

# Really Sustainable Investing



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# Motivation

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- “Sustainability” has become a buzzword for a set of related and increasingly popular investment themes
- The common thread through all of these ideas is that superior investment results will arise from long-lived enterprises.
- Enterprises may be long-lived for a number of reasons
  - Activities that make ongoing contributions to societal well-being (health care, renewable energy)
  - Companies that are better managed through superior internal governance.
  - Business activities with high barriers to competition, or technical obsolescence.

# Outline

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- The first part of today's discussion will be background on selected aspects of sustainable investing, illustrated with existing Northfield research.
- The empirical center of the presentation will focus on a "perfect foresight" where we analyze the long-term performance of the subset of companies (US and Global) that have survived more than 25 years to the present day.
  - The relative performance of various survivor portfolios is superior to popular benchmarks in ways that are highly intuitive.
- We will consider how the characteristics of the survivor portfolio are different from traditional benchmark portfolios.
- We will examine the extent to which membership in the survivor portfolio could have been predicted using the sustainability model from diBartolomeo (Journal of Investing, 2010).

# Early Research on Sustainable Investing

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- The earliest work I could find that touched on “sustainable investing” was a paper called “Is Pollution Profitable?” by Joseph Bragdon (1972).
- Bragdon went on to write several books that framed the definition of sustainable investment as being centered in enterprises that are long lived.
  - He created a 60 company stock index called LAMP that seeks to track performance of long-lived companies. Index data is available from 1995.
  - Northfield has been retained periodically to analyze the performance of the LAMP index relative to more widely recognized benchmarks
  - LAMP index relative performance has been very positive.

# Sustainability from Good Governance?

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- The “G” part of the ESG literature is a vast spectrum.
  - Most of the early research appearing in legal and business journals are papers saying “CEOs are greedy and boards of directors are stupid”, so strict governance is required to protect shareholders from unfair expropriation of economic benefit.
- More recent research indicates that the issues of what is good governance are much more nuanced, and may be very different across sectors (tech, cyclical, finance).
  - How the business is positioned within the macro-economy influences the relationships between stakeholders.
  - Kurtz (2012), <http://www.northinfo.com/documents/523.pdf>

# Moats and Barriers to Competition

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- A lot of recent research on sustainability has focused on the concept of barriers to entry or “corporate moats.”
  - Morningstar has “moats” as an important aspect of their company research.
  - Kurtz (2016) summarizes the concept and its relationship to ESG and sustainability, <http://www.northinfo.com/documents/730.pdf>
- A Classic example is the 1998 settlement of the lawsuit between a large number of US States and tobacco companies.
  - The tobacco firms paid \$20 Billion, but in return obtained an oligopoly as any new tobacco companies who were not part of the settlement would be subject to massive legal costs.

# Regulatory Barriers to Stupidity

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- In the wake of the Global Financial Crisis, lots of new (and often criticized) regulation has come into effect to prevent systemic instability.
- One interesting example is mortgage foreclosure rates.
  - During the period before and during the GFC, residential mortgage foreclosures generally spiked sharply upward across the USA.
  - A few states such as Vermont had no increase in foreclosures.
  - Vermont has a high capital gain tax on profits from real estate sales unless the property has been held for five years, effectively eliminating “house flipping.”
  - The downside for property owners has been low rates of property appreciation compared to many other states.

# The Amazon Effect

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- *The lack of “moat” can also be crucially important and can be identified.*
  - In the May 31, 2017 data set of the Northfield Single Market Risk Model transient factor 1 showed an interesting anomaly. The highest exposure to Transient Risk Factor 1 was Amazon with a “beta” of 4.2.
  - Many traditional retailers were at the other end of the spectrum for this factor, with high magnitude *negative* exposure values.
  - Macys, Staples, Dollar Tree, Dollar General, Foot Locker, AutoZone, Advanced Auto Parts are among the firms that the model sees being impacted by Amazon.
  - This was before the announcement of the Whole Foods acquisition.
  - *We thank our client Matarin Capital for pointing out this insight.*

# Empirical Tests – Perfect Foresight Design

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- In our first test, we isolate the set of 445 companies that existed in our US universe that “survived” from January 31, 1989 to September 30, 2017.
  - Due to the impact of multiple mergers and acquisitions through time, we only include firms whose basic identifying characteristics such as industry participation were unchanged.
- At the start of the test, the universe had 3398 members of which 445 survivors represent 13%.
  - The implied drop out rate is 6.8% per annum over the nearly 29 year sample period.
  - If we assume half of the drop outs were favorable (e.g. going private or acquired) and half were unfavorable, we get 3.4% per annum, consistent with diBartolomeo (2010)

# Survivor Performance Expectations

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- If we believe in sustainability as an investment thesis (e.g. LAMP), we would expect material outperformance of the survivor portfolio compared to traditional benchmarks.
- We would also expect that equally weighted portfolios of survivors would substantially outperform since rebalancing would put more money in temporarily depressed firms that we know a priori will survive.
- The alternative hypothesis is that survivors operate in a pathologically conservative fashion which promotes survival but actually reduces investor returns (like Vermont housing).

# US Survivor Portfolio Performance

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- Over the sample period, the capitalization weighted survivor portfolio produced a cumulative return of 2808%, compared to 1585% for the S&P 500.
  - Mean monthly return was 1.07 for the survivors versus .91 for the S&P. Monthly volatility was essentially identical at 4.12 versus 4.10
  - Annual alpha was 2% with a tracking error of 2.98. The T stat on outperformance was 3.17 (highly statistically significant)
  - Based on the Northfield US Fundamental Model, about two-thirds of the alpha appeared to be security specific and highly significant (T = 2.87). One third of alpha was explained by model factors but was borderline on statistical significance.
  - *The results support the thesis that there is something uniquely important about sustainability.*

# Influence of the Weighting Scheme

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- To test the direct influence of the degree of survivorship bias associated with equal weighting versus capitalization weighting, we ran the two portfolios against one another.
  - As previously described the alpha was around 30 basis points per month in favor of the equal weighted portfolio.
  - The annual tracking error was 8.58, which is *higher than either portfolio against the S&P 500*.
  - The T statistic on relative performance was 2.21 which is lower than either portfolio against the S&P 500.
  - Again, the alpha contribution of factor bets was not statistically significant. Everything shows up as idiosyncratic (T = 5.04)

# US Survivors Equally Weighted

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- Over the sample period, the equally weighted survivor portfolio produced a cumulative return of 7695%, compared to 1585% for the S&P 500.
  - Mean monthly return was 1.38 for the survivors versus .91 for the S&P. Portfolio monthly volatility was essentially identical at 4.60 versus 4.10
  - Annual alpha was 4.9% with a tracking error of 8. The T stat on outperformance was 3.58 (highly statistically significant)
  - Based on the Northfield US Fundamental Model, about 80% of the alpha appeared to be security specific and highly significant (T = 10.18). 20% of alpha was explained by model factors but was not statistically significant.
  - *The results support the investment thesis of sustainability if we know which firms would survive in the future.*

# Performance **Within** Sector

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	Portfolio	S&P 500	Active	S - Impact	SI T
ENERGY	3.71	8.78	-5.07	0	0
FINANCIAL	7.2	15.52	-8.31	0	0.58
TEL&UTILITIES	2.52	10.01	-7.49	0	0.64
TRANSPORTATION	2.11	1.51	0.61	0	<b>2.32</b>
TECHNOLOGY	23.38	16.92	6.46	0.05	<b>2.06</b>
HEALTH	13.55	11.6	1.94	0.01	1.04
CONS_STAPLE	22.87	15.72	7.14	0	-0.06
CONS_DISCRET	6.72	4.42	2.31	0.01	<b>2.56</b>
BASIC INDUSTRY	16.58	12.84	3.75	0.03	<b>2.29</b>
MISC	1.36	2.69	-1.33	0	-0.19

# A Global Picture

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- We conducted a similar analysis of Global equities for the sample period of February 1990 though September 2017.
- The initial universe was about 13,000 equities while there were 3398 survivors, suggesting an annual drop out rate of 4.7%, somewhat lower than the USA.
- We attribute the lower drop out rate to:
  - The initial universe has a smaller representation of small capitalization firms.
  - Non-US government were more willing to have government intervention into failing firms when jobs were at risk.
  - Asia markets had interlocking company structures that insulated incumbent management from merger and acquisition activity.
  - Numerous global markets active now were not in existence at the 1990 start point.

# Global Survivor Performance

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- Measured in US Dollars, the capitalization weighted survivor portfolio had a mean monthly return of .72%, comparable to various traditional benchmarks. Annual volatility was 15.1% comparable to traditional indices.
- The equal weighted survivor portfolio had a mean monthly return of 2.36%, or over 30% annually. Annual volatility was 38%, more than double popular benchmark indices.
- The impact of “guaranteed survival” was of much larger magnitude due to the greater volatility of individual global equities.
- This was particularly important in the consumer sector where many entities are local in nature (e.g. retailers).

# Performance Within Global Sectors

Sector	Equal%	Cap %	Active	S Impact	SI T
INDUSTRIAL SECTOR	46.11	33.37	12.74	0.16	2.27
CONSUMER SECTOR	19.67	18.84	0.83	0.57	2.09
TECHNOLOGY SECTOR	6.41	13.57	-7.17	0.55	1.18
INTEREST RATE SENSITIVE SECTOR	17.77	20.08	-2.31	0.09	3.84
NON-ENERGY MINERALS SECTOR	4.28	3.28	1	0.02	3.12
ENERGY MINERALS SECTOR	1.82	2.17	-0.35	0.01	2.29
HEALTH SECTOR	3.57	8.46	-4.9	0.19	3.24

# How About Imperfect Foresight?

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- The analysis so far indicates that with perfect foresight, survivor portfolios did generally provide good performance, with the equal weighted portfolios holding a large advantage consistent with expectations.
  - There were no pervasive returns to factor exposures either at the style factor or sector level that would account for improved performance relative to traditional benchmarks. Most of the return differences were explained by statistically significant differences in “within sector” performance.
  - Portfolios of survivor firms did not have materially lower volatility than traditional benchmarks.
- The question is whether we can obtain superior performance with imperfect predictions of which firms will survive.

# Predicting Non-Survival

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- diBartolomeo (JOI, 2010) provides a predictive model of firm survival based on a variation of the Merton “contingent claims” framework.
  - Merton (1974) poses the equity of a firm as a European call option on the firm’s assets, with a strike price equal to the face value of the firm’s debt. Alternatively, lenders are short a put on the firm assets. Default can occur only at debt maturity.
  - Black and Cox (1976) provide a “first passage” model. Default can occur before debt maturity. Firm extinction is assumed if asset values hit a boundary value (i.e. specified by bond covenants).
  - Leland (1994) and Leland and Toft (1996) Account for the tax deductibility of interest payments and costs of bankruptcy.

# The Merton Option Exercise

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- Underlying is the firm's assets with asset volatility determined from the factor model as equity volatility adjusted for leverage.
- Solve numerically for the "implied expiration date" of the option that equates the option value to the stock price Market implied expected life of the firm
- See Yaksick (1998) for computation of perpetual American call
- Include a term structure of interest rates so that as the implied expiration date moves around, the interest rate changes appropriately
- If you choose Black-Scholes as your option model, then you can solve BS for the implied time to expiration using a Taylor series approximation
- More complex option models allow for stochastic interest rates

# The Relation to ESG Concept of Sustainability

- diBartolomeo (2010) shows a strong correlation between predicted firm life and inclusion in ESG sensitive indices.
- Relationship confirmed to 2017 in Dyer and Zieff (2017), <http://www.northinfo.com/Documents/771.pdf>.
- Also consistent with studies by Khan (2015) and Kanuri (2015)

Portfolio: High Scoring Material/Sustainability (Value Weighted)								
	Period	Intercept	Market	SMB	HML	UMD	LIQ	Annualized Alpha
Khan, et.al (2015)	April 1993 to December 2013	0.0028** [2.04]	0.9415*** [27.59]	-0.2337*** [-4.19]	0.1136** [2.02]	-0.0163 [-0.39]	0.0837** [1.93]	3.39%

Portfolio: Wide Moat Stocks (Value Weighted)								
	Period	Intercept	K	SMB	HML	RMW	CMA	Annualized Alpha
Kanuri (2015)	June 2002 to May 2014		0.9111*** [22.95]	-0.2793*** [-4.97]	-0.0433 [-0.59]	0.0843 [1.39]	0.1407* [1.66]	2.99%

# US Sustainable Firms Live Performance

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- Dyer and Zieff (2017) calculate the performance of members of the DSI (SRI index) who were not in the S&P 500 against the performance of members of the S&P 500 that were not in the DSI.
  - Mean number of holdings in the DSI but not the S&P500: 156
  - Mean number of holdings in the S&P 500 but not the DSI: 265
  - Portfolio capitalization weighted
- For the period from February 1992 through February 2016, the “DSI only” portfolio outperformed by an average of .24% per month with volatility of 2.27%, T statistic = 1.80.
- This is about 3% per year, consistent with other studies.

# Predictive Strategies for Sustainability

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- For the period February 1992 through February 2016, the return on the S&P 500 was .82 per month with a volatility of 4.11 per month
- Forming a minimum volatility portfolio of firms rated top quintile by the method of diBartolomeo (2010) led to returns of .85 per month with a volatility of 3.57
  - If we lever the top quintile MV portfolio to volatility comparable to the S&P 500, we obtain a return of 1.10% per month.
- Forming a minimum volatility portfolio of firms rated in the bottom quintile provided returns of .92 per month with a volatility of 3.57
  - If we lever the bottom quintile MV portfolio to volatility comparable to the S&P 500, we obtain a return of 1.06% per month. Again annual alpha is in the range of 3%.
- *The small difference in return/risk for the top and bottom quintile sustainability portfolios suggests that the risk model used for optimization was effective in capturing risk differences.*

# Conclusions

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- Our study suggests that the obvious potential benefit of investing in firms that are sustainable is real.
- Multiple concepts used to define what is a sustainable firm have high correlation in practice, creating consistent impacts on investment performance.
- Metrics of firm sustainability whether done from the perspective of ESG, fundamental analysis (e.g. moats) or purely quantitative prediction models, all seem to be beneficial.
- The benefit of firm sustainability arises from superior long term performance, not from material declines in portfolio volatility.
- Traditional risk model factors are not explanatory of the return difference, but are an effective proxy for other measures in guiding sustainable portfolio construction.