



ENVEST INDEX FUND

INVESTMENT THESIS

As the world is evolving, so are investors' expectations regarding the role of corporations towards the well-being of the environment. With growth in Sustainable Investing, there is a greater demand for portfolios to be structured in a way that incorporates social, environmental and governance(ESG) factors. However, some of the factors that the 'S' and 'G' components in ESG constitutes include actual net cash flow per employee, women in management, average age of the board etc. Although the inclusion of these factors is a good metric to measure social and governance policies of the firm, this dilutes the weight of the environment score.

In light of these dynamics, we introduce a novel thematic index, Envest that brings in environmental factors in conjunction with an enhanced value strategy. Majority of the ETFs or fund strategies either integrate ESG or tracks single factors like pollution control, waste management among others. What makes Envest unique is that it directs assets exclusively to the environment theme which these indexes lack.

Fund Profile	
Fund type	Exchange Traded Product
Asset class	Equity
Market cap	Broad Market
Geographic focus	United States
Regulatory structure	Open-End Investment Company
General attribute	Environment
Investment Period	10 years
Target Fund Size	USD 50M
Fees	0.2%
Target Return	15-20%

Broadly Envest has the following objectives:

1. Achieve positive environmental impact along with financial returns
2. Align investors with their personal beliefs
3. Reduce the long-term risk inherent in a portfolio due to environmental changes

INDEX CONSTRUCTION:

Envest is constructed using top 10 percent large-cap US based companies in S&P 500 as part of our in-house research using the following five factors:

1. Total **Greenhouse Gas** emissions measured in millions of metric tons.
2. Total **CO2** Emissions measured in thousands of metric tons, it includes both direct and indirect emissions.
3. **Hazardous waste** measured in tons, it depicts the waste the company discards.
4. Total amount of **water** used measured in thousands of cubic meters; it measures the total supply of water for its operational purpose including process and cleaning water including water retained through recycling.
5. Total **energy consumption** measured in Mega Watt hour, it includes energy directly consumed through combustion and through chemical production in known equipment and in a controlled environment respectively.

These factors are then integrated with an enhanced-value investment strategy.

METHODOLOGY:

- Our objective is to minimize the exposure to the five environmental factors. This entails reducing total greenhouse gas and carbon dioxide emissions by 50 %, energy consumed by 30%, hazardous waste and the amount of water used by 20% in our target portfolio. These factors form the focal point to decide the weight allotted to every stock in the portfolio.
- Starting with 2011, we use price returns and emission standards to form an optimal portfolio allocation. These allocation weights are then tested on the next year returns and the process continues.
- The index is rebalanced annually.
- Following are the constraints used in our optimization model: -

1. The weights of the assets should not deviate more than 2% from their corresponding weight in the S&P 500 Index
2. Reduce the exposure of each of the five factors by the given reduction percentage from our parent.

We have used quadratic convex optimization technique to derive the allocations.

- Since our portfolio is structured to meet the needs of investors with a long-term horizon, we tilt our portfolio towards an **enhanced-value factor**

strategy (handpick cheaply available stocks that shows potential to outperform its peers in the long run).

We integrate our value factor by creating a standardized value score starting with Forward price to earnings (P/E), Price to book value(P/B) and Enterprise value/operating cash flows(EV/CFO).

COST STRUCTURE:

- Outsource real-time data from providers such as Bloomberg, Thomson Reuters, Factset,
- hire 2 research staff to implement portfolio optimization strategies
- hire 2 support staff to solicit emission data from companies by rolling out surveys and questionnaire.
- Approximate annual cost of fund is 2% of the fund size.

TARGET INVESTOR POOL:

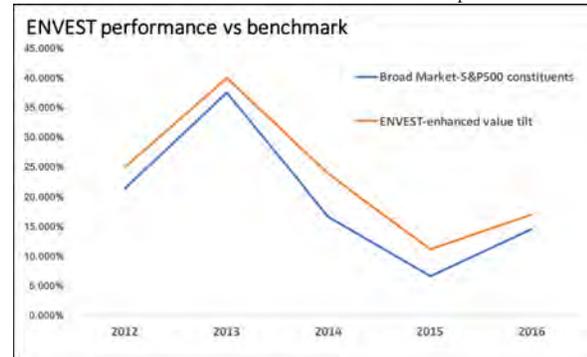
Pension funds, insurance accounts, sovereign wealth funds, endowment funds, investors with a long-term investment horizon.

FUND PERFORMANCE:

We back-tested our model till 2011 against the S&P 500 index and the following are the results we found for the year 2017.

Our analysis depicts that the value fund has been able to outperform S&P constituents' year after year, for a 15-20 bps increase in risk.

These returns might be attributed to greater allocation to companies who are showing an increasing concern to climate change risks, and that market has already started pricing their future potential.



Risk/Return	Fund	Benchmark
Correlation	0.986	-
Beta	0.927	-
Tracking Error	1.95%	-
Information Ratio	0.383	-
Excess Returns 1Y	4.08%	-
Kurtosis 1Y	1.113	1.766
Number of constituents	48	456
Skewness 1Y	0.82	1.05
Maximum Drawdown Risk 1Y	-5.380%	-5.730%

INDUSTRY ALLOCATION

As seen, the exposure to different Industry sectors varies on account of annual rebalancing.

- Consumer Staples and Healthcare show consistently higher allocations
- Materials and Energy sectors have lesser contribution compared to other sectors, because of a low environment score.
- There is a steady increase in allocation to Information Technology, thus signaling their growing concerns to environmental challenges

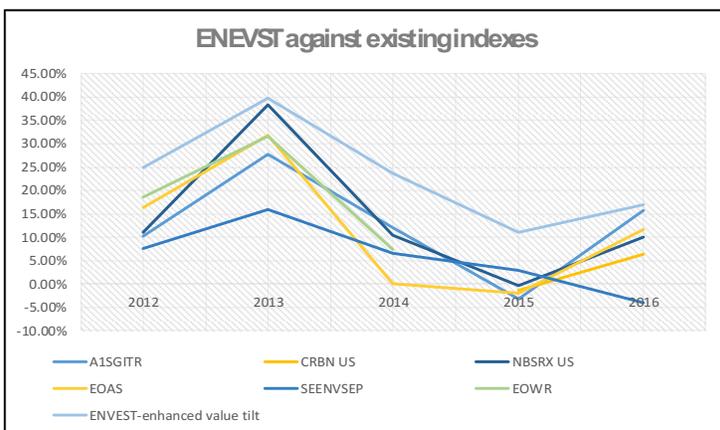
Industry	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016
Consumer Discretionary	22.484%	17.241%	21.758%	12.567%	15.859%	9.724%
Consumer Staples	17.293%	17.181%	14.579%	18.012%	22.445%	16.716%
Energy	3.554%	5.316%	3.669%	0.597%	4.070%	0.395%
Financials	0.000%	10.781%	8.560%	0.000%	1.234%	12.620%
Health Care	32.459%	20.061%	24.973%	29.824%	23.237%	12.771%
Industrials	12.292%	9.895%	17.074%	16.474%	9.832%	21.999%
Information Technology	5.313%	3.308%	6.134%	13.962%	11.436%	14.126%
Materials	0.815%	0.412%	0.000%	0.000%	0.383%	0.682%
Real Estate	3.515%	9.623%	0.000%	2.925%	8.528%	7.543%
Telecommunication Services	1.208%	5.636%	1.967%	0.000%	2.602%	2.838%
Utilities	1.066%	0.545%	1.284%	5.639%	0.375%	0.585%

- Real Estate is grossly neglected in the portfolio throughout history because of underreported data.

PERFORMANCE WITH OTHER POPULAR INDEXES:

A15GITR	Dow Jones Sustainability North America Composite Total Return Index
CRBN US	iShares MSCI ACWI Low Carbon Target ETF(US)
NBSRX US	Neuberger Berman Socially Responsive Fund Class Investor (US)
EOAS	FTSE Environmental opportunities All-Share index
SEENVSEP	STOXX Europe ESG Environmental Leaders Select 30Price EUR
EOWR	FTSE Environmental Opportunities Water Technology Index

Following is a comparison of Envest with other popular Sustainability Indexes. These indexes cover either ESG as a whole or track low carbon or single factors like pollution, waste or water among others.



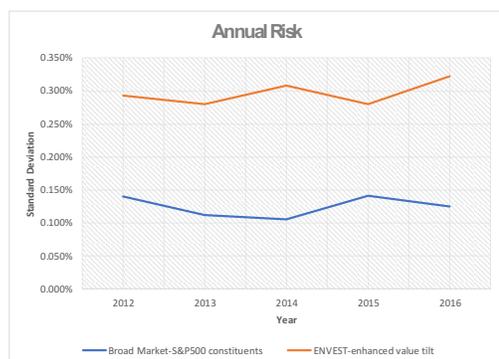
SCALABILITY:

- Diversify our asset universe to support Fixed Income asset class
- Span geographical areas beyond United States.
- Incorporate multifactor strategies and currency hedged indexes in case of cross country allocations.

ASSUMPTIONS:

- We optimize the portfolio starting 2011 since emission data was only available from that year onwards on public domain.
- Missing data was estimated using industry average per unit sales and market cap, and then multiplied by the sales and market cap of the corresponding companies to estimate its total emissions.
- To calculate a standardized z-score for P/B, P/E and EV/CFO, the series is first winsorized, which means the outliers are removed capped to 5th and 95th percentile respectively.
- EV/CFO is considered only for non-financial companies. In case of financial companies, value score is estimated as the weighted average of only Forward P/E and P/B ratios.
- The parent universe are the constituents of S&P 500 as of December 2017. Out of the 505 stocks, we have used those 456 for which price and market cap data were available starting Jan 2011.

RISKS:



1. Input data

- The emission standards available for companies on public domain might not be reliable.

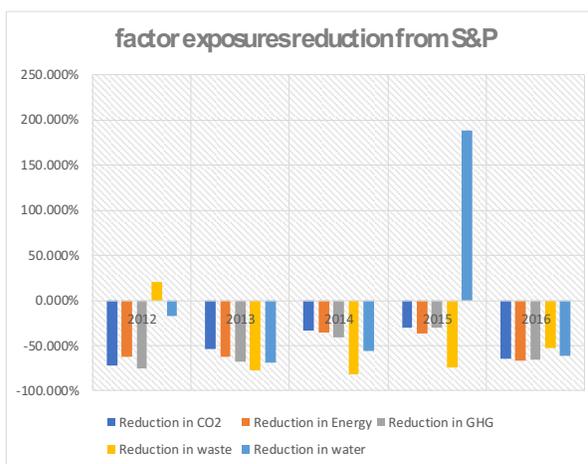
- Only few companies in Real Estate, Consumer Staples and healthcare have reported data related to greenhouse gas emissions.
 - Our estimation of total emissions for missing data, based on industry average, scaled with respect to market cap and revenue might not be robust.
 - Companies have started reporting data as of very recent years (2011). Back-testing of strategies upto 2011 does not give high confidence in results, and might be a part of the same economic cycle.
 - Stress-testing of portfolio based on fat-tailed black-swan events give abnormal returns.
- ### 2. Implementation in other markets and asset classes
- Emerging markets: This approach is difficult to implement in emerging markets due to a greater scarcity of data and underreporting that would credibly incorporate the environment features.
 - Commodities: Production of commodities is often associated with environmental side effects such as mining, pollution etc. making commodities a challenging asset class for Envest.
 - As far as alternative investments are concerned, the reduced transparency and reporting needs makes it contrary to the sustainable investing ideology.

Leading constituents as of 2016	
Walmart Inc	7.169%
HCA Healthcare Inc	4.837%
Tyson Foods Inc	4.531%
Everest Re Group Ltd	4.467%
Assurant Inc	4.233%
International Business Machines Corp	4.050%
Ventas Inc	3.274%
Cummins Inc	3.070%

FUTURE SCOPE

- To structure a more robust index fund that can assimilate different drivers of performance by combining factors such as momentum, quality and low volatility.
 - Impact investing: Looking to integrate impact investing so that investors can invest in green financing projects.
 - Negative screening: Performing regular screening to rule out companies that fail to meet certain social, environment or ethical criteria such as tobacco, gambling, weapons, animal testing to name a few.
- Achieving the objective of a constrained portfolio in emission standards comes at a premium of an increased risk appetite by 10-15 basis points at present. This is a small premium that investors can pay to account for financial risks in their portfolio in the event of increasing regulation on environment factors, for an equivalent level of return.

The following chart depicts the targeted reduction in the 5 environment factors from the parent universe:



Significant Social and Environmental Impact:

As more asset managers switch to a sustainable investing strategy and overweigh environmentally sound companies in their portfolio, companies and business owners will be compelled to change the business model and incorporate new technologies that will reduce their carbon footprint and improve on their energy efficiency.

CITATIONS:

- Data Sources: Bloomberg, Thomson Reuters
- Index methodology references: S&P and MSCI
- Optimization tools: Gurobi
- References:

<https://www.msci.com/www/blog-posts/finding-value-understanding/0189058470>
[http://www.ey.com/Publication/vwLUAssets/EY-climate-change-and-investment/\\$FILE/EY-climate-change-and-investment.pdf](http://www.ey.com/Publication/vwLUAssets/EY-climate-change-and-investment/$FILE/EY-climate-change-and-investment.pdf)
<https://www.blackrock.com/investing/investment-ideas/sustainable-investing>