bloomberg often did not correspond with Capital IQ and also did not include historical elements. Finally, titles captured in ExecuComp did provide historical information but are limited to the S&P 500 list for the current year and may not be consistently applied over time. Consequently, we need to review each company using company disclosures, websites, and individual biographies on a one-by-one basis to capture precise title and founder information. We start our process on a historical basis utilizing the S&P 500 list and then expand to the Russell 1000 Growth Index with the development of the project.

[29]As we discussed in a prior note, though the term "founder" may appear as a transparent variable with relatively minor deviation in interpretation, in practice, many databases, and even company websites, apply this term in inconsistent ways. We do not depend on search criteria or company websites to correctly assess the term but rather apply a consistent rule to each firm in the dataset.

[30]In addition to the founder-CEO index that has been developed by EntrepreneurShares and published and disseminated by Thompson Reuters, a company known as Solactive AG published a founder-run index in August 2015. The index includes an equal-weighted basket (annual rebalance) of stocks from Canada, Hong Kong, Japan, the Netherlands, Switzerland, the United Kingdom, and the United States. The founder CEO of Solactive (Steffen Scheuble) cites as his inspiration "an index being less focused on short-term profit but rather targeting long-term growth." Moreover, Solactive cites several key insights (on its web page) from its licensing partners at BNP. Kemal Bagci from BNP Paribas (participant in licensing the product for launch of structure products) noted that "Founder-CEOs usually work towards a vision through which they can contribute their share to the world. They are willing to invest more into Research and Development, on average over 9%, than others. These sustainable investments result in lasting outperformance of over 8% per annum." Another member from BNP (Florian Stasch) noted, "Many Founder-CEOs consider their business a lifetime achievement, willing to work hard for the long-term. This approach can have a positive impact on the growth of a company." To qualify for the index, stocks must have a minimum market capitalization of $1 billion and an average trading value of $1 million over the past three months. It should be further noted that the only other known product that follows a similar approach would be EntrepreneurShares Global Fund, which has a similar investment strategy across comparable geographic base. EntrepreneurShares Global Mutual Fund was launched November 11, 2010 (five years prior to the Solactive founder-run index) and includes key variables other than founder CEO.

[31]For purposes of analytical comparison, we used the S&P 500 Growth Index, the Russell 1000 Growth Index, and the Vanguard Growth ETF (ticker: VUG). The Vanguard Growth ETF seeks to track the performance of the CRSP U.S. Large Cap Growth Index and has net assets of approximately $30 billion, a very low expense ratio (0.06%), and low turnover (10.7%). It has 310 holdings. We select this ETF because our factor analysis (as we discuss later) requires specific holdings (not a summary of returns) to properly compute the factor relationships (e.g., value, momentum, size). Moreover, given the extensive number of computations required for a detailed factor analysis over an extended period of time (including the 2008–2009 recession), we need an index with fewer than 500 securities to perform the computation from 2006 through 2015 (Bloomberg Analytics—one of the most detailed and powerful factor tools available in the marketplace—has data limitations on number of computations it can provide). Rather than selecting a broader market index (such as S&P 500 or Russell 1000 Growth) for a shorter time period (e.g., multiple periods of three-year duration),

we decided to employ a U.S. large-cap growth ETF with slightly fewer stock holdings and a longer time period.

[32]The founder-CEO index has a relatively high correlation with the VUG (0.92). Later in this article, we will show performance analytics and attribution relative to this benchmark. We considered using more popular indexes, such as S&P 500 Growth or Russell 1000 Growth, for comparison purposes. However, the founder-CEO index only has a correlation of 0.84 with the S&P 500 Growth Index and a correlation of 0.88 with the Russell 1000 Growth Index. Furthermore, due to the complex data intensity of our factor analysis utilized on Bloomberg, we chose a U.S. large-cap growth index with fewer constituents than the S&P 500 Growth and Russell 1000 Growth to allow a more comprehensive factor analysis (shown later). Given all of the considerations involved, we believe the VUG is an appropriate fit for our analysis.

[33]As we will discuss in the performance analytics section, the relative performance of the founder-CEO index versus benchmarks varies considerably across sectors. Much of the relative performance in generating alpha derives from a few sectors, including IT, Health Care, and Staples. Interestingly, one of the worst-performing sectors for the founder-CEO index comes from Real Estate (which has a relative overweight) and Industrials (which has a relative underweight).

[34]As our results in the "Performance Attribution" section show later in the article, the IT sector for founder CEOs contributes significant alpha generation to the portfolio performance due to stock selectivity but loses some alpha due to low allocation to the IT sector (relative to the benchmark).

[35]The 30-stock portfolio in the founder-CEO index is subject to wide variations in composition with a one- or two-stock movement during rebalancing (e.g., dropping two health care stocks and adding two IT companies). In contrast, a 500-stock index would be less likely to experience strong shifts in sector weights. We realize that it might be preferable to use a founder-CEO index with many holdings, although the nature of such an objective, while keeping true to a high level of data integrity, becomes impractical. We source founder CEOs from many data sources: Bloomberg, Factset, CapitalIQ, ExecuComp, and company websites. Data are often difficult to find and inconsistent across sources. Many opportunities exist for errors of omission. We identify approximately 500 companies per quarter that trade on a major U.S. exchange and have a founder currently present in the company. From the approximately 500 companies, approximately 150 include a founder CEO. Each quarter, the approximately 150 founder-CEOs are rebalanced and ranked by market cap. The top 30 are selected and placed in the portfolio with an adjusted market cap weight. Although we track approximately 150 publicly traded founder-CEO companies, approximately 30 constituents fit the U.S. large-cap category. As we drift below the top 30 U.S. large-cap founder-CEO constituents, the market capitalizations begin to fall sharply, thus negating the benefits of a well-defined benchmark. Given the wide variation of returns among U.S. large, mid, and small cap, we believe it is best to limit the number of constituents (while meeting the minimum threshold of diversification) and use a U.S. large-cap growth benchmark. After determining the 30 stock selections per quarter, we apply a smoothing factor to the index to reduce turnover (which approximates less than 10% per quarter). The founder-CEO index that we employ is consistent with the founder-CEO index on Bloomberg (ticker: CEOF) developed by EntrepreneurShares butt calculated and distributed by Thompson-Reuters. The computations applied in this analysis employ a bottom-up dividend reinvestment approach (which assumes that dividends are reinvested back into issuing company), compared to the top-down dividend reinvestment approach (in which dividends are reinvested back into index). We employ this approach (with disclosure) to be consistent with the excess return computations shown in the "Performance Attribution" and "Factor Analysis" sections (which assume a bottom-up dividend reinvestment approach in the computational algorithm). Over an extended period of time, the compounded nature of the reinvestment methodology can generate potentially wide variations of returns.

[36]Despite IT and Health Care being shown as (significantly) underweight during the time period of the study, as we will see in the "Performance Attribution" section, much of the performance contribution comes from three key sectors: IT, Health Care, and Consumer Discretionary.

[37]This time period corresponds with a complete market cycle, including the 2007–2009 stock market recession. The time period also corresponds with an actual performance track record implemented (along with other variables) in an entrepreneur model along with a founder-CEO index (published and disseminated by Thomson Reuters). As noted in a prior section, many companies included in our study have been delisted due to acquisitions, corporate actions, and bankruptcies. These older records, in particular, have been very time consuming to gather, although they help ensure accuracy, completeness of data, and elimination of survivorship bias. Data have been computed on the eVestment database with U.S. large-cap growth as a benchmark universe.

[38]We perform the analysis for the December 2006 through December 2015 time periods. The one-year period (and year to date) correspond with calendar year 2015; the two other bar charts correspond with the three-year and five-year periods (dating from December 31, 2015), respectively.

[39]eVestment is a database widely used by the financial industry's top consultants and includes one of the most comprehensive sets of returns for investment professionals around

the world. The database aggregates returns and provides analytic capabilities for computing traditional investment criteria, such alpha, beta, information ratio (IR), tracking error, and so on. The graphs, statistics, and benchmark data have all been computed and/or supplied by eVestment.

[40]The number of comparison funds for the three-year period is 3,559 (top two percentile), and the number of comparison funds for the one-year period is 3,819 (top five percentile). Moreover, when compared within an eVestment database universe of 351 U.S. large-cap growth equity funds, the founder-CEO index still ranks among the top one percentile for the five-year time period. Among U.S. large-cap equity growth funds, percentile ranking drops to two percentile for the three-year period and 28th percentile for the one-year period (that reflects 2015 alone).

[41]The number of funds in the all U.S. equity universe ranges from 3,799 (2015) to 4,409 (2008).

[42]The founder-CEO index ranked in the top fifth percentile among all U.S. equity funds in 2015 and 2013 and top 10 percentile in 2009 and 2011. We note that against an eVestment universe of 400+ U.S. large-cap growth funds, the founder-CEO index ranks in the top 10 percentile for four of the nine years shown, but it also falls in the bottom half of the percentile rankings for four out of the nine years. The numbers for the eVestment database vary from year to year based on the number of constituent funds in existence with reported performance records.

[43]We note that corresponding with this time period, July 2005 through December 2016, EntrepreneurShares, LLC applied a founder-CEO model (along with some other variables) and compiled a performance track record for U.S. large cap separately managed accounts that was ranked at the top by *Pension and Investment* for an extended 10-year track record, dated February 22, 2016. Moreover, EntrepreneurShares U.S. large-cap growth applies a similar model of founder CEOs (along with a few other variables) and on January 7, 2017 was ranked seventh by *The Wall Street Journal* (Category Kings) for 2016 performance among 700 comparable U.S. large-cap growth strategies. In more recent periods, the EntrepreneurShares performance (which includes founder CEO along with other variables) significantly outperforms the founder-CEO index model alone, suggesting that although the founder-CEO variable provides very compelling information over an extended period of time, it may be enhanced in certain market conditions with other management- or entrepreneur-related data.

[44]In other words, the founder-CEO index provides a monthly return of 6% or more in 19 out of 108 months, or approximately 17.6% of all months. The VUG U.S. large-cap benchmark, in contrast, provides a monthly return of 6% or more in 11 out of 108 months, or approximately 10.1% of the time.

[45]The strong performance of +4% months (33/108, or over 30% of all months) for the founder-CEO index clearly contributes to the overall outperformance.

[46]The wide dispersion of monthly returns corresponds with the higher standard deviation for the founder-CEO index (19.72%) compared to the VUG (17.31%). These statistics are shown in Exhibit 4.

[47]The VUG has 61 out of 108 months with a return distribution of +4% to –2%, whereas the founder-CEO index has 49 out of 108 months with the same distribution.

[48]The IR is measured as the excess returns of the portfolio (over a benchmark) divided by the tracking error (standard deviation of the difference between returns). Investors prefer a high IR over a low ratio because high IR implies the investor is being well compensated for additional risk. The SR is similar to an IR, although in the former case the numerator of the ratio examines the excess returns of an asset's returns over the risk-free rate of return and then divides this excess return by the asset's standard deviation of returns. Consequently, the IR measures the risk-adjusted return in relation to a benchmark (such as the S&P 500 Index or the VUG), whereas the SR measures outperformance relative to a risk-free rate of return (e.g., U.S. Treasury bill). We also compute the excess returns on a relative basis to 301 U.S. large-cap growth funds. In this case, the founder-CEO ranks among the top nine percentile for excess returns and total returns, top 18 percentile for annualized alpha, top 16 percentile for IR, and top 39 percentile for the SR.

[49]The scatterplot shows the founder-CEO index positioned such that only a few investment options provide superior returns with the same or less risk. Moreover, given the risk component (as measured by standard deviation of returns), there appear to be many investment options with greater risk and lower historical returns. Notably, there are some investment options with greater returns and less risk. Although there is obviously no guarantee that historical patterns will continue, to the extent that the risk–return trade-off continues going forward, we can conclude that the founder-CEO index, at least in terms of this historical chart, appears to provide a compelling return given the risk level and alternative investment options. This presumption is consistent with charts in other sections of this article that show relatively high excess returns, risk-adjusted alpha, IR, and SR.

[50]The up capture of 118.052% implies that when the S&P rises by 100%, the founder-CEO index rises by 118.05%. Moreover, when the S&P declines by 100%, the down capture implies that the founder-CEO index declines by 102.03%. The unequal nature of the increases versus the decreases favors a positive bias to the founder-CEO index. Moreover, as the next endnote describes, the larger number of positive periods, relative to negative periods, provides a net benefit to the founder-CEO strategy. Presumably, if the

study had been conducted during a severe downturn in the market, the results alone could be much more negative and potentially detrimental to the investor.

[51]The founder-CEO index has 65 positive periods and 43 negative periods during the December 2006–December 2015 examination period. Consequently, the upward bias of positive periods over negative periods, coupled with an exaggerated benefit (with strong periods being relatively stronger than the negative periods), combine for a net benefit to this investment strategy.

[52]As Exhibit 11 shows, the IT and Health Care sectors perform appreciably better than the peer benchmark. However, in the case of IT, the founder-CEO index has a sector weight that is almost 10% below the benchmark weight (19.54% versus 29.72% for VUG) and a low sector weight for Health Care (9.78% for founder-CEO index versus 12.54% sector weight for VUG).

[53]Given the strong growth orientation of the founder-CEO index and heavy sector concentration, we thought it might be possible (likely) that a growth or sector factor might negate much of the selection effect of the founder-CEO index. As the factor analysis demonstrates, the founder-CEO selection factor is, by far, the most dominant factor among the 20+ factors we examine.

[54]The Fama–French three-factor model (see Fama and French [1993]) is well represented in academic literature and provides a solid basis to assess key factors in portfolio returns.

[55]The Carhart model shows an improvement from the Fama–French three-factor model (improving from 13.54% to 15.71%), owing to the inclusion of the momentum factor. However, much of the 60.71% of the return is still without explanation.

[56]This analysis is likely the first documentation to recognize the finding in factor form, when compared side-by-side to other well-known factors. In time, if corroborated by other academic scholars, it may well be recognized as common knowledge.

[57]In total, we examined 30 different factors in an attempt to help evaluate the total active return. We utilized the capabilities of Bloomberg analytic tool to see if the founder-CEO factor might be encompassed within another factor. As we will show, the founder-CEO variable during the time of our study has been extremely helpful in explaining excess returns.

[58]All of the factors other than the selection effect founder CEO sum to approximately 1.47% (total active return of 60.79% equals the selection effect of 59.32% + 1.47% for all other factors).

[59]The challenge should not be taken lightly. Although it is easy to suggest a longer time period, the complexity of correctly assembling a thorough sample of 20+ or 30+ years would be an enormous undertaking. To avoid a self-selection bias, each publicly traded firm needs to be checked (individually) for the proper founder and CEO. Because no current database currently holds these data from inception, it becomes a very manual process. Many firms disappear due to takeovers, bankruptcies, mergers, delisting, and so on. Moreover, even current records show inconsistencies among the top four or five useful databases (Bloomberg, FactSet, Capital IQ, SEC company disclosures, company websites). Preparing the nine-year database of founder CEOs likely required 1,000–1,500+ hours. Going further back in time 20+ years would take well over 3,000 hours, and many missing data points are likely to exist.

[60]We note that there may be many reasons why a founder CEO may depart, including retirement, death, acquisition, bankruptcy, and merger, among others. To minimize bias, we include only the founder-CEO companies for which we have a complete dataset for periods both before and after the CEO departs.

[61]The return differential is striking and statistically significant past the 1% level. To incorporate differing comparison periods, we apply market-adjusted returns (excess returns) for each year both before and after CEO departure. Given the strong contrast in the return differential, this research issue will gain more attention. Our future research report will show the numbers of mergers, acquisitions, bankruptcies, deaths, and retirements associated with the founder CEO departure and the outcomes of each.

[62]As of October, 2017, the founder-CEO index comprised 15.4% of the VUG and 6.6% of the S&P 500 Index. These weights are determined by examining a side-by-side comparison on Bloomberg for both indexes and compiling the respective weights of each.

[63]*Active share* refers to the weight of a security within a portfolio relative to the weight of the security in the comparable benchmark. Securities that have high active share will have a disproportionate impact on the performance of a portfolio relative to the benchmark. The portfolio will benefit from high active share when its key holdings perform well (above the average security in the benchmark); conversely, when securities with high active share perform poorly, the portfolio will have a greater likelihood of underperforming its benchmark.

[64]As we discussed earlier, the founder-CEO index has a disproportionate weight in three key sectors: IT, Consumer Discretionary, and Health Care. As of October 2017, the founder-CEO index had 66% in those three sectors. However, VUG, owing to its growth orientation, is also heavily weighted in the same three sectors. As of October 2017, the VUG also has approximately 66% in IT, Consumer Discretionary, and Health Care; the S&P 500 Growth has 68%; and the Russell 1000 Growth Index has approximately 69%. Consequently, the distinction is not as significant as one might initially anticipate. In contrast, the S&P 500 Index (not growth) only has 49% in IT, Consumer Discretionary, and Health Care. Therefore, a tighter benchmark for a smart

beta portfolio would be for those portfolio managers who may be seeking a smart beta approach for their U.S. large-cap growth portfolio (in lieu of or in addition to VUG, Russell 1000 Growth Index, or S&P 500 Growth Index).

[65]As the last endnote indicated, the founder-CEO index has a 66% weight in the IT, Consumer Discretionary, and Health Care sectors. In contrast, the S&P 500 only has 49% weight in the same sectors. The most efficient smart beta opportunity with the founder-CEO index is with the VUG or Russell 1000 Growth because of similarities in the sector composition (66% for founder-CEO and for VUG, 69% for Russell 1000 Growth, and 68% for S&P 500 Growth).

[66]Because the founder-CEO index has a growth and sector bias (e.g., Consumer Discretionary, IT), the fund manager should decide whether or not market conditions favor growth or the founder-CEO sector bias. In the event the fund manager chooses a passive path, without preference, the implied risk assumption will be that the portfolio will succeed during market conditions that favor growth (and sector preferences) and underperform during periods of value or whenever sectors diverge from founder-CEO patterns (e.g., Utilities, Materials, Industrials). Over an extended period of time, it appears that the decision to overweight a founder-CEO index generates excess returns, but again, this presumes that periods going forward will be similar to the 2006–2015 period. If the fund manager holds a basket of the individual securities, the most effective path for minimizing tracking error to the benchmark would be to eliminate purchases in the IT, Consumer Discretionary, and Health Care sectors and replace them with the founder-CEO basket. Otherwise, the higher weights in those three sectors would create significant tracking error risk.

[67]As added support, at least one active fund manager, EntrepreneurShares, LLC, uses the founder-CEO index in implementing its active fund strategy. This passive variable, coupled with other proprietary factors, enables it to achieve its fund performance.

[68]Solactive and EntrepreneurShares, LLC both supply founder-CEO indexes and investment strategies associated with them.

[69]Clearly, some investment managers may choose to eschew the smart beta portfolio approach and simply invest in a concentrated set of founder-CEO stocks for an extended period of time. Such an approach obviously embraces more risk than a diversified smart beta portfolio, although it potentially rewards the investor with superior risk-adjusted returns over the prevailing time period.

REFERENCES

Adams, R., H. Almeida, and D. Ferreira. "Understanding the Relationship between Founder-CEOs and Firm Performance." *Journal of Empirical Finance*, Vol. 16, No. 1 (2009), pp. 136-150.

Aldrich, H. *Organizations and Environment*. Englewood Cliffs, NJ: Prentice Hall, 1979.

Basu, N., L. Dimitrova, and I. Paeglis. "Family Control and Dilution in Mergers." *Journal of Banking and Finance*, 33 (2009), pp. 829-841.

Carhart, M. "On Persistence of Mutual Fund Performance." *The Journal of Finance*, 52 (1997), pp. 57-82.

Dobrev, S., and W. Barnett. "Organizational Roles and Transition to Entrepreneurship." *Academy of Management Review*, 48 (2005), pp. 433-449.

Fahlenbrach, R. "Founder-CEOs, Investment Decisions, and Stock Market Performance." *Journal of Financial and Quantitative Analysis*. Vol. 44, No. 2 (2009), pp. 439-466.

Fama, E., and K. French. "Common Risk Factors in Stock and Bond Returns." *Journal of Financial Economics*, Vol. 33, No. 1 (1993), pp. 3-56.

Fama, E., and M. Jensen. "Separation of Ownership and Control." *Journal of Law and Economics*, 26 (1983), pp. 301-326.

Fischer, H.M., and T.G. Pollock. "Effects of social capital and power on surviving transformational change: The case of initial public offerings." *Academy of Management Journal*, 47 (2004), pp. 463-481.

Gao, N., and B. Jain. "Founder CEO Management and the Long-Run Investment Performance of IPO Firms." *Journal of Banking and Finance*, Vol. 35, No. 7 (2011), pp. 1669-1682.

Jacobs, B., and K. Levy. "Disentangling Equity Return Regularities: New Insights and Investment Opportunities." *Financial Analysts Journal*, Vol. 44, No. 3 (1988), pp. 18-43.

——. "Smart Beta versus Smart Alpha." *The Journal of Portfolio Management*, Vol. 40, No. 7 (Summer 2014).

Johnson, B., R. Magee, N. Nagarajan, and H. Newman. "An Analysis of the Stock Price Reaction to Sudden Executive Deaths." *Journal of Accounting and Economics*, Vol. 7, No. 1–3 (1985), pp. 151-174.

Leland, H., and D. Pyle. "Informational Asymmetries, Financial Structure, and Financial Intermediation." *Journal of Finance*, Vol. 32, No. 2 (1977), pp. 371-384.

Marriage, M. "Smart Beta 'Bandwagon' Triggers Alarm." *Financial Times*, September 6, 2013, https://www.ft.com/content/dd113b50-ff6a-11e2-b2fa-00144feab7de.

Morck, R., A. Shleifer, and R. Vishny. "Management Ownership and Market Valuation: An Empirical Analysis." *Journal of Financial Economics*, 20 (1988), pp. 293-315.

Nelson, T. "The Persistence of Founder Influence: Management Ownership, and Performance Effects at Initial Public Offering." *Strategic Management Journal*, 24 (2003), pp. 707-724.

O'Reilly, C., and J. Chatman. "Organizational Commitment and Psychological Attachment: The Effects of Compliance, Identification, and Internalization on Prosocial Behavior." *Journal of Applied Psychology*, 71 (1986), pp. 492-499.

Palia, D., D. Abraham, and W. Chia-Jane. "Founder versus Non-Founder in Large Companies: Financial Incentives and the Call for Regulation." *Journal of Regulatory Economics*, Vol. 33, No. 1 (2008), pp. 55-86.

Shulman, J.M. "A New Investment Style: Featuring an Index of Entrepreneurial Companies." *The Journal of Index Investing*, Vol. 1, No. 2 (2010), pp. 107-115.

Shulman, J.M., and E. Noyes. "The Rich Get Richer and So Can You: Investing in a Billionaires' Index." *The Journal of Index Investing*, Vol. 2, No. 4 (2012), pp. 12-32.

Villalonga, B., and R. Amit. "How Do Family Ownership, Management, and Control Affect Firm Value?" *Journal of Financial Economics*, Vol. 80, No. 2 (2006), pp. 385-417.

Wasserman, N. "Founder-CEO Succession and the Paradox of Entrepreneurial Success." *Organization Science*, Vol. 14, No. 2 (2003), pp. 149-172.

Winther, K.L., and S.R. Steenstrup. "Smart Beta or Smart Alpha." *The Journal of Investing*, Vol. 25, No. 1 (2016), pp. 85-94.