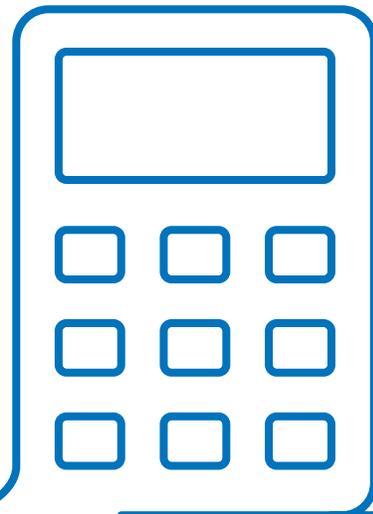


REPORT

Predicting Long-term Success

FOR CORPORATIONS AND
INVESTORS WORLDWIDE



FCLTGlobal is dedicated to rebalancing investment and business decision-making towards the long-term objectives of funding economic growth and creating future savings.

FCLTGlobal is a not-for-profit dedicated to developing practical tools and approaches that encourage long-term behaviors in business and investment decision-making. It takes an active and market-based approach to achieve its goals. By conducting research and convening business leaders, FCLTGlobal develops tools and generates awareness of ways in which a longer-term focus

can increase innovation, and create value. FCLTGlobal was founded in 2016 by BlackRock, Canada Pension Plan Investment Board, The Dow Chemical Company, McKinsey & Company, and Tata Sons out of the Focusing Capital on the Long Term initiative. Its membership encompasses asset owners, asset managers and corporations from around the world.

MEMBERS



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This document benefited from the insight and advice of FCLTGlobal’s Members and other experts. We are grateful for all the input we have received, but the final document is our own and the views expressed do not necessarily represent the views of FCLTGlobal’s Members or others. The information in this article is true and accurate to the best of FCLTGlobal’s knowledge. All recommendations are made without guarantee on the part of FCLTGlobal. Reliance upon information in this material is at the sole discretion of the reader; FCLTGlobal disclaims any liability in connection with the use of this article.

Executive Summary

Through our research, FCLTGlobal aims to identify the key determinants of long-term success for companies and investors around the world. We then use this knowledge to encourage long-term behaviors across capital markets.

This paper focuses on predictors of long-term health that are grounded in rich global data going back over time. Looking across the value chain—at companies, asset managers, and asset owners—we find the following:

- **Global companies are falling short on long-term behaviors.** Companies are scoring lower than they did in 2014, and well below the level reached before the financial crisis, on our overall measure of long-term behavior.
- **Overdistribution of capital can be a drain on corporate performance.** Although distributing capital via buybacks and dividends makes sense in some circumstances, our analysis finds that companies taking this approach tend to generate lower five-year returns on invested capital (ROIC, our preferred measure of performance).
- **Corporate research and development (R&D) can boost returns.** By looking at the marginal value of additional research spending, we show that R&D investments are linked to higher ROIC.
- **Employee ownership is linked to higher returns among global asset managers.** Employee ownership is the strongest predictor of success for asset managers, particularly those in equity investing.
- **Net returns for asset owners are linked to both governance and investment strategy.** Relevant factors include board diversity, active ownership, lower costs, a higher funded ratio, and higher exposure to both public and private equity.

Of course, not all drivers of long-term success are easily measured or detected, and if more data were available, we could deepen our understanding of vital factors such as talent retention and customer loyalty. But even with existing data limitations, we are able to confirm some well-known predictors of long-term success and also unearth some novel ones.

What follows is a fuller account of our findings, our methodology, and our thoughts on how best to extend these results in the future.

Predicting Long-term Success for Corporations and Investors Worldwide

The research is piling up. Companies that aim for long-term success tend to find it, while those who reach for short-term gains end up with lower corporate profits, reduced shareholder returns, and more limited job creation.

We at FCLTGlobal are working to advance our understanding of the benefits of long-term thinking by extending these findings to reflect the experience of organizations both around the world and across the value chain—including global corporations, asset managers, and asset owners.

Our work has shown that the key factors for long-term success fall into a few broad categories:

- **Sound organizational governance, to provide the foundation for long-term value creation**
- **Incentive alignment over time and across the investment value chain, to ensure that all players are pulling in the same direction**
- **Engagement across institutional boundaries, to resolve issues and provide staying power for pursuing long-term goals**
- **Strategies for innovation, talent, capital allocation, and risk management, to support a company's long-term performance and sustainable growth**
- **Effective public policy, to provide the conditions that enable long-term behavior**

Having identified these areas as the driving forces of long-term success, FCLTGlobal is pursuing a multi-year research plan to assess the significance of each with greater rigor. Outputs will include both detailed white papers and easy-to-use tool kits for translating our research into practice.

At present, however, many of the key components of long-term success remain difficult to quantify. For issues such as talent retention, customer loyalty, and reputation, there are not consistent sources of global data across multiple years. FCLTGlobal plans to support efforts to expand the availability of these and other vital but sparsely collected data.

This paper, however, takes a more focused approach by using the data available today to identify those indicators of long-term success that we can already measure in a rigorous, consistent way for global companies, asset managers, and asset owners.

Our approach builds on several earlier studies, beginning with a landmark 2017 analysis from McKinsey & Company, dubbed the Corporate Horizon Index. Looking across the period from 2001 to 2014, that study uncovered a strong connection between long-term thinking and corporate outperformance among US firms, with long-term companies generating revenue growth that was 47 percent higher than their shorter-term competitors.

More recently, a KPMG analysis covering 335 companies across four countries during the years from 2003 to 2017 found that the earnings of long-term-oriented companies grew far faster than the earnings of short-term companies (8.5 percent per year, compared with 4.6 percent).

The present paper extends this work in a number of ways:

- **By looking at firms around the world**
- **By analyzing both companies and investors**
- **By incorporating metrics not reflected on financial statements, such as board diversity**

Building on the expertise of FCLTGlobal members, a wide review of the academic literature, and our own data analysis, we reached a number of significant—and sometimes surprising—findings:

- **Long-term behaviors are becoming less common among corporations.** When we look across all the measurable predictors of long-term success identified in our analysis, we find that global corporations have grown less long-term in recent years and remain less long-term-oriented than they were before the financial crisis. One big reason is the rising tendency to distribute—and sometimes overdistribute—capital.
- **Overdistribution of capital can hurt corporations.** In our analysis, companies that overdistribute capital—in the form of buybacks and dividends—tend to fare worse, in terms of return on invested capital, than peers that safeguard funds for other uses.
- **Corporate research and development (R&D) can provide real benefits.** Another key predictor of higher long-term ROIC among corporations is their *research quotient*, an innovative measure of the marginal value of additional research spending.
- **Employee ownership is strongly connected to returns among asset managers.** For equity-focused managers, in particular, there is a tight link between gross returns and employee ownership of the firm.
- **Additional data could enrich our understanding of long-term success among asset owners.** Data limitations make it difficult to identify discrete factors associated with high net returns among asset owners. However, by pooling factors, we show that net returns are connected to an array of items including gender diversity on the board, active ownership, lower costs, a higher funded ratio, and higher exposure to both public and private equity.

The following sections share the full findings from our analysis, first for corporations, then for asset managers, and finally for asset owners. Some of these findings are surprising; others confirm the existing consensus. But either way, they add rigor to our understanding of the actions and behaviors associated with long-term success. And they can also help shape future research—from FCLTGlobal and others—on precise steps companies and investors can take to improve their long-term prospects.

Factors Associated with Long-term Performance of Corporations

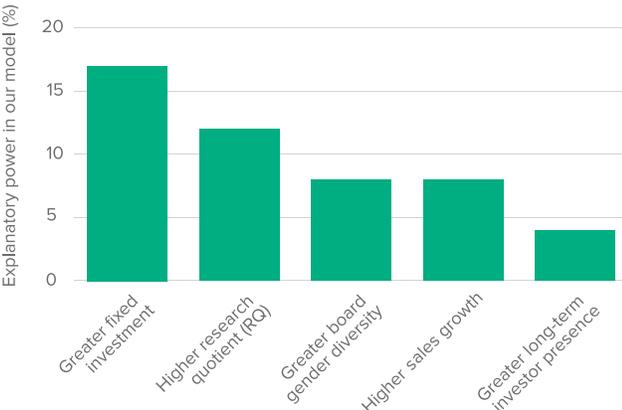
METHOD

To ensure a global perspective, we focus on the large, publicly traded companies in the MSCI ACWI, which represents 85 percent of the global investable opportunity set. We measure long-term performance in terms of ROIC, which reflects the return on the whole capital structure of a company and can be a more direct measure of corporate performance than stock movements, which are subject to the added volatility that comes from investor perception. Using total shareholder return (TSR) as the prime measure produces similar, if slightly weaker, results.

PAYOFF OF LONG-TERM BEHAVIORS

If companies were more long-term, our model suggests they could earn an additional US\$1.5 trillion per year in ROIC. This calculation is based on the counterfactual assumption that companies ranking among the bottom 50 percent in our assessment of long-term habits had instead performed as well as the median company in the MSCI ACWI without degrading the performance of firms in the top 50 percent.

Figure 1. Factors associated with higher long-term value creation



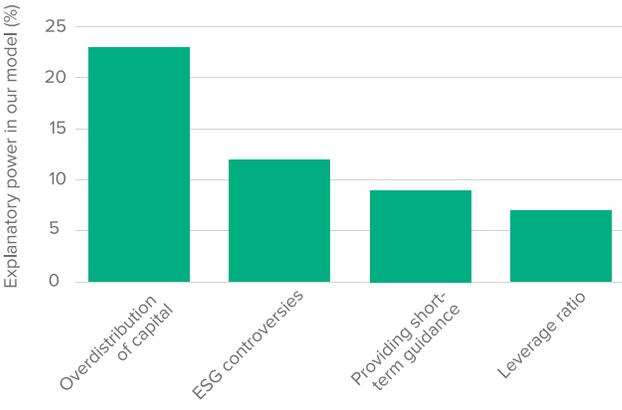
SUMMARY

Our analysis identified a range of factors associated with the long-term health of companies, which we split into two buckets: positively correlated factors that predict long-term health and negatively correlated factors that suggest weakness ahead.

The factor most strongly bound to long-term performance was actually one of those negative factors—something to avoid—namely, **overdistribution of capital** in the form of dividends and buybacks that exceed the free cash flow generated by the company. Naturally, efforts to return money to shareholders can and do make sense when companies do not have more attractive investments to pursue. And it is possible that the causal link actually runs in the other direction—that is, companies with limited growth potential may be more likely to return money to shareholders. But our analysis shows that capital distributions to investors in excess of free cash flow are associated with weaker ROIC.

Another factor that weighs on long-term value creation is excessive **leverage**—though, again, this is not a blanket dismissal, as leverage can be vital to businesses and borrowing can be an auspicious sign that a company has ideas worth pursuing. As a general tendency, though, more leverage among companies in our dataset translates into lower ROIC.

Figure 2. Factors associated with lower long-term value creation



Environmental, social, and governance (ESG) controversies can also be a drain on long-term ROIC, an effect that is most meaningful for larger firms with more extensive media coverage.

Issuing **short-term guidance** also portends weaker performance. This is consistent with existing research showing that quarterly guidance makes companies and investors overly sensitive to short-term concerns.

On the other hand, there were a number of factors positively associated with long-term ROIC—meaning as they went up, so did returns.

One of those had to do with R&D spending. To capture this, we use a calculation called **research quotient (RQ)**, which reflects the productivity of corporate R&D dollars by measuring incremental revenue for each marginal increase in R&D spending. This is a more tailored way to assess R&D effectiveness than familiar measures such as total spending or number of patents, which do not reliably predict future returns.

Having a **diverse board**—including a mix of genders and ages—is also connected to strong returns. And it is a good sign when a company’s shares are held by **long-term investors**, which we measure as the portfolio-wide holding period of the investor base.

Higher levels of **fixed investment** also seem to portend long-term health. As does strong **sales growth**, which suggests a link between recent performance and future performance.

DEFINITION AND DETAIL

Figures 1 and 2, and Tables 1 and 2 summarize the findings on corporations, presenting the individual factors, the underlying calculations, and the explanatory power of each factor. The middle column in the tables—explanatory power—is a statistical value reflecting the discrete impact of each factor *within our model*. So the 17 percent value for greater fixed investment (Table 1) means that variations in this one factor explain 17 percent of the variations in the outcomes captured by the model. It *does not* mean that corporate fixed investment explains 17 percent of the total variance in ROIC across the MSCI ACWI, because our model is necessarily incomplete, as it does not cover those predictors of long-term ROIC for which we lack standard, reliable, broadly available measures. In addition, we excluded from our analysis factors with more than 20 percent missing data, with the exception of RQ.

Table 1. Factors associated with *higher* long-term value creation

FACTOR	EXPLANATORY POWER	CALCULATION
Greater fixed investment	17%	(Capital expenditures - Depreciation)/Assets
Higher research quotient (RQ)	12%	% increase in revenue for 1% increase in R&D
Greater board gender diversity	8%	Percentage of board that is female
Higher sales growth	8%	Trailing five-year average of year-over-year change in revenue
Greater long-term investor presence	4%	Percentage of company owned by firms with < 50% dollar turnover (effectively holding period >2 years)

Table 2. Factors associated with *lower* long-term value creation

FACTOR	EXPLANATORY POWER	CALCULATION
Overdistribution of capital	23%	(Dollar value of net issuance (net of buybacks) - Dividends + Free cash flow)/Assets
ESG controversies	12%	Number of controversies across 23 ESG topics ranging from child labor to tax fraud, designed to avoid double counting
Providing short-term guidance	9%	Instances of quarterly or semiannual guidance over past five years
Leverage ratio	7%	Total debt/Assets

SECTOR BREAKDOWN

Although we recognize that capital structures and industry dynamics can differ dramatically, our analysis found a surprising consistency across the corporate world when it comes to indicators of long-term success. For instance, overdistribution of capital is strongly connected with long-term weakness in sectors as diverse as technology, energy, and consumer staples. Conversely, fixed investment is tied to long-term health for firms in healthcare, consumer discretionary, consumer staples, and beyond.

The factor whose impact varies most across industries is leverage—a warning sign in regulated sectors such as finance and utilities but less meaningful for technology and retail firms.

TRENDS OVER TIME

By aggregating these indicators into a single metric, it is possible to compute a score that captures the long-term orientation of the global corporate environment as a whole (Figures 3 and 4). That score can be calculated annually to reflect changes over time, so a broad improvement in a positive indicator such as sales growth—or a decline in a negative indicator such as excessive capital distribution—would show up as a trend increase in the long-term score.

Between 2014 and 2017, the overall score for global firms fell from 46 to 39 (Figure 3), in part as a result of a steady decline in fixed investment. More broadly, the Great Recession seems to have dampened long-term thinking in a persistent way. In 2017, companies were less focused on long-term behaviors than they were from 2004 to 2007 (Figure 4), not least because the post-recession era has seen a substantial increase in capital distribution via buybacks and dividends, which is associated with weaker ROIC.

Figure 3. Global firms have become less oriented toward the long term in recent years

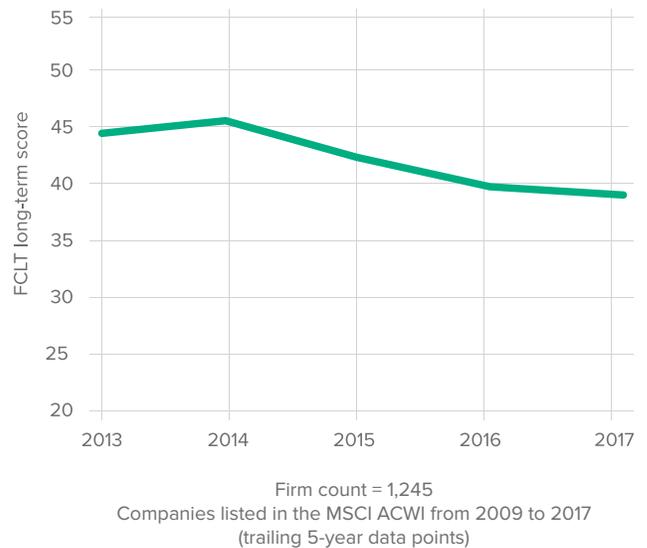


Figure 4. Global firms are less oriented toward the long term than before the financial crisis



OVERBOARDING IS RARE AND DOES NOT SEEM TO MATERIALLY AFFECT LONG-TERM ROIC

In addition to the nine factors on the previous page, we examined several other potential factors that our literature review highlighted as likely contributors or barriers to long-term success. One of those proved less predictive than anticipated: overboarding, or the risk that serving on multiple boards can be a distraction. Part of the reason is that fewer than 5 percent of all MSCI ACWI directors in our sample served on 3 or more public company boards, and the median number of external public company boards on which they served was 1.1. Directors are also trending away from being overcommitted: since 2008, in the United States, the percentage of non-CEO directors who sit on 5 or more boards has halved, from 3.2 percent to 1.6 percent, and investors increasingly scrutinize the number of boards on which each director sits. Given this dearth of examples and increased investor scrutiny of board performance, overboarding seems more like a theoretical quandary than a real-world concern today—and we found no correlation between overboarding and long-term results.

Factors Associated with Long-term Performance of Asset Managers

METHOD

Our analysis of asset managers covers those who self-report to eVestment (aggregate \$45.6 trillion in assets under management, or AUM). Long-term performance is measured in terms of five-year gross returns across equity, fixed-income, and mixed portfolios among asset managers (see methodology for additional detail about the relationship between manager-level analysis and fund-level analysis).

PAYOFF OF LONG-TERM BEHAVIORS

According to our model, asset managers who score well on key long-term predictors—those at the 75th percentile—generate annual gross returns that are 90 basis points higher than asset managers at the 25th percentile.

SUMMARY

Asset managers with the strongest long-term gross returns tend to have a high level of **employee ownership**, which may help to align incentives. Having high **net inflows** is also a positive indicator, though this finding may reflect the ability of successful managers to attract money—rather than any tendency for growth to improve returns.

On the flip side, **turnover among portfolio managers** is an indicator of trouble ahead as is **strategy proliferation**.

Figure 5. Factors associated with *higher* and *lower* long-term value creation

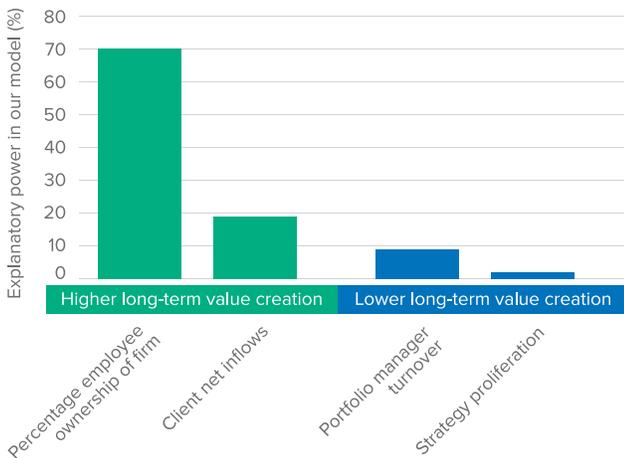


Table 3a. Factors associated with *higher* long-term value creation

FACTOR	EXPLANATORY POWER	CALCULATION
Percentage employee ownership of firm	70%	Percentage of equity owned by employees
Client net inflows	19%	Trailing five-year average of year-over-year change in client net inflows

Table 3b. Factors associated with *lower* long-term value creation

FACTOR	EXPLANATORY POWER	CALCULATION
Portfolio manager (PM) turnover	9%	Number of PMs turning over during the year/ Total PMs
Strategy proliferation	2%	Trailing five-year total number of strategies active and open/ Total assets under management over the past five years

DEFINITION AND DETAIL

Figure 5 and Tables 3a and 3b summarize the findings, showing the individual factors, the way they are calculated, and their explanatory power within the model (a fuller explanation is available in the “Definition and Detail” section for corporations).

ASSET CLASS BREAKDOWN

Unlike what we found for corporations—where the factors associated with long-term success tend to hold across industries—the key predictors of asset manager success vary widely across different asset classes.

Employee ownership is a stronger indicator of long-term returns on the equity side than for asset management as a whole and not significant for fixed-income. The same pattern holds for portfolio manager turnover, which is more meaningful for equities than for asset management as a whole and not significant for fixed-income.

Consistent with expectations, equity managers had the greatest gross returns dispersion and fixed-income managers the least.

OTHER POSSIBILITIES

At the outset, we considered a number of other potential indicators of long-term success among asset managers. Looking at portfolio manager ownership of the fund would have added useful granularity to our analysis of employee ownership, whereas ESG measures could have given a broader sense of how carefully managers review the ESG characteristics of their investments. Finally, a thorough understanding of the investor-investee dialogue in active ownership have allowed a tighter analytic connection across the value chain, connecting long-term investors with the success of managers and corporations.

For now, there are not enough global data on these topics to permit rigorous assessment. If that changes, we will be ready.

Factors Associated with Long-term Performance of Asset Owners

METHOD

For our analysis of asset owners, we combined manually collected material on 23 of the largest pensions and sovereign wealth funds in the world with a separate dataset on 175 US pension funds—collectively covering nearly \$11 trillion in AUM. We also undertook a survey of FCLTGlobal members.

We measured long-term performance in terms of five-year net returns. The limited availability of global data on asset owners constrained our conclusions about the factors associated with long-term success.

SUMMARY

Given the data limitations, the only discrete factor that we were able to definitively associate with long-term success is the percentage of a portfolio allocated to equities—where **higher equity allocation** is a statistically significant predictor of long-term value creation. Although we recognize that this finding may reflect the rising equity markets during the 2012-17 time frame that we are considering, it is consistent with research on how the risk premium affects equity returns over time.

Pooling factors suggests that net returns may be connected to a suite of strategies and behaviors that include **gender diversity on the board, strategic engagement, lower costs**, a higher **funded ratio**, and higher exposure to both public and private equity.

DEFINITION AND DETAIL

Tables 4a and 4b summarize the findings, showing the individual factors, the way they are calculated, and their explanatory power within the model (a fuller explanation is available in the “Definition and Detail” section for corporations).

Table 4a. Factors collectively associated with *higher* long-term value creation, when considered as a bundle

FACTOR	CALCULATION
Funded ratio	Fair value of assets/Present value of projected liabilities or obligations
Board gender diversity	Percentage of board that is female
Exposure to public and private equity	(Public equity AUM + Private equity AUM)/Total AUM
Strategic engagement	1 point for having a strategic engagement policy, 1 point for having a proxy voting policy, and 2 points for having both

Table 4b. Negative factor associated with *lower* long-term value creation

FACTOR	CALCULATION
Higher costs	(Fees + Operating expenses)/AUM

OTHER POSSIBILITIES

As with asset managers, our inquiry into the long-term predictors of success among asset owners opened with a wider spectrum of potential factors. Uniformly calculated and broad-based data about diversification among the largest asset owners would have deepened our understanding of the role of investment strategy in long-term performance. Details on asset owners’ own benchmarks would have provided a useful comparison with actual performance. Finally, ESG measures might have provided interesting insight into reputational standing and social priorities.

As of now, however, such data are too inconsistent and incomplete to allow for rigorous global analysis.

Conclusion: More Data Means Richer Knowledge

The depth and breadth of our findings is limited by the availability of high-quality and complete global datasets. To counter these limitations, we followed a rigorous process beginning with a thorough literature review of academic and investment research to identify factors supported by existing studies. We then decided to focus on factors with rich, global data (and no more than 20 percent missing data), allowing us to measure granular change year over year. After consulting with a broad range of experts, we moved to the data analysis phase, using more than 20 million data points to distill which of the pre-vetted factors had a statistically significant impact on long-term value creation.

While we are proud of the rigor of this approach, no method is perfect. Our focus on factors with broad data prevented us from evaluating aspects of talent and culture that we know are vital to the long-term prospects of corporations, asset managers, and asset owners. These include customer satisfaction and employee engagement, both of which have been shown to be connected to long-term success.

Similarly, although our minimum 80 percent data completeness standard limited some of the biases associated with missing data, it also eliminated whole dimensions of information from our purview, such as executive compensation duration—which has been linked to long-term performance in academic work but where global data is currently incomplete. Such incomplete data create space for omitted variable issues, distorting our ability to measure the true explanatory power of the factors that we can regress (omitted variable issues plague a wide range of attempts to describe complex multidimensional issues with academic rigor).

But even with imperfect data, we were able to advance the state of knowledge around long-term behaviors by isolating and identifying a number of the key factors correlated with long-term success around the world and across the value chain.

In the corporate world, that includes appropriate reinvestments in the business rather than overdistributions of capital, productive R&D, and an end to quarterly guidance—to name just a few. For asset managers, it means embracing employee ownership as a paramount concern (on the equity side). And among asset owners, it means embracing the reality of the equity risk premium, among other things.

The next step—for FCLTGlobal in particular and the spread of long-term thinking in general—is to amass a richer universe of data and a broader array of methodologies to drive the research forward. We are working with our members and other business, academic, and policy leaders to accomplish just that while pursuing a more integrated approach to understanding the deepest drivers of long-term success, whether they have to do with governance, incentives, engagement, strategy, or public policy.

Appendix: Methodology

Corporations

UNIVERSE

Companies in the MSCI ACWI (covering 23 developed and 24 emerging markets), which includes approximately 2,500 companies. Trailing five-year data points for 2003–2017 are used to determine coefficients in the barometer and self-assessment tool, and will populate only if the company has been part of the ACWI for each of the past five years. This subset represents an aggregate market cap of US\$46.6 trillion.

For year-over-year comparisons, the company must have been part of the ACWI at the end of each of the five years of the trailing five-year period (e.g., for a 2013–2017 comparison, we would use only companies that were in the ACWI for the trailing five years ended in 2013, 2014, 2015, 2016, and 2017, respectively).

SOURCES

FactSet, Refinitiv, amkANALYTICS via Professor Anne Marie Knott

YEARS COVERED

Rather than set a specific range, we used the maximal available span of consistent data for each factor. In no case did we go back further than 1999.

Y VARIABLE

Return on invested capital (ROIC). Trailing five-year ROIC was regressed on multiple factors to determine factor weights. Those factor weights were then used to project five-year future value creation.

FORMULA FOR TRAILING CUMULATIVE FIVE-YEAR ROIC

$$(1 + \text{Year 1 net income}/\text{Average of invested capital at the beginning and end of Year 1}) \times (1 + \text{Year 2 net income}/\text{Average of invested capital at the beginning and end of Year 2}) \times (1 + \text{Year 3 net income}/\text{Average of invested capital at the beginning and end of Year 3}) \times (1 + \text{Year 4 net income}/\text{Average of invested capital at the beginning and end of Year 4}) \times (1 + \text{Year 5 net income}/\text{Average of invested capital at the beginning and end of Year 5}) - 1$$

FORMULA FOR PROJECTED CUMULATIVE FIVE-YEAR ROIC

$$(1 + 2018 \text{ net income}/\text{Average of invested capital at the beginning and end of 2018}) \times (1 + 2019 \text{ net income}/\text{Average of invested capital at the beginning and end of 2019}) \times (1 + 2020 \text{ net income}/\text{Average of invested capital at the beginning and end of 2020}) \times (1 + 2021 \text{ net income}/\text{Average of invested capital at the beginning and end of 2021}) \times (1 + 2022 \text{ net income}/\text{Average of invested capital at the beginning and end of 2022}) - 1$$

STATISTICAL SIGNIFICANCE

Determined by multivariable regression following significance in univariate regression, each with a 95 percent confidence interval

MISSING DATA

We used multiple imputation, a method for replacing missing data with substitute values that are drawn multiple times from a distribution.

OUTLIERS

Winsorization (i.e., adjusting the value of outliers to bring them closer to other values in the data set) where appropriate

APPROACH TO COVARIANCE

Eliminated factors with 10+ variance inflation factor (VIF), that is, factors that, when combined with all of the other factors, have a variance at least 10 times as large as if it were uncorrelated with all of the other factors

DUMMY VARIABLES

- Years: 2004–2017 (2003 = base year) for company, sector, and country rankings
- Regions: LATAM, APAC, EMEA (North America = base region) for company and sector rankings
- Sectors (BICs classification): consumer discretionary, consumer staples, energy, financials, healthcare, industrials, materials, technology, utilities (communications = base sector) for company and region rankings

CONTROL VARIABLES:

- Size for company rankings only
- None for sector and country rankings

Appendix: Methodology

Asset Managers

UNIVERSE

789 investment management firms with US\$45.6 trillion in AUM. Trailing five-year data points for 1997–2017 are used to determine coefficients in the barometer and self-assessment tool, and will populate only when the firm has reported returns on active products for each of the past five years. For year-over-year comparisons, the firm must have reported returns on active products at the end of each of the five years of the trailing five-year period (see corporate description for more detail).

SOURCE

eVestment

YEARS COVERED

1993–2017

Y VARIABLE

Gross returns. Trailing five-year gross returns were regressed on multiple factors to determine factor weights. Those factor weights were then used to project five-year future value creation.

FORMULA FOR TRAILING CUMULATIVE FIVE-YEAR GROSS RETURNS

$(1 + \text{Year 1 return}) \times (1 + \text{Year 2 return}) \times (1 + \text{Year 3 return}) \times (1 + \text{Year 4 return}) \times (1 + \text{Year 5 return}) - 1$

FORMULA FOR PROJECTED CUMULATIVE FIVE-YEAR GROSS RETURNS

$(1 + 2018 \text{ annual return}) \times (1 + 2019 \text{ annual return}) \times (1 + 2020 \text{ annual return}) \times (1 + 2021 \text{ annual return}) \times (1 + 2022 \text{ annual return}) - 1$

STATISTICAL SIGNIFICANCE

Determined by multivariable regression following significance in univariate regression, each with a 95 percent confidence interval

MISSING DATA

Multiple imputation

OUTLIERS

Winsorization where appropriate

APPROACH TO COVARIANCE

Eliminated factors with 10+ VIF, that is, factors that, when combined with all of the other factors, have a variance at least 10 times as large as if it were uncorrelated with all of the other factors

DUMMY VARIABLES

Years: 1998–2017 (1997 = base year)

CONTROL VARIABLES

None

Asset Owners

UNIVERSE

Survey of FCLTGlobal members and manual data collection from publicly available information from largest pension and sovereign wealth funds globally, for a total of 23 owners (approximately US\$7 trillion). That data was combined with a separate database of 175 US pension funds (approximately US\$3.7 trillion).

SOURCES

Member survey and manual collection

YEARS COVERED

Five years 2012–2018, depending on whether fiscal year-end is before or after June 30

Y VARIABLE

Net returns

TWOFOLD APPROACH

(1) We analyzed a two-sample t-test on trailing five-year net returns relative to the factor levels to gauge potential statistical significance. (2) We performed a full regression of the database of 175 US pension funds on the following subset of the x variables: higher funded ratio, higher expenses, greater exposure to public and private equity, and greater allocation to illiquids.

FORMULA FOR TRAILING CUMULATIVE FIVE-YEAR NET RETURNS

$(1 + \text{Year 1 return}) \times (1 + \text{Year 2 return}) \times (1 + \text{Year 3 return}) \times (1 + \text{Year 4 return}) \times (1 + \text{Year 5 return}) - 1$

STATISTICAL SIGNIFICANCE

(1) Not possible to conclusively establish via two-sample t-test. (2) Equity allocation was the only factor found to have a statistically significant positive impact on long-term value creation.

MISSING DATA

(1) > 50 percent missing data: reweighting of applicable factors to 100 percent

(2) < 50 percent missing data: mean imputation

OUTLIERS

N/A

APPROACH TO COVARIANCE

N/A

DUMMY VARIABLES

Years: N/A

CONTROL VARIABLES

N/A

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